

HEALTH OUTCOMES DATA FOR BENICIA

Report Date March 2018

SOLANO COUNTY HEALTH SERVICE AREA

The Solano County health service area (HSA) is the 18 ZIP codes which make up Solano County, California. Figure 1 and Table 1 show the Solano County HSA.

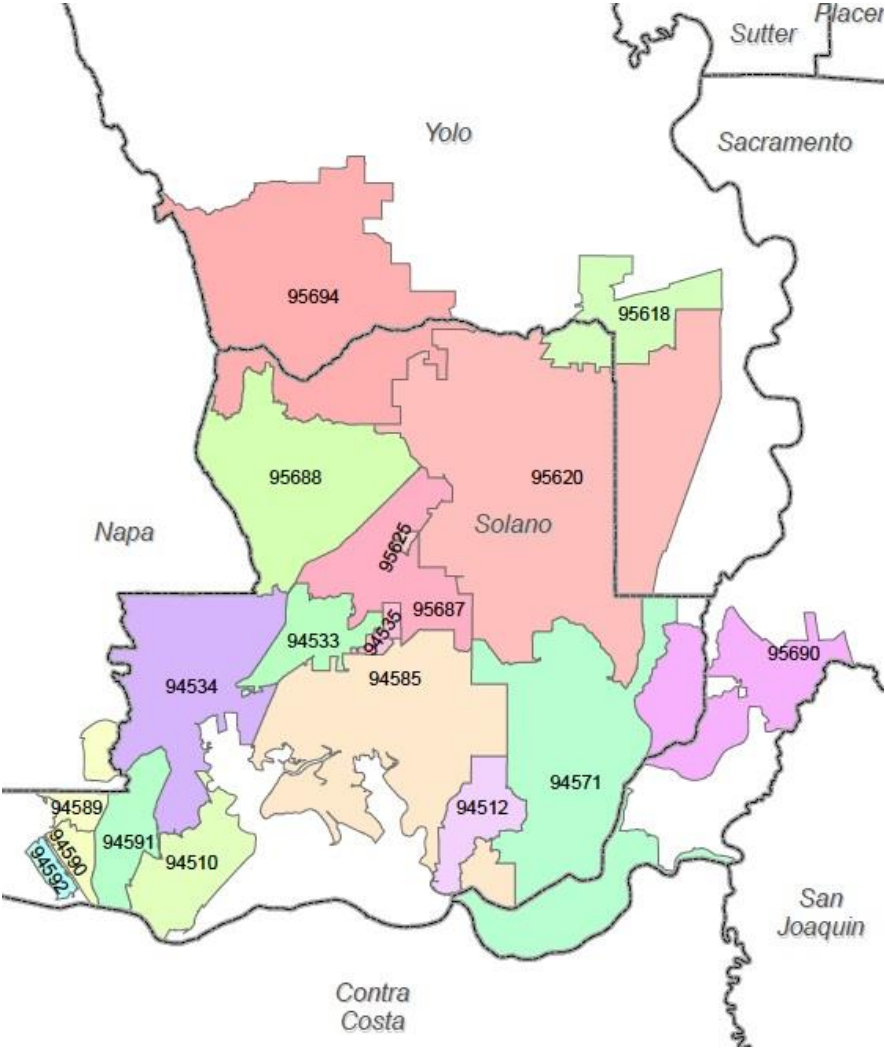


Figure 1: Solano County Health Service Area

Table 1. Solano County ZIP Codes and Corresponding Areas/Communities

ZIP Code	Community/Area
94510	Benicia
95618	Davis
95688	West Vacaville
94534	West Fairfield
95687	East Vacaville
95625	Elmira
94512	Birds Landing
94535	Travis AFB
94592	Mare Island
94571	Rio Vista
95620	Dixon
94585	Suisun City
95694	Winters
94591	East Vallejo
95690	Walnut Grove
94533	East Fairfield
94590	South/Central Vallejo
94589	North Vallejo

Demographics of the HSA

The health service area of Solano County is located in Northern California and has approximately 417 thousand residents. As Tables 2 and 3 show, the area is considerably diverse in population, economic stability (income and poverty), and insurance status. Table 2 shows the total population count for the Solano County HSA, the median age of the HSA, and the median income compared to the state benchmarks. Table 3 provides information on the presence of medically underserved, low income, and minority residents in Solano County.

Population characteristics

Table 2: Census population counts, median age, and median income for the Solano County HSA, compared to the state

Area	Population	Median Age	Median Income
94510	27,294	44.2	\$88,930
94512	231	41.0	\$142,885
94533	69,067	32.9	\$55,413
94534	36,560	39.7	\$92,676
94535	4,728	21.3	\$50,970
94571	8,025	56.9	\$54,223
94585	28,823	32.8	\$70,374
94589	30,364	36.8	\$56,068
94590	35,263	37.4	\$41,819
94591	53,548	40.1	\$73,509
94592	562	38.0	\$105,352
95690	2,015	46.1	\$61,150
95694	10,008	40.8	\$55,163
95618	27,262	29.5	\$82,313
95620	20,845	34.6	\$71,261
95625	188	30.4	\$75,114
95687	66,129	38.0	\$73,583
95688	34,599	38.4	\$79,452
<i>Solano County</i>	417,258	37.1 years	\$67,177
<i>CA State</i>	37,659,181	35.4 years	\$61,094

Source: 2013 American Community Survey 5-year Estimates

Note: The population of Solano County makes up 1% of all residents in the State of California.

Table 3: Percent living below federal poverty level, percent uninsured and percent minority for the Solano County HSA

Area	Percent below Federal poverty (less than or equal to 100% FPL)	Percent Uninsured	Percent Minority (Hispanic or non-White)
94510	5.7%	8.6%	36.4%
94512	0.0%	0.0%	52.4%
94533	17.9%	14.6%	70.9%
94534	5.4%	6.9%	53.2%
94535	12.7%	0.9%	34.1%
94571	10.9%	21.2%	31.3%
94585	13.4%	11.6%	76.0%
94589	17.7%	20.7%	83.6%
94590	25.0%	20.9%	70.6%
94591	12.5%	12.4%	72.7%
94592	6.0%	3.7%	58.2%
95690	14.0%	11.8%	52.6%
95694	10.7%	16.6%	51.1%
95618	18.8%	5.9%	41.8%
95620	11.2%	14.7%	49.7%
95625	11.7%	0.0%	0.0%
95687	9.1%	8.4%	46.4%
95688	10.1%	11.3%	37.1%
<i>Solano County</i>	13.0%	12.9%	59.5%
<i>CA State</i>	15.9%	17.8%	60.3%

Source: 2013 American Community Survey 5-year Estimates

*Values shaded in blue are those that fall above or below the desired direction in comparison to the county, state or national benchmarks.

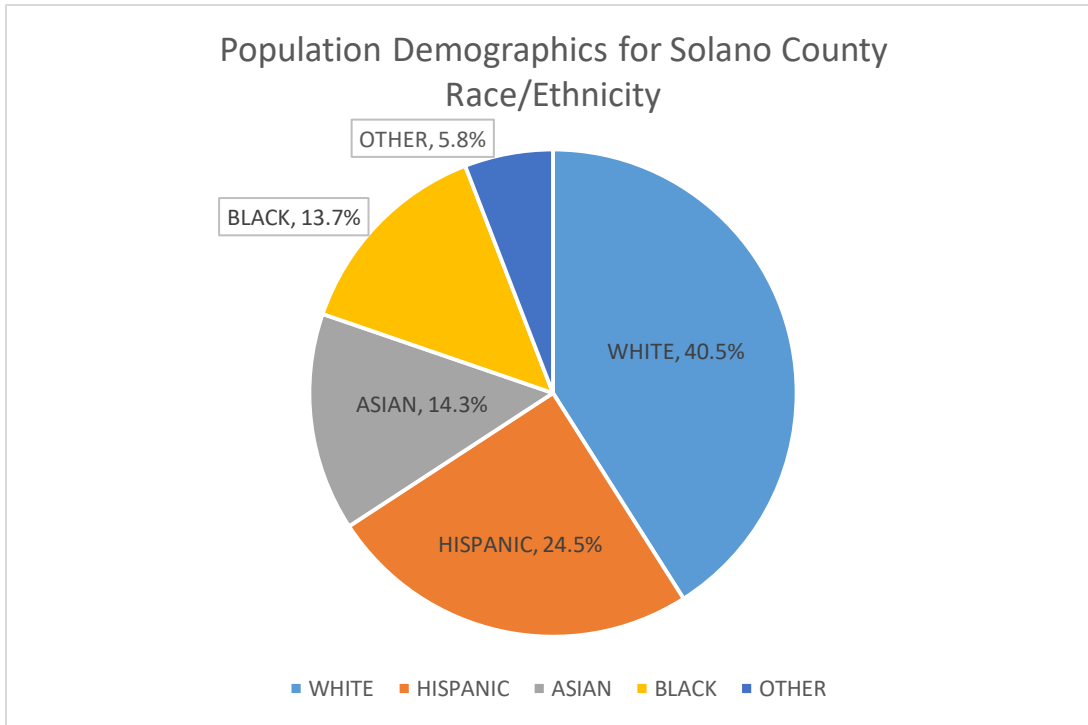


Figure 2: Population demographics for Solano County by race/ethnicity
Source: 2013 American Community Survey, 5-year Estimates

Demographic data for the Solano HSA showed that Whites make up the highest percent of residents in Solano County, followed by Hispanics, Asians and Blacks.

Outcome Data for the HSA

Mortality data were primarily obtained from the California Department of Public Health (CDPH), and morbidity data were primarily obtained from Office of Statewide Health Planning and Development (OSHPD). These data were processed to result in a set of indicators for risk behaviors, disease/injury, and mortality. Data from CDPH were used to develop mortality rates and broader measures of health status for each ZIP code in the HSA. Data from OSHPD were used to develop hospitalization (H) and emergency department (ED) discharge rates for each ZIP code in the HSA. The majority of indicators pertaining to living conditions and other “upstream” factors in the report were obtained from the US Census Bureau. These indicators primarily focus on the socio-demographic characteristics of the population within the HSA, and are also listed in Appendix A. Health outcome and health behaviors were also collected from the Kaiser Permanente Community Commons Data Platform (CCDP) to compliment the indicators already collected from additional sources. Indicators in the CCDP were only selected for final analysis and inclusion if they did not duplicate indicators that were pulled from other sources. A detailed list of indicators collected is in Appendix A, Data Dictionary and Processing.

The secondary data were processed in multiple stages before they were analyzed. The three basic processing steps included rate smoothing, age-adjustment and obtainment of benchmark rates. A detailed description of this process is outlined in Appendix A, Data Dictionary and Processing.

Some data were only available at a county level, making an assessment of health needs at a neighborhood level challenging. Furthermore, disaggregated data around age, ethnicity, race, and gender are not available for all data indicators, which limited the ability to examine disparities of health within the community. Lastly, data are not always collected on a yearly basis, meaning that some data are several years old.

Mortality and Morbidity (Disease and Injury) in Solano County

Examination of health outcomes included measures of illness (morbidity) and death (mortality) including communicable and non-communicable diseases and injuries. The conditions examined included: chronic disease, cancer, respiratory health, mental health, substance abuse, sexually-transmitted diseases (including HIV/AIDS), tuberculosis, and dental health, along with unintentional and self-inflicted injuries.

Overall Health Status: Rates of Age-adjusted All-Cause Mortality, Infant Mortality and Life Expectancy at Birth

These health status indicators provide information about the overall health status of the Solano County community. Though specific measures of mortality show how communities suffer from specific conditions, overall health status indicators communicate length of life, quality of life, socioeconomic factors, and the intersection of the environment and personal behaviors. Table 4 examines three common overall health status indicators: age-adjusted all-cause mortality, infant mortality, and life expectancy at birth for each of the Solano County ZIP codes. Throughout the entire report: Values in blue are those that fall above or below the desired direction in comparison to county, state or national benchmarks; tables that contain a “0” indicate that the rate for that ZIP code was zero or that data were not provided by OSHPD due to small cell counts (less than 5). Additionally, tables with a “N/A” notation indicate that data were missing or unavailable for that ZIP code.

Table 4: Overall health status indicators: Age-adjusted all-cause mortality, infant mortality, and life expectancy at birth

Overall Health Status Indicators	ZIP Code	Age-Adjusted All-Cause Mortality (per 10,000 pop)	Infant Mortality Rate (per 1,000 live births)	Life Expectancy at Birth (years)
	94510	68.35	4.47	80.68
	94512	0.00	0.00	N/A
	94533*	78.86	5.10	77.45
	94534	63.71	4.62	81.04
	94535	0.00	4.72	N/A
	94571*	59.57	0.00	81.07
	94585	68.88	5.06	81.60
	94589*	68.98	4.75	78.98
	94590*	76.05	4.61	77.29
	94591*	63.68	5.19	79.87
	94592	0.00	0.00	N/A
	95690	62.40	0.00	79.04
	95694	64.27	4.55	80.54
	95618	54.23	4.49	83.59
	95620	54.32	4.20	82.88
	95625	0.00	0.00	N/A
	95687	80.93	4.65	78.16
	95688*	64.61	4.67	79.90
	<i>Solano County</i>	70.83	5.50	79.11
<i>CA State</i>	64.60	4.90	80.50	
<i>National 2013</i>	N/A	N/A	78.80	
<i>Healthy People 2020 Target</i>	N/A	6.00	N/A	

Source: CDPH, 2010-2012

*Indicates Focus Community

Chronic Diseases -- Diabetes, Heart Disease, Stroke, Hypertension and Kidney Disease

Both primary and secondary data indicated that most chronic illnesses are common in the Solano County health service area (HSA).

Diabetes

Diabetes was the seventh leading cause of death nationally in 2013. Quantitative findings showed clear geographic health disparities across the Solano County HSA. Table 5 displays rates of mortality, emergency departments (ED) visits, and hospitalizations (H) due to diabetes for each ZIP code in Solano County.

Table 5: Mortality, ED visit, and hospitalization rates for diabetes compared to county, state, and Healthy People 2020 benchmarks (rates per 10,000 population)

	ZIP Code	Mortality	Age-Adjusted ED Visits	Age-Adjusted Hospitalizations
Diabetes	94510	2.26	199.41	117.45
	94512	0.00	87.06	133.75
	94533*	2.61	423.03	255.59
	94534	2.03	199.96	135.41
	94535	0.00	84.13	97.65
	94571*	2.84	199.70	167.82
	94585	1.84	310.40	212.19
	94589*	3.01	545.31	260.74
	94590*	2.76	663.37	281.21
	94591*	2.19	367.11	182.60
	94592	0.00	195.95	124.54
	95690	0.00	167.35	175.72
	95694	0.00	253.32	144.25
	95618	1.51	118.82	76.11
	95620	2.19	267.22	151.58
	95625	0.00	221.28	143.26
	95687	2.03	267.57	168.15
	95688*	1.84	268.21	217.14
	<i>Solano County</i>	2.56	342.51	194.13
	<i>CA State</i>	2.11	209.15	192.30
<i>Healthy People 2020 Target</i>	6.60	N/A	N/A	

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

*Indicates Focus Community

Heart Disease

Heart disease is the leading cause of death in the nation for individuals under the age of 85, and includes a number of different types of heart-related conditions, with coronary heart disease being the most common and a major cause of heart attacks. Nationwide, more than 600,000 people die of heart disease each year. Table 6 examines rates for mortality, ED visits, and hospitalizations due to heart disease.

Table 6: Mortality, ED visit and hospitalization rates for heart disease compared to county, state, and Healthy People 2020 benchmarks (rates per 10,000 population)

	ZIP Code	Mortality	Age-adjusted ED Visits	Age-adjusted Hospitalizations
Heart Disease	94510	11.23	207.57	191.89
	94512	0.00	45.19	168.51
	94533*	16.32	252.45	275.53
	94534	11.25	174.35	194.85
	94535	0.00	33.62	47.82
	94571*	28.88	152.06	204.53
	94585	9.06	210.97	235.47
	94589*	15.14	327.93	266.45
	94590*	19.90	403.83	319.57
	94591*	14.29	270.13	219.46
	94592	0.00	135.48	131.94
	95690	19.07	156.49	254.42
	95694	12.43	198.82	163.49
	95618	7.50	97.42	113.50
	95620	10.13	165.15	164.89
	95625	0.00	125.12	147.26
	95687	11.78	244.38	228.83
	95688*	9.62	239.47	280.72
	<i>Solano County</i>	13.23	246.40	234.79
	<i>CA State</i>	15.82	112.64	222.00
<i>Healthy People 2020 Target</i>	10.10	N/A	N/A	

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

*Indicates Focus Community

Table 7: Mortality, ED visit and hospitalization rates for stroke compared to county, state, and Healthy People 2020 benchmarks (rates per 10,000 population)

Stroke	ZIP Code	Mortality	Age-Adjusted ED Visits	Age-Adjusted Hospitalizations
	94510	3.87	42.01	48.57
94512	0.00	4.63	17.94	
94533*	3.60	47.82	71.87	
94534	3.22	37.10	45.62	
94535	0.00	0.00	0.64	
94571*	4.48	24.91	38.16	
94585	3.28	37.88	59.80	
94589*	5.01	65.06	74.51	
94590*	3.67	72.39	78.32	
94591*	4.03	55.59	61.50	
94592	0.00	17.05	33.50	
95690	4.80	17.85	46.42	
95694	3.77	27.55	41.54	
95618	2.31	20.80	29.76	
95620	4.28	30.07	47.63	
95625	0.00	9.70	29.80	
95687	2.79	44.84	51.60	
95688*	3.71	44.06	64.77	
<i>Solano County</i>	3.67	48.71	59.30	
<i>CA State</i>	3.60	18.55	52.23	
<i>Healthy People 2020 Target</i>	3.40	N/A	N/A	

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

*Indicates Focus Community

Table 8: Mortality, ED visit and hospitalization rates for hypertension compared to county and state benchmarks (rates per 10,000 population)

Hypertension	ZIP Code	Mortality	ED Visits	Hospitalizations
		94510	1.04	518.58
	94512	0.00	177.29	197.70
	94533*	1.11	812.33	463.84
	94534	1.28	471.13	304.45
	94535	0.00	178.31	160.26
	94571*	1.38	474.27	342.28
	94585	1.52	674.70	398.74
	94589*	0.86	1088.87	449.31
	94590*	0.00	1326.25	515.34
	94591*	1.55	791.77	350.85
	94592	0.00	553.06	343.74
	95690	0.00	427.52	406.43
	95694	0.00	515.71	264.10
	95618	1.18	299.42	181.52
	95620	0.99	513.23	274.60
	95625	0.00	518.11	380.86
	95687	1.21	587.33	358.80
	95688*	1.07	631.85	486.77
	Solano County	N/A**	724.05	385.16
	CA State	1.21	408.99	383.74

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

*Indicates Focus Community

**CDPH data on mortality due to Hypertension for the County was not available

Table 4: Mortality, ED visit and hospitalization rates for kidney disease compared to county and state benchmarks (rates per 10,000 population)

Kidney Disease	ZIP Code	Mortality	Age-Adjusted ED Visits+	Age-Adjusted Hospitalizations+
		94510	0.00	115.61
	94512	0.00	12.36	26.29
	94533*	0.96	159.57	232.85
	94534	0.56	111.49	149.57
	94535	0.00	0.05	28.91
	94571*	0.78	90.06	145.87
	94585	0.92	140.49	203.27
	94589*	1.21	238.16	238.98
	94590*	0.97	267.99	267.13
	94591*	0.82	165.79	178.43
	94592	0.00	96.19	171.54
	95690	0.00	59.13	155.59
	95694	0.00	109.88	120.33
	95618	0.73	46.17	86.45
	95620	0.90	90.74	121.10
	95625	0.00	41.61	104.99
	95687	0.74	156.09	183.22
	95688*	0.87	135.32	226.47
	<i>Solano County</i>	N/A	156.84	190.83
	<i>CA State</i>	0.73	57.09	160.01

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

+OSHPD data includes data for nephritis, nephrotic syndrome, and nephrosis

*Indicates Focus Community

Cancer -- Incidence, ED visit, Hospitalization, Mortality and Screening Rates by Specific Cause of Cancer

Cancer is one of the leading causes of death in the nation, with more than 8% of the population receiving a cancer diagnosis at least once in their lifetime. In an attempt to gain a better understanding of how Solano County is affected by cancer, the assessment included the examination of cancer incidence for female breast, colorectal, lung and prostate cancers at the ZIP code level. All-cause cancer mortality and ED visits and hospitalizations for specific causes of cancer are also examined by ZIP code and included lung cancer, colorectal cancer, prostate cancer, and female breast cancer. These specific cancers were chosen for this assessment because they are among the leading causes of new cases and/or of deaths related to cancer among Americans today. Screening rates for breast cancer, cervical cancer and colorectal cancer were also examined at the HSA level.

Rates -- Breast (female), colorectal, lung, and prostate cancer incidence

Cancer incidence communicates risk for cancer within the Solano County communities. Table 10 shows incidence rates for female breast, colorectal, lung and prostate cancers for each of the ZIP codes in Solano County. Rates for each ZIP code are compared to the state benchmark as well as the Solano County HSA rate, which is an aggregate of all 18 ZIP codes within the HSA.

Table 10: Cancer incidence (new cases) for female breast cancer, colorectal cancer, lung cancer and prostate cancer (rates per 10,000 population)

Cancer Incidence	ZIP Code	Breast-Female	Colorectal	Lung	Prostate
		94510	25.49	2.92	6.51
	94512	N/A	N/A	N/A	N/A
	94533*	16.80	4.19	5.01	12.24
	94534	20.65	4.12	3.98	16.63
	94535	N/A	N/A	N/A	N/A
	94571*	30.00	5.47	8.02	24.93
	94585	12.92	3.13	3.87	12.89
	94589*	18.23	4.40	6.85	14.51
	94590*	19.93	5.01	7.00	16.79
	94591*	18.35	4.37	6.22	18.75
	94592	N/A	N/A	N/A	N/A
	95690	21.73	N/A	N/A	15.68
	95694	11.07	3.76	N/A	13.14
	95618	16.44	2.78	2.11	9.52
	95620	16.15	3.77	5.49	11.36
	95625	N/A	N/A	N/A	N/A
	95687	20.61	3.72	6.23	9.96
	95688*	18.37	4.14	5.85	25.00
	<i>Solano County HSA</i>	18.75	4.01	5.45	14.89
	<i>CA State</i>	13.16	3.88	4.54	11.61

Source: California Cancer Registry, 2010-2012

*Indicates Focus Community

Rates -- All-cause cancer mortality and lung cancer ED visits and hospitalizations

An all-cause cancer mortality rate shows the overall effect of cancer as an illness in Solano County. Unfortunately, mortality data for specific cancers are not available at the sub-county level, and therefore are not included in this assessment. However, ED visits and hospitalization rates due to lung cancer are reported in Table 11, followed by rates for colorectal, prostate and female breast cancer in Table 12.

Table 11: Mortality rates for all-cause cancer, and ED visits and hospitalization rates for lung cancer compared to county, state, and Healthy People 2020 benchmarks (rates per 10,000 population)

ZIP Code	Mortality All-Cause Cancer	ED Visits Lung Cancer	Hospitalizations Lung Cancer
94510	17.59	6.99	10.02
94512	0.00	3.49	9.97
94533*	16.84	6.19	8.44
94534	15.51	5.92	7.43
94535	0.00	2.74	3.71
94571*	31.62	6.59	11.80
94585	13.15	2.75	8.58
94589*	17.86	7.93	11.52
94590*	18.17	10.12	15.74
94591*	17.06	10.65	11.96
94592	0.00	4.08	8.70
95690	15.18	2.93	12.16
95694	16.70	3.25	4.79
95618	12.64	0.51	2.58
95620	12.74	4.00	7.18
95625	0.00	0.00	0.00
95687	23.29	5.02	8.12
95688*	17.42	4.14	12.24
<i>Solano County</i>	18.18	6.80	10.06
<i>CA State</i>	15.41	2.68	7.95
<i>Healthy People 2020</i>	16.10	N/A	N/A

Source: Mortality: CDPH, 2012; ED visits: OSHPD, 2011-2013

*Indicates Focus Community

Rates -- Female breast, colorectal, prostate cancer ED visit and hospitalizations

A lack of access to primary health care greatly effects the risk for late diagnosis of cancer. It is especially crucial for those cancers for which early diagnosis and prevention are important in order to reduce further related morbidity and mortality. Table 12 examines ED visit and hospitalizations related to female breast cancer, colorectal cancer (male and female) and prostate cancer.

Table 5: Rates of ED visits and hospitalizations for female breast cancer, colorectal cancer, and prostate cancer (rates per 10,000 population)

ZIP Code	ED visits Female Breast Cancer	Hospitalization Female Breast Cancer	ED visits Colorectal Cancer	Hospitalization Colorectal Cancer	ED visits Prostate Cancer	Hospitalization Prostate Cancer
94510	15.19	11.02	2.56	4.87	13.22	14.18
94512	0.00	11.46	0.00	0.00	8.51	0.00
94533*	14.76	9.33	3.38	6.36	12.32	11.73
94534	16.24	11.08	1.85	5.89	13.53	14.27
94535	0.00	0.00	0.00	2.79	0.00	0.00
94571*	9.99	16.70	3.05	9.04	22.83	22.96
94585	9.99	9.14	2.82	4.81	6.23	7.51
94589*	11.84	12.37	4.21	7.09	17.27	9.98
94590*	38.28	21.24	7.63	8.12	21.93	12.78
94591*	16.49	10.06	3.56	7.62	17.88	14.37
94592	7.15	0.00	0.00	0.00	0.00	0.00
95690	6.42	12.28	3.19	5.92	4.78	18.35
95694	4.11	9.37	3.77	6.98	12.21	7.60
95618	6.78	7.35	0.94	3.12	4.04	7.68
95620	14.16	10.47	2.05	5.36	7.00	9.97
95625	0.00	0.00	2.40	13.82	0.00	0.00
95687	15.13	10.66	3.57	6.16	11.18	8.88
95688*	13.67	11.12	3.02	10.51	11.03	21.01
<i>Solano County</i>	17.09	11.51	3.69	6.79	13.68	12.24
<i>CA State</i>	6.59	11.07	1.85	6.43	5.79	12.37

Source: OSHPD, 2011-2013

*Indicates Focus Community

Respiratory Health – Chronic Obstructive Pulmonary Disease (COPD), Asthma, and Tuberculosis

COPD is a progressive lung disease that makes it very hard to breathe and refers to the two main conditions of emphysema and chronic bronchitis. Tobacco smoking is the biggest risk factor for COPD. As many as 6.8 million people have COPD at the national level. Tuberculosis (TB) is a respiratory condition caused by a bacterium called Mycobacterium tuberculosis. In an effort to understand the impact of respiratory illness in Solano County, mortality rates for chronic lower respiratory disease (CLRD) are presented in Table 13 along with rates of ED visits and hospitalizations related to COPD. Rates of ED visits and hospitalizations due specifically to asthma are examined independently in Table 14.

Table 6: Mortality rates due to chronic lower respiratory disease, ED visits and hospitalization rates due to COPD compared to county, state, and Healthy People benchmarks (rates per 10,000 population)

	ZIP Code	Mortality CLRD	ED Visits COPD	Hospitalizations COPD
	Chronic Lower Respiratory Disease (CLRD) & Chronic Obstructive Pulmonary Disease (COPD)	94510	3.62	289.57
94512		0.00	113.66	84.38
94533*		4.24	447.79	205.95
94534		3.79	240.54	133.48
94535		0.00	20.15	27.09
94571*		4.22	385.00	313.14
94585		2.39	326.38	148.78
94589*		5.99	529.97	221.34
94590*		4.11	700.55	261.52
94591*		3.57	404.94	170.00
94592		0.00	319.18	115.33
95690		0.00	217.27	230.07
95694		2.18	181.55	122.18
95618		2.00	99.05	70.40
95620		2.39	229.01	126.76
95625		0.00	989.82	326.84
95687		4.84	319.39	166.11
95688*		4.17	341.39	232.43
<i>Solano County</i>		4.18	384.51	183.83
<i>CA State</i>		3.46	218.3	154.44
<i>Healthy People 2020</i>	N/A	56.80	50.10	

Source: Mortality: CDPH, 2012; ED visits: OSHPD, 2011-2013

*Indicates Focus Community

Rates -- ED visits and hospitalizations due to Asthma

Asthma is one of the leading health issues in the US. National data indicate that one in 12 adults and one in 11 children have asthma. Table 14 examines ED visits and hospitalizations due to asthma (all ages) in Solano County.

Table 7: ED visit and hospitalization rates due to asthma compared to county and state benchmarks (rates per 10,000 population)

Asthma	ZIP Code	ED Visits	Hospitalizations
		94510	202.13
	94512	83.01	0.00
	94533*	333.64	116.90
	94534	184.17	81.52
	94535	13.35	21.67
	94571*	256.24	137.64
	94585	255.00	93.89
	94589*	375.27	120.07
	94590*	470.83	131.67
	94591*	291.99	100.54
	94592	238.09	84.74
	95690	110.42	98.91
	95694	119.94	72.84
	95618	57.13	43.60
	95620	160.19	79.35
	95625	841.33	176.76
	95687	221.48	88.85
	95688*	254.32	120.87
	<i>Solano County</i>	276.21	102.22
	<i>CA State</i>	148.86	70.55

Source: OSHPD, 2011-2013

*Indicates Focus Community

Mental Health

Mental illness is defined as “health conditions that are characterized by alterations in thinking, mood, or behavior (or some combination thereof) associated with distress and/or impaired functioning.” Depression is the most common type of mental illness in the United States and by 2020 will be the second leading cause of disability worldwide. Mental illness is strongly correlated with many risks for chronic diseases, such as physical inactivity, smoking, excessive drinking, and insufficient sleep. Mental health data at the sub-county level is difficult to obtain. ED visits and hospitalizations due to mental health conditions are provided in Table 15 as a way of examining mental health in the HSA.

Table 8: ED visit and hospitalization rates due to mental health issues compared to county and state benchmarks (rates per 10,000 population)

Mental Health	ZIP Code	ED Visits	Hospitalizations
		94510	259.24
	94512	91.34	109.80
	94533*	259.14	186.82
	94534	153.77	110.47
	94535	12.44	27.20
	94571*	293.13	281.61
	94585	188.99	141.65
	94589*	373.68	208.45
	94590*	522.80	252.42
	94591*	283.46	152.65
	94592	272.90	158.46
	95690	167.20	150.76
	95694	148.55	115.95
	95618	106.13	91.48
	95620	160.04	126.71
	95625	803.13	346.79
	95687	227.13	154.28
	95688*	230.35	200.83
	<i>Solano County</i>	263.42	169.96
	<i>CA State</i>	149.93	186.92

Source: OSHPD, 2011-2013

*Indicates Focus Community

Dental Health

Oral health is important to overall quality of life. Data used in this assessment to examine the status of oral health in the Solano County HSA included rates of ED visits and hospitalizations related to dental conditions. These data are dated from 2011 – 2013, before the reinstatement of dental coverage under the state Medicaid (Medi-Cal) program.

Table 9: ED visit and hospitalization rates due to dental issues compared to county and state benchmarks (rates per 10,000 population)

Dental Health	ZIP Code	ED Visits	Hospitalizations
	94510	27.17	6.74
	94512	32.32	0.00
	94533*	102.77	10.72
	94534	21.63	4.87
	94535	6.82	3.70
	94571*	39.85	10.52
	94585	63.76	6.05
	94589*	83.13	8.39
	94590*	147.22	12.30
	94591*	59.43	8.31
	94592	40.25	7.47
	95690	32.08	8.00
	95694	38.71	5.76
	95618	17.54	4.88
	95620	37.98	6.77
	95625	195.28	8.39
	95687	49.86	7.82
	95688*	45.45	9.90
	<i>Solano County</i>	65.59	8.43
<i>CA State</i>	41.34	7.81	

Source: OSHPD, 2011-2013

*Indicates Focus Community

Injury -- Intentional (Suicide and Self- inflicted injury) and Unintentional

In 2013, suicide was the 10th leading cause of death nationally, and the second leading cause of death for Americans 15-34 years of age. Unintentional injuries were the third leading cause of death overall but the first leading cause of death for Americans 1-44 years of age. Unintentional injuries are defined as “predictable and preventable when proper safety precautions are taken” and not considered accidents.

Table 17: Mortality rates due to suicide and ED visits and hospitalization rates due to self-inflicted injury compared to county, state, and Healthy People 2020 benchmarks (rates per 10,000 population)

Suicide/Self-Inflicted Injury	ZIP Code	Mortality	ED Visits	Hospitalizations
	94510	1.06	8.81	2.51
	94512	0.00	0.00	6.44
	94533*	0.73	14.50	3.68
	94534	0.62	5.99	2.36
	94535	0.00	2.18	2.08
	94571*	1.33	10.78	4.31
	94585	0.00	8.39	3.00
	94589*	0.83	12.37	2.31
	94590*	0.93	15.23	5.72
	94591*	0.85	7.59	2.67
	94592	0.00	9.32	4.65
	95690	0.00	8.25	3.18
	95694	0.00	9.75	3.35
	95618	1.25	5.05	2.69
	95620	0.00	8.54	3.21
	95625	0.00	14.83	0.00
	95687	1.36	10.08	4.22
	95688*	1.86	16.60	6.71
	<i>Solano County</i>	0.94	10.94	3.63
<i>CA State</i>	1.04	8.18	4.40	
<i>Healthy People 2020</i>	1.00	N/A	N/A	

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

*Indicates Focus Community

Table 18: Mortality, ED visit and hospitalization rates due to unintentional injury compared to county and state benchmarks (rates per 10,000 population)

Unintentional Injury	ZIP Code	Mortality	ED Visits	Hospitalizations
	94510	2.17	738.31	138.08
	94512	0.00	532.99	176.92
	94533*	2.60	1124.02	177.96
	94534	2.19	629.21	132.15
	94535	0.00	102.93	28.25
	94571*	2.74	742.17	278.87
	94585	1.84	841.27	129.02
	94589*	3.32	1076.99	171.94
	94590*	3.89	1522.23	210.52
	94591*	3.14	911.13	149.90
	94592	0.00	995.98	163.19
	95690	3.76	634.11	215.10
	95694	2.08	644.23	115.40
	95618	1.71	407.75	68.78
	95620	2.59	762.98	125.27
	95625	0.00	2252.02	217.92
	95687	3.01	802.35	143.61
	95688*	1.84	1005.20	220.20
	<i>Solano County</i>	2.63	935.70	161.45
<i>CA State</i>	2.88	666.38	154.85	
<i>Healthy People 2020</i>	3.40	N/A	N/A	

Sources: Mortality: CDPH, 2012; ED visits and hospitalizations: OSHPD, 2011-2013

*Indicates Focus Community

Risk Behaviors and Living Conditions in Solano County

Risk behaviors contribute to increased risk for morbidity and mortality of most health conditions in a community, and are often the focus of community-based health promotion efforts. These risk behaviors include smoking, poor nutrition, physical inactivity, violent behavior, alcohol and drug usage, and risky sexual behaviors. In order to gain a clear understanding of reasons behind why individuals engage in risky behavior it is equally important to consider the conditions in which they live. These living conditions include the physical, social, economic/work, and service environment.

Substance Abuse

Substance abuse, specifically the use of alcohol and drugs, is a leading preventable cause of death in the United States, costing states millions of dollars each year in treatment costs. Alcohol impaired driving is the cause of 33% of all fatal car accidents. This assessment included examination of multiple indicators addressing substance abuse. The indicators presented here include: ED visits and hospitalizations due to substance abuse by ZIP code, alcohol and tobacco smoking prevalence, liquor store access and percent of household expenditures for alcohol and tobacco. Prescription drug abuse has also become a major problem for adults nationally.

Table 19: ED visit and hospitalization rates due to substance abuse compared to county and state benchmarks (rates per 10,000 population)

	ZIP Code	ED Visits	Hospitalizations
Substance Abuse+	94510	334.28	113.76
	94512	157.41	128.56
	94533*	421.38	181.09
	94534	160.20	74.79
	94535	27.13	25.61
	94571*	312.93	205.94
	94585	307.28	135.32
	94589*	762.71	186.08
	94590*	1480.94	312.17
	94591*	550.91	134.68
	94592	285.17	106.83
	95690	271.85	174.89
	95694	265.58	103.96
	95618	127.60	44.17
	95620	291.83	103.97
	95625	942.30	285.86
	95687	268.81	120.95
	95688*	289.65	195.15
	<i>Solano County</i>	466.25	155.25
	<i>CA State</i>	253.80	145.00

Source: OSHPD, 2011-2013, +coded under **Mental Health codes**

*Indicates Focus Community

Table 20: ED visit and hospitalization rates due to STDs and HIV/AIDS compared to county and state benchmarks (rates per 10,000 population)

	ZIP Code	ED visits STIs	Hospitalizations STIs	ED visits HIV/AIDS+	Hospitalizations HIV/AIDS+
	Sexually Transmitted Infections	94510	1.74	1.39	1.11
94512		0.00	0.00	0.00	0.00
94533*		7.58	4.35	4.39	2.80
94534		1.13	2.61	0.66	1.40
94535		0.00	0.00	0.00	0.00
94571*		3.01	3.47	1.31	2.60
94585		2.43	3.12	1.27	1.85
94589*		11.66	7.67	5.41	5.01
94590*		15.51	9.30	6.72	7.50
94591*		5.67	4.80	2.15	4.16
94592		22.39	12.64	18.58	12.79
95690		3.30	0.00	0.00	0.00
95694		1.76	0.81	0.40	0.00
95618		0.42	1.05	0.15	0.28
95620		1.17	1.98	0.00	1.32
95625		0.00	0.00	0.00	0.00
95687		1.84	2.30	0.62	1.33
95688*		2.72	8.01	1.94	6.47
<i>Solano County</i>		5.21	4.43	2.50	3.16
<i>CA State</i>		3.20	4.58	1.95	3.36

Source: OSHPD, 2011-2013

+HIV/AIDS is considered a subcategory of STIs in the ICD 9 diagnostic codes.

*Indicates Focus Community

Housing Stability – Percent housing vacancy, people per housing unit and percent renting

Stable, clean and affordable housing is an essential public health need. The lack of a stable place to live can have negative health effects on individuals and families, making it hard to manage daily life responsibilities. Table 21 shows rates for various indicators of housing stability by ZIP code for Solano County.

Table 10: Housing vacancy, people living per housing unit, and percent of population renting by ZIP code

ZIP Code	Percent Housing Vacancy	People per Housing Unit	Percent Renting
94510	6.4	2.54	31.1
94512	0.0	2.75	47.6
94533*	7.5	3.04	48.6
94534	2.3	2.87	24.1
94535	10.0	3.50	99.0
94571*	10.6	2.09	28.9
94585	4.3	3.22	33.8
94589*	8.9	3.18	37.5
94590*	16.2	2.51	56.2
94591*	9.8	2.92	32.1
94592	16.3	2.61	5.6
95690	20.4	2.73	36.4
95694	2.5	2.86	41.8
95618	4.6	2.85	43.2
95620	6.6	3.08	37.1
95625	0.0	3.24	86.2
95687	5.2	2.73	38.4
95688*	5.6	2.79	32.5
<i>Solano County</i>	7.6	2.85	38.3
<i>CA State</i>	8.6	2.94	44.7

Source: 2013 American Community Survey, 5-year estimates

*Indicates Focus Community

Social Environment

This assessment included indicators for crime, assault and homicide in the Solano County HSA. Crime data included major crimes, violent crime, property crime, arson and domestic violence.

Rates -- Major crime, violent crime, property crime, arson and domestic violence

Criminal activity in a community has a strong effect on a community's actual and perceived safety. Data on major crimes reported to the California Department of Justice are provided for the law enforcement jurisdictions in the Solano County HSA and compared to an estimated county benchmark.

Table 11: Major crime, violent crime, property crime, arson and domestic violence per 10,000 population by police jurisdiction

Police Municipality	Major Crimes*	Violent Crime	Property Crime	Arson	Domestic Violence
Benicia	154.64	11.02	140.68	2.94	26.81
Dixon	241.31	18.89	221.87	0.54	24.83
Fairfield	380.35	46.75	331.73	1.88	66.74
Rio Vista	374.45	42.95	328.81	2.68	33.55
Suisun	245.50	22.57	222.22	0.71	20.11
Vacaville	248.45	21.58	225.04	1.83	39.08
Vallejo	581.40	87.04	489.75	4.61	41.00
Solano County Sheriff	333.88	64.35	263.73	5.80	33.76
<i>Solano</i>	375.04	47.96	324.33	2.76	43.62
<i>CA State</i>	312.65	40.26	270.41	1.98	40.18

Source: California Department of Justice, 2013

*combination of violent crimes, property crimes, and arson

Economic & Work Environment

Economic stability is crucial to overall health and wellbeing. Community members who struggle to pay for basic needs like stable housing, adequate food, and health care are at greater risk of negative health outcomes. This assessment examined indicators related to lack of employment, income, poverty and insurance status.

Table 12: Percent Unemployed and median income by ZIP code

Economic Stability	ZIP Code	Percent Unemployed	Median Income
	94510	7.8	\$88,930
	94512	0.0	\$142,885
	94533*	13.2	\$55,413
	94534	6.4	\$92,676
	94535	11.6	\$50,970
	94571*	24.1	\$54,223
	94585	10.5	\$70,374
	94589*	17.1	\$56,068
	94590*	19.0	\$41,819
	94591*	13.7	\$73,509
	94592	16.3	\$105,352
	95690	18.1	\$61,150
	95694	8.1	\$55,163
	95618	7.2	\$82,313
	95620	10.5	\$71,261
	95625	0.0	\$75,114
	95687	9.4	\$73,583
	95688*	10.5	\$79,452
	<i>Solano County</i>	12.1	\$67,177
<i>CA State</i>	11.5	\$61,094	

Source: Census, 2013

*Indicates Focus Community

Table 24: Percent populations living in poverty, percent families with children in poverty, percent single FHH in poverty, and percent elderly households in poverty

Poverty	ZIP Code	Percent Under 100% Federal Poverty Level	Percent Families with Children in Poverty	Percent Single Female Headed Households (FHH) in Poverty	Percent Elderly Households in Poverty
		94510	5.7	7.3	24.1
	94512	0.0	0.0	0.0	0
	94533*	17.9	21.1	38.6	2.51
	94534	5.4	6.2	23.6	0.8
	94535	12.7	14.0	52.7	0
	94571*	10.9	8.4	43.7	2.48
	94585	13.4	14.9	32.3	0.47
	94589*	17.7	21.6	34.5	2.74
	94590*	25.0	29.0	41.6	3.53
	94591*	12.5	16.6	35.3	1.5
	94592	6.0	11.1	100.0	0
	95690	14.0	15.3	0.0	1.21
	95694	10.7	14.0	14.7	2.11
	95618	18.8	7.0	24.0	1.24
	95620	11.2	14.2	40.3	1.48
	95625	11.7	0.0	0.0	0
	95687	9.1	10.3	26.0	1.44
	95688*	10.1	12.4	37.3	1.53
	<i>Solano County</i>	13.0	15.4	34.2	1.8
	<i>CA State</i>	15.9	17.8	36.8	2.26

Source: Census, 2013

*Indicates Focus Community

Percent -- Prenatal care in the 1st trimester and low birth weight

Prenatal care during the first trimester has been linked to improved health outcomes of pregnancy for both mothers and infants. The most significant benefits of early and ongoing prenatal care include healthy birth weight and decreased risk of preterm delivery.

Table 25: Percent of live births with the mother receiving prenatal care in the 1st trimester and percent of births with low birth weight

Prenatal Health	ZIP Code	Percent of Live Births with Prenatal Care in 1 st Trimester	Percent of Births with Low Birth Weight
		94510	86.6
	94512	N/A	0.0
	94533*	69.4	6.9
	94534	83.4	7.1
	94535	78.0	6.7
	94571*	78.2	6.7
	94585	77.2	6.3
	94589*	77.2	7.9
	94590*	76.2	7.8
	94591*	81.3	7.0
	94592	N/A	0.0
	95690	77.7	6.7
	95694	81.1	6.0
	95618	86.8	6.2
	95620	79.9	5.5
	95625	N/A	0.0
	95687	77.8	6.2
	95688*	77.2	6.1
	<i>Solano County</i>	77.8	6.7
	<i>CA State</i>	83.6	6.8

Source: CDPH, 2010-2012

*Indicates Focus Community

APPENDICES

Appendix A: Secondary Data Dictionary and Processing

Introduction

The secondary data supporting the 2016 Community Health Needs Assessment (CHNA) was collected from a variety of sources, and was processed in multiple stages before it was used for analysis. This document details those various stages. Approaches used to define ZIP code boundaries, and the approaches that were used to integrate records reported for PO boxes into the analysis are described. General data sources are then listed, followed by a description of the basic processing steps applied to most variables. It concludes by detailing additional specific processing steps used to generate a subset of more complicated indicators.

HSA vs. County Benchmark Rates

Due to data availability, the service area for the Solano 2016 Community Health Needs Assessment was defined in two separate ways. One approach was to use Solano County as the service area. While this approach was the most natural, and best reflected the focus area of collaborative members, it did not allow for a consideration of variation in conditions across the county. An alternative approach was also used, where the service area was defined based on ZIP Code Tabulation Areas (ZCTAs), as defined by the US Census Bureau. In this approach, all ZCTAs that had a meaningful overlap with Solano County were included in the analysis. The benefit of this approach was that it allowed for the calculation of morbidity and mortality rates based on data available at the ZIP code level. This allowed for a better understanding of how these conditions varied within the county.

These different service area definitions also lead to the creation of different benchmarks representing the overall conditions within the study area. For indicators reported at the actual county level, county rates were either obtained or calculated for the county as a whole. Some indicators were not available at the county level. In these instances, benchmark rates were calculated for the set of ZCTAs (or estimated for ZIP codes, depending on the indicator). Rates calculated for the set of ZCTAs contained in the service area were found by summing cases across all ZCTAs, and dividing that number by the sum of the appropriate denominator across all ZCTAs. Service area rates obtained from the Kaiser Permanente Community Commons Data Platform (CCDP) were estimated using a process described on their community commons platform. In most cases, the service area values represent the aggregate of all data for geographies (ZIP codes, counties, tracts, etc.) which fall within the service area boundary. For more detail, visit the CCDP

(<http://www.communitycommons.org/groups/community-health-needs-assessment-chna/chna-data-platform/faqs/>).

ZIP Code Definitions

All morbidity and mortality variables collected in this analysis are reported by patient mailing ZIP codes. ZIP codes are defined by the US Postal Service as a single location (such as a PO Box), or a set of roads along which addresses are located. The roads that comprise such a ZIP code may not form contiguous areas, and do not match the approach of the US Census Bureau, which is the main source of population and demographic information in the US. Instead of measuring the population along a collection of roads, the Census reports population figures for distinct, contiguous areas. In an attempt to support the analysis of ZIP code data, the Census Bureau created ZIP Code Tabulation Areas (ZCTAs). ZCTAs are created by identifying the dominant ZIP code for addresses in a given Census block (the smallest unit of Census data available), and then grouping blocks with the same dominant ZIP code into a corresponding ZCTA. The creation of ZCTAs allows us to identify population figures that, in combination the morbidity and mortality data reported at the ZIP code level, allow us to calculate rates for each ZCTA. But the difference in the definition between mailing ZIP codes and ZCTAs has two important implications for analyses of ZIP level data.

First, it should be understood that ZCTAs are approximate representations of ZIP codes, rather than exact matches. While this is not ideal, it is nevertheless the nature of the data being analyzed. Secondly, not all ZIP codes have corresponding ZCTAs. Some PO Box ZIP codes or other unique ZIP codes (such as a ZIP code assigned to a single facility) may not have enough addressees residing in a given census block to ever result in the creation of a ZCTA. But residents

whose mailing addresses correspond to these ZIP codes will still show up in reported morbidity and mortality data. This means that rates cannot be calculated for these ZIP codes individually because there are no matching ZCTA population figures.

In order to incorporate these patients into the analysis, the point location (latitude and longitude) of all ZIP codes in California¹ were compared to ZCTA boundaries². Because various morbidity and mortality data sources were available in different years, this comparison was made between the ZCTA boundaries and the point locations of ZIP codes in April of the year (or the final year in the case of variables aggregated over multiple years) for which the morbidity and mortality variables were reported. All ZIP codes (whether PO Box or unique ZIP code) that were not included in the ZCTA dataset were identified. These ZIP codes were then assigned to either ZCTA that they fell inside of, or in the case of rural areas that are not completely covered by ZCTAs, the ZCTA to which they were closest. Morbidity and mortality information associated with these PO Box or unique ZIP codes were then assigned added to the ZCTAs to which they were assigned.

For example, 94609 is a PO Box located in Carmichael. 94609 is not represented by a ZCTA, but it could have patient data reported as morbidity and mortality variables. Through the process identified above, it was found that 94609 is located within 94608, which does have an associated ZCTA. Morbidity and mortality data for ZIP codes 94609 and 94608 were therefore assigned to ZCTA 94608, and used to calculate rates. All ZIP code level morbidity and mortality variables given in this report are therefore actually reporting approximate rates for ZCTAs. But for the sake of familiarity of terms they are presented in the body of the report as ZIP code rates.

Data Sources

The majority of mortality, morbidity, and socio-economic variables were collected from three main data sources: the US Census Bureau (Census), the California Office of Statewide Health Planning and Development (OSHPD), and the California Department of Public Health (CDPH). Census data was collected both to provide descriptions of population characteristics for the study area, as well as to calculate rates for morbidity and mortality variables. Table 42 below lists the 2013 population characteristic variables and sources. Table 26 below lists sources for variables used to calculate morbidity and mortality rates, which were collected for 2012, 2013, and 2014. These demographic variables were collected variously at the Census blocks and tracts, ZCTA, county, and state levels. In urban areas, Census blocks are roughly equivalent to a city block, and tracts to a neighborhood. Health outcome and health behavior indicators were also collected from the Kaiser Permanente Community Commons Data Platform (CCDP) to compliment the indicators already collected from other sources.

Kaiser Permanente Community Commons Data Platform

The Community Commons Data Platform (CCDP) is a web-based platform designed to assist hospitals, non-profit organizations, state and local health departments, financial institutions and other organizations seeking to better understand the needs and assets of their communities. The CCDP was used to collect additional indicators, including indicators by race and ethnicity, in order to better understand what is driving health in the community and prioritize issues that require the most urgent attention. The list of CCDP indicators used is detailed below in Table 46, Remaining Secondary Indicators.

Table 26: Demographic variables collected from the US Census Bureau³

Derived Variable Name	Source Variable Names	Source
Percent Minority	Total Population - Not Hispanic or Latino: - White alone	2013 American Community

¹ Datasheer, L.L.C. (2015, April 15). *ZIP Code Database DELUXE BUSINESS*. Retrieved from Zip-Codes.com: <http://www.Zip-Codes.com>

² U.S. Census Bureau. (2015). *TIGER/Line® Shapefiles and TIGER/Line® Files*. Retrieved August 31, 2011, from <http://www.census.gov/geo/maps-data/data/tiger-line.html>

³ U.S. Census Bureau. (2015). *2013 American Community Survey 5-year estimates; 2012 American Community Survey 5-year estimates; 2011 American Community Survey 5-year estimates..* Retrieved February 14, 2015, from American Fact Finder: <http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

(Hispanic or non-White)		Survey 5-year Estimate Table B03002
Population 5 Years or Older who speak Limited English	For age groups 5 to 17; 18 to 64; and 65 years and over: Speak Spanish: - Speak English "not well"; Speak Spanish: - Speak English "not at all"; Speak other Indo-European languages: - Speak English "not well"; Speak other Indo-European languages: - Speak English "not at all"; Speak Asian and Pacific Island languages: - Speak English "not well"; Speak Asian and Pacific Island languages: - Speak English "not at all"; Speak other languages: - Speak English "not well"; Speak other languages: - Speak English "not at all"	2013 American Community Survey 5-year Estimate Table B16004
Percent Households 65 years or Older in Poverty	Income in the past 12 months below poverty level: - Family households: - Married-couple family: - Householder 65 years and over; Income in the past 12 months below poverty level: - Family households: - Other family: - Male householder, no wife present: - Householder 65 years and over; Income in the past 12 months below poverty level: - Family households: - Other family: - Female householder, no husband present: - Householder 65 years and over; Income in the past 12 months below poverty level: - Nonfamily households: - Male householder: - Householder 65 years and over; Income in the past 12 months below poverty level: - Nonfamily households: - Female householder: - Householder 65 years and over; Total Households	2013 American Community Survey 5-year Estimate Table B17017
Median income	Estimate; Median household income in the past 12 months (in 2013 inflation-adjusted dollars)	2013 American Community Survey 5-year Estimate Table B19013
GINI Coefficient	Gini Index	2013 American Community Survey 5-year Estimate Table B19083
Average Population per Housing Unit	Total population in occupied housing units	2013 American Community Survey 5-year Estimate Table B25008
Percent with Income Less Than Federal Poverty Level	Total: - Under .50; Total: - .50 to .99	2013 American Community Survey 5-year Estimate Table C17002
Percent Foreign Born	Total population - Foreign born	2013 American Community Survey 5-year Estimate Table DP02
Percent Non-Citizen	Foreign-born population - Not a U.S. citizen	2013 American Community Survey 5-year Estimate Table DP02
Percent Over 18 that are Civilian Veterans	VETERAN STATUS - Civilian population 18 years and over - Civilian veterans	2013 American Community Survey 5-year Estimate Table DP02

Percent Civilian Noninstitutionalized Population with a Disability	DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION - Total Civilian Noninstitutionalized Population	2013 American Community Survey 5-year Estimate Table DP02
Percent with Public Assistance	INCOME AND BENEFITS (IN 2013 INFLATION-ADJUSTED DOLLARS) – With Food Stamp/SNAP benefits in the past 12 months	2013 American Community Survey 5-year Estimate Table DP03
Percent with Public Insurance	HEALTH INSURANCE COVERAGE - Civilian noninstitutionalized population - With health insurance coverage - With public coverage	2013 American Community Survey 5-year Estimate Table DP03
Percent Renter Occupied Households	Occupied housing units - Renter-occupied	2013 American Community Survey 5-year Estimate Table DP04
Percent Vacant Housing Units	Total housing units - Vacant housing units	2013 American Community Survey 5-year Estimate Table DP04
Percent Households with No Vehicle	Occupied housing units - No vehicles available	2013 American Community Survey 5-year Estimate Table DP04
Percent Households with Commute Times to work 60 minutes or more	Workers with travel times 60 to 89 minutes; workers with travel times 90 minutes or more; Total workers 16 years and over who did not work at home;	2013 American Community Survey 5-Year Estimate Table B08012
Total Population	Total population	2013 American Community Survey 5-year Estimate Table DP05
Percent Asian (not Hispanic)	Total population - Not Hispanic or Latino - Asian alone	2013 American Community Survey 5-year Estimate Table DP05
Percent Black (not Hispanic)	Total population - Not Hispanic or Latino - Black or African American alone	2013 American Community Survey 5-year Estimate Table DP05
Percent Hispanic (any race)	Total population - Hispanic or Latino (of any race)	2013 American Community Survey 5-year Estimate Table DP05
Percent American Indian (not Hispanic)	Total population - Not Hispanic or Latino - American Indian and Alaska Native alone	2013 American Community Survey 5-year Estimate Table DP05
Percent Pacific Islander (not Hispanic)	Total population - Not Hispanic or Latino - Native Hawaiian and Other Pacific Islander alone	2013 American Community Survey 5-year Estimate Table DP05
Percent White (not Hispanic)	Total population - Not Hispanic or Latino - White alone	2013 American Community Survey 5-year Estimate Table DP05
Percent Other or Two or More Races (not Hispanic)	Total population - Not Hispanic or Latino - Some other race alone;	2013 American Community Survey 5-year Estimate Table DP05
Percent Female	Total population - Not Hispanic or Latino - Two or more races Total population – Female	2013 American Community Survey 5-year Estimate Table DP05

Percent Male	Total population – Male	2013 American Community Survey 5-year Estimate Table DP05
Median Age	Median age (years)	2013 American Community Survey 5-year Estimate Table DP05
Population by Age Group	Under 5 years; 5 to 9 years; 10 to 14 years; 10 to 14 years; 20 to 24 years; 25 to 34 years; 35 to 44 years; 5 to 54 years; 55 to 59 years; 60 to 64 years; 65 to 74 years; 75 to 84 years; 85 years and over	2013 American Community Survey 5-year Estimate Table DP05
Percent Single Female Headed Households	Female householder, no husband present, family household	2013 American Community Survey 5-year Estimate Table S1101
Percent 25 or Older Without a High School Diploma	100 - Percent high school graduate or higher	2013 American Community Survey 5-year Estimate Table S1501
Percent Families with Children in Poverty	All families - Percent below poverty level; Estimate; With related children under 18 years	2013 American Community Survey 5-year Estimate Table S1702
Percent Single Female Headed Households in Poverty	Female householder, no husband present - Percent below poverty level; Estimate; With related children under 18 years	2013 American Community Survey 5-year Estimate Table S1702
Percent Unemployed	Unemployment rate; Estimate; Population 16 years and over	2013 American Community Survey 5-year Estimate Table S2301
Percent Uninsured	Percent Uninsured; Estimate; Total civilian noninstitutionalized population	2013 American Community Survey 5-year Estimate Table S2701
Percent of Homeowners with Mortgage with Housing Costs above 30% of Income	Percent; SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAPI) - Housing units with a mortgage (excluding units where SMOCAPI cannot be computed) - 30.0 to 34.9 percent; Percent; SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAPI) - Housing units with a mortgage (excluding units where SMOCAPI cannot be computed) - 35.0 percent or more	2013 American Community Survey 5-year Estimate Table DP04
Percent of Homeowners with no Mortgage with Housing Costs above 30% of Income	Percent; SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAPI) - Housing unit without a mortgage (excluding units where SMOCAPI cannot be computed) - 30.0 to 34.9 percent; Percent; SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAPI) - Housing unit without a	2013 American Community Survey 5-year Estimate Table DP04

Percent of Renters with Rent above 30% of Income	mortgage (excluding units where SMOCAP I cannot be computed) - 35.0 percent or more Percent; GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAP I) - Occupied units paying rent (excluding units where GRAP I cannot be computed) - 30.0 to 34.9 percent; Percent; GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAP I) - Occupied units paying rent (excluding units where GRAP I cannot be computed) - 35.0 percent or more	2013 American Community Survey 5-year Estimate Table DP04
Percent of All Housing Units with Housing Costs above 30% of Income	Percent; SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAP I) - Housing units with a mortgage (excluding units where SMOCAP I cannot be computed) - 30.0 to 34.9 percent; Percent; SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAP I) - Housing units with a mortgage (excluding units where SMOCAP I cannot be computed) - 35.0 percent or more; Percent; GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAP I) - Occupied units paying rent (excluding units where GRAP I cannot be computed) - 30.0 to 34.9 percent; Percent; GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAP I) - Occupied units paying rent (excluding units where GRAP I cannot be computed) - 35.0 percent or more; Percent; GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAP I) - Occupied units paying rent (excluding units where GRAP I cannot be computed) - 30.0 to 34.9 percent; Percent; GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAP I) - Occupied units paying rent (excluding units where GRAP I cannot be computed) - 35.0 percent or more; Housing units with a mortgage (excluding units where SMOCAP I cannot be computed); Housing unit without a mortgage (excluding units where SMOCAP I cannot be computed); Occupied units paying rent (excluding units where GRAP I cannot be computed)	2013 American Community Survey 5-year Estimate Table DP04

Table 27: Census variables used for mortality and morbidity rate calculations^{3,4}

Derived Variable Name	Source Variable Names	Source
Total Population	Total Population	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014) 2010 Decennial Census Summary File 1
Female	Female	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Male	Male	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age Under 1	DP05: Under 5 years PCT12: Male and Female, ages under 1, 1, 2, 3, and 4	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014); 2010 Decennial Census Summary File 1 Table PCT12

⁴ U.S. Census Bureau. (2013). *2010 Census Summary File 1*. Retrieved February 14, 2013, from American Fact Finder: <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

Age 1 to 4	DP05: Under 5 years PCT12: Male and Female, ages under 1, 1, 2, 3, and 4	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014); 2010 Decennial Census Summary File 1 Table PCT12
Age 5 to 14	5 to 9 years; 10 to 14 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 15 to 24	15 to 19 years; 20 to 24 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 25 to 34	25 to 34 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 35 to 44	35 to 44 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 45 to 54	45 to 54 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 55 to 64	55 to 59 years; 60 to 64 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 65 to 74	65 to 74 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 75 to 84	75 to 84 years	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Age 85 and over	85 years and over	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
White	HISPANIC OR LATINO AND RACE - Total population - Not Hispanic or Latino - White alone	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Black	HISPANIC OR LATINO AND RACE - Total population - Not Hispanic or Latino - Black or African American alone	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Hispanic	HISPANIC OR LATINO AND RACE - Total population - Hispanic or Latino (of any race)	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Native American	HISPANIC OR LATINO AND RACE - Total population - Not Hispanic or Latino - American Indian and Alaska Native alone	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)
Asian/Pacific Islander	HISPANIC OR LATINO AND RACE - Total population - Not Hispanic or Latino - Asian alone; HISPANIC OR LATINO AND RACE - Total population - Not Hispanic or Latino - Native Hawaiian and Other Pacific Islander alone	American Community Survey 5-year Estimate Table DP05 (2011, 2012, 2013, 2014)

Collected morbidity and mortality data included the number of emergency department (ED) discharges, hospital (H) discharges, and mortalities associated with a number of conditions, as well as various cancer and STI incidence rates. Aggregated 2011 – 2013 ED and H discharge data were obtained from the Office of Statewide Health Planning and Development (OSHPD). Table 44 lists the specific variables collected by ZIP code and county. These values report the total number of ED or H discharges that listed the corresponding ICD9 code as either a primary or any secondary diagnosis, or a principle or other E-code, as the case may be. In addition to reporting the total number of discharges associated with the specified codes per ZIP code/county, this data was also broken down by sex (male and female), age (under 1 year, 1 to 4 years, 5 to 14 years, 15 to 24 years, 25 to 34 years, 35 to 44 years, 45 to 54 years, 55 to 64 years, 65

to 74, 75 to 84 years, and 85 years or older), and normalized race and ethnicity (Hispanic of any race, non-Hispanic White, non-Hispanic Black, non-Hispanic Asian or Pacific Islander, non-Hispanic Native American).

Table 28: 2011 – 2013 OSHPD hospitalization and emergency department discharge data

Category	Variable Name	ICD9/E-Codes
Cancer	Breast Cancer	174, 175
	Colorectal Cancer	153, 154
	Lung Cancer	162, 163
	Prostate Cancer	185
Chronic Disease	Diabetes	250
	Hypertension	401-405
	Heart Disease	410-417, 428, 440, 443, 444, 445, 452
	Chronic Kidney Disease	580-589
	Stroke	430-436, 438
Infectious Disease	HIV/AIDS	042-044
	STIs	042-044, 090-099, 054.1, 079.4
	Tuberculosis	010-018, 137
Injuries ⁵	Assault	E960-E969, E999.1
	Self-Inflicted Injury	E950-E959
	Unintentional Injury	E800-E869, E880-E929
Mental Health	Mental Health	290, 293-298, 301,311
	Mental Health: Substance Abuse	291-292, 303-305
Respiratory	Asthma	493-494
	Chronic Obstructive Pulmonary Disease (COPD)	490-496
Other	Hip Fractures	820
	Oral cavity/Dental	520-529
	Osteoporosis	733

Mortality data, along with some birth data, for each ZIP code in 2010, 2011, and 2012 were collected from the California Department of Public Health (CDPH). The specific variables collected are defined in Table 40. The majority of these variables were used to calculate specific rates of mortality for 2012. A smaller number of them were used to calculate more complex derived indicators. To increase the stability of these derived indicators, rates were calculated using data from 2010 to 2012. These variables include the total number of live births, total number of infant deaths (ages under 1 year), all-cause mortality by age, births with low infant birthweight, and births with mother’s age at delivery under 20. Table 45 consequently also lists the years for which each variable was collected.

⁵ E-code definitions for injury variables derived from CDC. (2011). *Matrix of E-code Groupings*. Retrieved March 4, 2013, from Injury Prevention & Control: Data & Statistics(WISQARS): http://www.cdc.gov/injury/wisqars/ecode_matrix.html

Table 29: CDPH birth and mortality data by ZIP code

Variable Name	ICD10 Code	Years Collected
Total Deaths		2012
Male Deaths		2012
Female Deaths		2012
Deaths by Age Group:		
Under 1, 1-4, 5-14, 15-24, 25-34,45-54, 55-64, 65-74, 75-84, and 85 and over		2010 - 2012
Diseases of the Heart	I00-I09, I11, I13, I20-I51	2012
Malignant Neoplasms (Cancer)	C00-C97	2012
Cerebrovascular Disease (Stroke)	I60-I69	2012
Chronic Lower Respiratory Disease	J40-J47	2012
Alzheimer’s Disease	G30	2012
Unintentional Injuries (Accidents)	V01-X59, Y85-Y86	2012
Diabetes Mellitus	E10-E14	2012
Influenza and Pneumonia	J09-J18	2012
Chronic Liver Disease and Cirrhosis	K70, K73-K74	2012
Intentional Self Harm (Suicide)	U03, X60-X84, Y87.0	2012
Essential Hypertension & Hypertensive Renal Disease	I10, I12, I15	2012
Nephritis, Nephrotic Syndrome and Nephrosis	N00-N07, N17-N19, N25-N27	2012
All Other Causes	Residual Codes	2012
Total Births		2010 - 2012
Births with Infant Birthweight Under 1500 Grams, 1500-2499 Grams		2010 - 2012
Births with Mother's Age at Delivery Under 20		2010 - 2012

Cancer incidence data were obtained from the California Cancer Registry for each ZIP code. The data reported the total aggregated incidence of cancers from 2010 – 2012 for breast, colorectal, lung, and prostate cancers. ZIP codes with more than zero but fewer than three cases were masked. For processing purposes, these masked values were treated as zeros.

Chlamydia and gonorrhea incidence data for 2014 were obtained from the County Public Health offices in El Dorado, Placer, Sacramento, Solano and Yolo counties. The incidence data were reported by 2014 ZCTA per 10,000 population. A number of steps were taken to process these variables due to differences in reporting geography and data provided. First, some counties provided pre-calculated rates, while others provided raw counts by ZIP code. Second, some counties provided data for all ZIP codes, while others provided only data for those with reported cases exceeding a certain masking standard. Finally, because ZIP codes can cross county boundaries, each county health office provided only information on the cases that occurred in ZIP codes within their respective counties.

The following approaches were applied to address these irregularities. First, pre-calculated rates were only used for those counties for which raw counts were not reported. Second, a consistent standard to mask rates for ZIP codes with 5 or fewer cases was applied across all counties reporting raw counts, and for counties only reporting rates for a subset of ZIP codes (i.e. Solano County), it was assumed that counties for which data was not reported had 0 incidence rates. For ZIP codes that fell within multiple counties providing data, these cases were simply totaled for the given ZIP code. For ZIP codes that fall partially outside of the counties reporting data, the calculated rates are based only on cases occurring within the reporting counties.

The remaining secondary variables were collected from a variety of sources, and at various geographic levels. Table 30 lists the sources of these variables, and lists the geographic level at which they were reported.

Table 30: Remaining secondary variables

Variable	Year	Definition	Reporting Unit	Data Source
Current Smokers	2014	Current Smoking Status - Adults and Teens	County	2014 California Health Interview Survey http://ask.chis.ucla.edu/AskCHIS/tools/layouts/AskChisTool/home.aspx#/geography (last accessed 9 Oct 2015)
Food Deserts	2010	USDA Defined Food Desert; Low Access 1 mile Urban 10 Mile rural	Tract	USDA http://www.ers.usda.gov/data-products/food-access-research-atlas/download-the-data.aspx (Last Accessed 9 Oct 2015)
Modified Retail Food Environment Index (mRFEI)	2013	Table 00CZ2 for the following NAICS codes: 445120, 722513, 445230, 452910, 445110	ZCTA	US Census Bureau 2013 County Business Patterns
Park Access	2010	Percent of 2010 ZCTA Population in blocks located within 1/2 mile of a park	ZCTA	2010 Decennial Census SF1; ESRI U.S. Parks 2014, park_dtl.gdb Series Name Data and Maps for ArcGIS® Issue 2014 - World, Europe, and United States
Health Professional Shortage Areas (Primary Care, Dental, Mental Health)	2015	Current Primary Care, Dental Health, and Mental Health Health Provider Shortage Areas	Shortage Areas (non-point locations)	US Department of Health & Human Services Health Resources and Services Administration; http://datawarehouse.hrsa.gov/data/datadownload/hpsadownload.aspx (last accessed 29 Aug 2015)
Major Crime Rate	2013	Major Crimes (combination of violent crimes, property crimes, and arson)	Law enforcement jurisdiction	California Attorney General - Criminal Justice Statistics Center: Crimes and Clearances http://oag.ca.gov/crime/cjsc/stats/crimes-clearances (last accessed 3 Sep 2015)
Domestic Violence Rate	2013	Domestic Violence-Related Calls for Assistance	Law enforcement jurisdiction	California Attorney General – Criminal Justice Statistics Center: Domestic Violence-Related Calls for Assistance http://oag.ca.gov/crime/cjsc/stats/domestic-violence (last access 30 Oct 2015)
Traffic Accidents Resulting in Fatalities	2013	Traffic Accidents Resulting in Fatalities	Point locations	National Highway Traffic Safety Administration Fatality Analysis Reporting System (FARS) ftp://ftp.nhtsa.dot.gov/fars/2013/DBF/ (last accessed 8 Sep 2015)

Variable	Year	Definition	Reporting Unit	Data Source
Pollution Burden	2014	Cal EnviroScreen Pollution Burden Scores indicator (based on ozone and PM2.5 concentrations, diesel PM emissions, drinking water contaminants, pesticide use, toxic releases from facilities, traffic density, cleanup sites, impaired water bodies, groundwater threats, hazardous waste facilities and generators, and solid waste sites and facilities)	Tract	California Office of Environmental Health Hazard Assessment CalEnviroScreen Version 2.0 http://oehha.ca.gov/ej/ces2.html
Population Living Near a Transit Stop	2012	Population weighted centroid distance to the closest fixed public transit stop	Census Block Group	US EPA Smart Location Database https://edg.epa.gov/data/Public/OP/SLD/SmartLocationDb.zip (last accessed 29 Aug 2015)
Access to Dentists	2013	Dentists, Rate per 100,000 Population	County	US Department of Health and Human Services, Health Resources and Services Administration, Areas Health Resource File http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Access to Mental Health Providers	2014	Mental Health Care Provider, Rate per 100,000 Population	County	University of Wisconsin Population Health Institute, County Health Ranking http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Access to Primary Care	2012	Primary Care Physicians, Rate per 100,000 Population	County	US Department of Health & Human Services, Health Resources and Services Administration, Area Health Resource File http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Alcohol – Excessive Consumption	2006 – 2012	Estimated Adults Drinking Excessively (Age-Adjusted Percentage)	County	Center for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Accessed via the Health Indicators Warehouse. U.S. Department of Health and Human Services, Health Indicators Warehouse http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Alcohol – Expenditures	2014	Alcoholic Beverage Expenditures, Percentage of Total Food-At-Home Expenditures	Tract	Nielsen, Nielsen SiteReports http://www.communitycommons.org/groups/community-health-needs-assessment-chna

Variable	Year	Definition	Reporting Unit	Data Source
Asthma – Prevalence	2011 – 2012	Percent Adults with Asthma	County	Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Breastfeeding (Any)	2012	Percentage of Mothers Breastfeeding (Any)	County	California Department of Public Health (CDPH) – Breastfeeding Statistics http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Cancer Incidence (Cervical)	2010 – 2012	Annual Cervical Cancer Incidence Rate (per 100,000 Population)	County	National Institute of Health, National Cancer Institute, Surveillance, Epidemiology, and End Results Program. State Cancer Provides, 2008-2012 http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Cancer Screening - Mammogram	2008 - 2012	Annual Cervical Cancer Incidence, Rate per 100,00 Population	County	National Institutes of Health, National Cancer Institute, Surveillance, Epidemiology, and End Results Program. State Cancer Profiles http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Cancer Screening – Pap Test	2012	Percent Adults Females Age 18+ with Regular Pap Test (Age Adjusted)	County	Dartmouth College Institute for Health Policy & Practice, Dartmouth Atlas of Health Care http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Cancer Screening – Sigmoid/Colonoscopy	2006 – 2012	Percent Adults Screened for Colon Cancer (Age Adjusted)	County	Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Accessed via the Health Indicators Warehouse. US Department of Health & Human Services, Health Indicators Warehouse http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Children Eligible for	2013 - 2014	Percent Students Eligible for Free or Reduced Price Lunch	Address	National Center for Education Statistics, NCES – Common Core of

Variable	Year	Definition	Reporting Unit	Data Source
Free/Reduced Price Lunch				Data http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Commute to Work – Alone in Car	2009 – 2013	Percentage of Workers Commuting by Car, Alone	Tract	US Census Bureau, American Community Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Commute to Work – Walking/Biking	2009-2013	Percentage Walking or Biking/Work	Tract	US Census Bureau, American Community Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Diabetes Management (Hemoglobin A1c Test)	2012	Percent Medicare Enrollees with Diabetes with Annual Exam	County	Dartmouth College Institute for Health Policy & Clinical Practice, Dartmouth Atlas of Health Care http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Diabetes Prevalence	2012	Percent Adults with Diagnosed Diabetes (Age Adjusted)	County	Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Economic Security – Commute Over 60 Minutes	2009 - 2013	Percent of Workers Communities More than 60 Minutes	Tract	US Census Bureau, American Community Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Education – High School Graduation Rate	2013	Cohort Graduation Rate	County	California, Department of Education http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Education – Reading Below Proficiency	2012 – 2013	Percentage of Grade 4 ELA Test Score Not Proficient	County	California, Department of Education http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Education – School Enrollment Age 3-4	2009 - 2013	Percentage Population Age 3-4 Enrolled in School	Tract	US Census Bureau, American Community Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Federally Qualified Health Centers	2015	Federally Qualified Health Centers, Rate per 100,000 Population	Address	U.S. Department of Health & Human Services, Center for Medicare & Medicaid Services, Provider of Services File - Sept. 2015. http://www.communitycommons.org

Variable	Year	Definition	Reporting Unit	Data Source
Food Environment – Fast Food Restaurants	2011	Fast Food Restaurants, Rate per 100,000 Population	Tract	g/groups/community-health-needs-assessment-chna U.S. Census Bureau, County of Business Patterns. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Food Environment – Grocery Stores	2011	Grocery Stores, Rate per 100,000 Population	Tract	U.S. Census Bureau, County of Business Patterns. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Food Security – Food Insecurity Rate	2013	Percentage of the Population with Food Insecurity	County	Feeding America http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Food Security – Population Receiving SNAP	2011	Percent Population Receiving SNAP Benefits	County	U.S. Census Bureau, Small Area Income & Poverty Estimates. http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Fruit/Vegetable Expenditures	2014	Fruit / Vegetable Expenditures, Percentage of Total Food-At-Home Expenditures	Tract	Nielsen, Nielsen SiteReports http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Heart Disease Prevalence	2011 – 2012	Percent Adults with Heart Disease	County (Grouping)	University of California Center for Health Policy Research, California Health Interview Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna
High Blood Pressure - Unmanaged	2006 - 2010	Percent Adults with High Blood Pressure	County	Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Housing – Assisted Housing	2013	HUD – Assisted Units, Rate per 10,000 Housing Units (2010)	County	U.S. Department of Housing and Urban Development http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Housing – Substandard Housing	2009 – 2013	Percent Occupied Housing Units with One or More Substandard Conditions	County	U.S. Census Bureau, American Community Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna

Variable	Year	Definition	Reporting Unit	Data Source
Insurance – Population Receiving Medicaid	2009 – 2013	Percent of Insured Population Receiving Medicaid	Tract	assessment-chna U.S. Census Bureau, American Community Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Accessed via the Health Indicators Warehouse. US Department of Health & Human Services, Health Indicators Warehouse http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Lack of Social or Emotional Support	2006 – 2012	Percent Adult Without Adequate Social / Emotional Support (Age-Adjusted)	County	U.S. Census Bureau, County Business Patterns. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna University of California Center for Health Policy Research, California Health Interview Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Accessed via the Health Indicators Warehouse http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Liquor Store Access	2012	Liquor Stores, Rate per 100,000 Population	County	U.S. Census Bureau, County Business Patterns. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna University of California Center for Health Policy Research, California Health Interview Survey http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Low Fruit/Vegetable Consumption (Youth)	2011 - 2012	Percent Population Age 2-13 with Inadequate Fruit/Vegetable Consumption	County (Grouping)	Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Accessed via the Health Indicators Warehouse http://www.communitycommons.org/groups/community-health-needs-assessment-chna University of Missouri, Center for Applied Research and Environmental Systems. California Department of Public Health, CDPH - Death Public Use Data http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Mental Health – Poor Mental Health Days	2006 - 2012	Average Number of Mentally Unhealthy Days per Month	County	University of Missouri, Center for Applied Research and Environmental Systems. California Department of Public Health, CDPH - Death Public Use Data http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Mortality – Homicide	2010 - 2012	Homicide, Age-Adjusted Mortality, Rate per 100,000 Population	ZIP Code	University of Missouri, Center for Applied Research and Environmental Systems. California Department of Public Health, CDPH - Death Public Use Data http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Mortality – Motor Vehicle Accident	2010 - 2012	Motor Vehicle Accident, Age Adjusted Mortality, Rate per 100,000 Population	ZIP Code	University of Missouri, Center for Applied Research and Environmental Systems. California Department of Public Health, CDPH - Death Public Use Data

Variable	Year	Definition	Reporting Unit	Data Source
Mortality – Pedestrian Accident	2010 - 2012	Pedestrian Accident – Age Adjusted Mortality, Rate per 100,000 Population	ZIP Code	http://www.communitycommons.org/groups/community-health-needs-assessment-chna University of Missouri, Center for Applied Research and Environmental Systems. California Department of Public Health, CDPH - Death Public Use Data http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Obesity (Youth)	2013 - 2014	Percent Obese	County	California Department of Education, FITNESSGRAM® Physical Fitness Testing http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Overweight (Youth)	2013 - 2014	Percent Overweight	County	California Department of Education, FITNESSGRAM® Physical Fitness Testing http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Physical Inactivity (Adult)	2012	Percent Population with no Leisure Time Physical Activity	County	Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Physical Inactivity (Youth)	2013 - 2014	Percent Physically Inactive	County	California Department of Education, FITNESSGRAM® Physical Fitness Testing http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Preventable Hospital Service Days	2011	Age-Adjusted Discharge, Rate per 10,000 Population	County	California Office of Statewide Health Planning and Development, OSHPD Patient Discharge Data. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Soft Drink Expenditures	2014	Soda Expenditures, Percentage of Total Food-At-Home Expenditures	Tract	Nielsen, Nielsen Site Reports http://www.communitycommons.org/groups/community-health-needs-assessment-chna
STD – HIV Hospitalizations	2011	Age-Adjusted Discharge, Rate per 10,000 Population	County	California Office of Statewide Health Planning and Development, OSHPD Patient Discharge Data. Additional

Variable	Year	Definition	Reporting Unit	Data Source
STD – HIV Prevalence	2010	Population with HIV/AIDS, Rate by 100,000 Population	County	data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna US Department of Health & Human Services, Health Indicators Warehouse. Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention http://www.communitycommons.org/groups/community-health-needs-assessment-chna
STD – No HIV Screening	2011 - 2012	Percent Adults Never Screened for HIV/AIDS	County	Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. Additional data analysis by CARES http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Tobacco Expenditures	2014	Cigarette Expenditures, Percentage of Total Household Expenditures	Tract	Nielsen, Nielsen SiteReports http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Transit – Road Network Density	2011	Total Road Network Density (Road Miles per Acre)	County	Environmental Protection Agency, EPA Smart Location Database http://www.communitycommons.org/groups/community-health-needs-assessment-chna
Violence – School Suspensions	2013-2014	Suspension Rate	County	California Department of Education. 2013-2014 school year http://www.communitycommons.org/groups/community-health-needs-assessment-chna

General Processing Steps

Rate Smoothing

All OSHPD, as well as all single-year CDPH, variables were collected for all ZIP codes in California. The CDPH datasets included separate categories that included either patients who did not report any ZIP code, or patients from ZIP codes whose number of cases fell below a minimum level. These patients were removed from the analysis. As described above, patient records in ZIP codes not represented by ZCTAs were added to those ZIP codes corresponding to the ZCTAs that they fell inside or were closest to. When consolidating ZIP codes into ZCTAs, any ZIP code with no value reported were treated as having a value of 0. If a two or more ZIP codes were combined into a single ZCTA, and at least one of those ZIP codes had a value reported, all other ZIP codes with a masked value were treated as having values of 0. Thus ZCTA values were recorded as NA only if all ZIP codes contributing values to them had masked values reported for all associated ZIP codes.

The next step in the analysis process was to calculate rates for each of these variables. However, rather than calculating raw rates, empirical bayes smoothed rates (EBR) were created for all variables possible⁶. Smoothed rates are considered preferable to raw rates for two main reasons. First, the small population of many ZCTAs, particularly those in rural areas, meant that the rates calculated for these areas would be unstable. This problem is sometimes referred to as the small number problem. Empirical bayes smoothing seeks to address this issue by adjusting the calculated rate for areas with small populations so that they more closely resemble the mean rate for the entire study area. The amount of this adjustment is greater in areas with smaller populations, and less in areas with larger populations.

Because the EBR were created for all ZCTAs in the state, ZCTAs with small populations that may have unstable high rates had their rates “shrunk” to more closely match the overall variable rate for ZCTAs in the entire state. This adjustment can be substantial for ZCTAs with very small populations. The difference between raw rates and EBR in ZCTAs with very large populations, on the other hand, is negligible. In this way, the stable rates in large population ZIP codes are preserved, and the unstable rates in smaller population ZIP codes are shrunk to more closely match the state norm. While this may not entirely resolve the small number problem in all cases, it does make the comparison of the resulting rates more appropriate. Because the rate for each ZCTA is adjusted to some degree by the EBR process, it also has a secondary benefit of better preserving the privacy of patients within the ZCTAs.

EBR were calculated for each variable using the appropriate base population figure reported for ZCTAs in the American Community Survey 5-year estimate tables: overall EBR for ZCTAs were calculated using total population; and sex, age, and normalized race/ethnicity EBR were calculated using the appropriate corresponding population stratification. In cases where multiple years of data were aggregated, populations for the central year were used and multiplied by the number of years of data to calculate rates. For OSHPD data, 2012 population data was used. For multi-year CDPH variables (2010 – 2012), 2011 data was used. Population data from 2012 was used to calculate single-year CDPH variables.

ZCTAs with NA values recorded were treated as having a value of 0 when calculating the overall expected rates for a state as a whole, but were kept as NA when smoothing the value for the individual ZCTA. This meant that smoothed rates could be calculated for each variable in each area, but if a given ZCTA had a value of NA for a given variable, it retained that NA value after smoothing.

EBR were attempted for every overall variable, but could not be calculated for certain variables. In these cases, raw rates were used instead. The final rates in either case for H, ED, and the basic mortality variables were then multiplied by 10,000, so that the final rates represent H or ED discharges, or deaths, per 10,000 people.

Age Adjustment

The additional step of age adjustment⁷ was performed on the all-cause mortality variables. Because the occurrence of these conditions varies as a function of the age of the population, differences in the age structure between ZCTAs could obscure the true nature of the variation in their patterns. For example, it would not be unusual for a ZCTA with an older population to have a higher rate of ED visits for stroke than a ZCTA with a younger population. In order to accurately compare the experience of ED visits for stroke between these two populations, the age profile of the ZCTA needs to be accounted for. Age adjusting the rates allows this to occur.

To age adjust these variables, we first calculated age stratified rates by dividing the number of occurrences for each age category by the population for that category in each ZCTA. Because estimates of age under 1 and from 1 to 4 were not available in the American Community Survey datasets used in this analysis, the proportion of the population under age 5 that was also under age 1 was calculated using 2010 decennial Census data for each geographic area. These proportions were then compared to the age under 5 variables from the American Community Survey datasets for each geographic

⁶ Anselin, L. (2003). *Rate Maps and Smoothing*. Retrieved February 16, 2013, from <http://www.dpi.inpe.br/gi>

⁷ Klein, R. J., & Schoenborn, C. A. (2001). *Age adjustment using the 2000 projected U.S. population. Healthy People Statistical Notes, no. 20*. Hyattsville, Maryland: National Center for Health Statistics.

area to estimate the values for the population under 1 and from 1 to 4. These estimated values were then used to calculate age stratified rates. Age stratified EBR were used whenever possible. Each age stratified rate was then multiplied by a coefficient that gives the proportion of California's total population that was made up by that age group as reported in the 2010 Census. The resulting values are then summed and multiplied by 10,000 to create age adjusted rates per 10,000 people.

Benchmark Rates

A final step was to obtain or generate benchmark rates to compare the ZCTA level rates to. Benchmarks for all OSHPD variables were calculated at the HSA, county, and state levels. HSA rates were calculated by first summing the total number of cases and relevant populations for each variable across all ZCTAs in the HSA. ZCTAs with NA values were treated at this stage as having a value of 0. Smoothed EBR rates were then calculated for each HSA using a broader set of HSAs.

County benchmark rates were calculated as raw rates for each county, or in the case of small counties, group of counties, using the relevant populations variables. State rates were calculated as raw rates by first summing all county level values (treating and NA value as a 0), and then dividing these values by the relevant population value.

HSA, county, and state benchmark rates were also provided for CDPH data. HSA benchmarks were calculated in a process similar to that described above for OSHPD HSA benchmarks: the total number of cases and relevant populations were summed for each variable across all ZCTAs in the HSA, and used to calculate smoothed EBR rates using a broader set of HSAs.

County and state benchmark rates were either calculated using CDPH data reported at the county and state level^{8,9}, or else obtained from the County Health Status Profiles 2014¹⁰. The resulting benchmark values for CDPH and OSHPD variable were all reported as rates per 10,000 unless the original variable was reported using some other standard as described below.

Processing for Specific Variables

Additional processing was needed to create the Community Health Vulnerability Index (CHVI), the CDPH related variables, and as well as some of the other variables. The process used to calculate these variables are described in this section below.

Social Inequities Dataset

The social inequities dataset included 22 indicators (presented in Table 31) that were analyzed at the ZIP code level to identify and flag the top 20% of ZIP codes with the highest rates of social inequities compared to county and state benchmarks. For the CHVI, ZIP codes were flagged if they intersected a census tract whose CHVI value fell within the top 20% of the HSA, values 3.9 to 6.0. In addition to quantitative measures, Focus Communities were further verified through analysis of input from initial service area wide key informant interviews. Input on vulnerable locations within the HSA were considered from interviews with public health experts and area service providers. Locations identified as vulnerable were then cross-referenced with the ZIP codes that were flagged in the CHVI and social inequities data, as well as with ZIP codes that were identified as Focus Communities in 2013. This was included to allow greater continuity between CHNA round and to reflect the work of the hospitals oriented to serve these disadvantaged communities.

⁸ California Department of Public Health. (2010,2011,2012). *Ten Leading Causes of Death, California Counties and Selected City Health Departments*. Retrieved July 7, 2015, from <http://www.cdph.ca.gov/data/statistics/Documents/VSC-2012-0520.pdf>; <http://www.cdph.ca.gov/data/statistics/Documents/VSC-2011-0520.pdf>; <http://www.cdph.ca.gov/data/statistics/Documents/VSC-2010-0520.pdf>

⁹ California Department of Public Health. (2015a, July 17). Retrieved from Center for Health Statistics and Informatics: Vital Statistics Query System.: <http://www.apps.cdph.ca.gov/vsq/>

¹⁰ California Department of Public Health. (2015b, July 2). Retrieved from County Health Status Profiles 2014: <http://www.cdph.ca.gov/programs/ohir/Documents/OHIRProfiles2014.pdf>

Table 131: Social Inequities indicators to determine Focus Communities

Median income	Percent Non-White or Hispanic population
GINNI coefficient (measure of income inequality)	Foreign born population
Population in poverty (under 100 Federal Poverty Level)	Citizenship status
Percent with public assistance	Population 5 Years or Older who speak Limited English
Percent households 65 years or older in poverty	Single female headed households
Percent families with children in poverty	Percent homeowners with housing expenses greater than 30% of income (homes with mortgages)
Percent single female headed households in poverty	Percent homeowners with housing expenses greater than 30% of income (homes without mortgages)
Percent unemployed	Percent renters with housing expenses greater than 30% of income
Uninsured population	Population over 18 that are civilian veterans
Population with public insurance	Percent renter occupied housing units
Population with any disability	Percent population 25 or older without a high school diploma

Community Health Vulnerability Index (CHVI)

The CHVI is a health care disparity index based in largely based on the Community Need Index (CNI) developed by Barsi and

Roth¹¹. The CHVI uses the same basic set of demographic variables to address health care disparity as outlined in the CNI, but these variables are aggregated in a different manner to create the CHVI. For this report, the following nine variables were obtained from the 2013 American Community Survey 5-year Estimate dataset at the census tract level:

- Percent Minority
- Population 5 Years or Older who speak Limited English
- Percent 25 or Older Without a High School Diploma
- Percent Unemployed
- Percent Families with Children in Poverty
- Percent Households 65 years or Older in Poverty
- Percent Single Female Headed Households in Poverty
- Percent Renter Occupied Households
- Percent Uninsured

All census tracts that crossed ZCTAs within the HSA were included in the analysis. Each variable was scaled using a min-max stretch, so that the tract with the maximum value for a given variable within the study area received a value of 1, and the tract with the minimum value for that same variable within the study area received a 0. All scaled variables were then summed to form the final CHVI. Areas with higher CHV values therefore represent locations with higher concentrations of the target index populations, and are likely experiencing poorer health care disparities.

¹¹ Barsi, E. L., & Roth, R. (2005). The "Community Need Index". *Health Progress*, 86(4), 32-38. Retrieved from <https://www.chausa.org/docs/default-source/health-progress/the-community-need-index-pdf.pdf?sfvrsn=2>

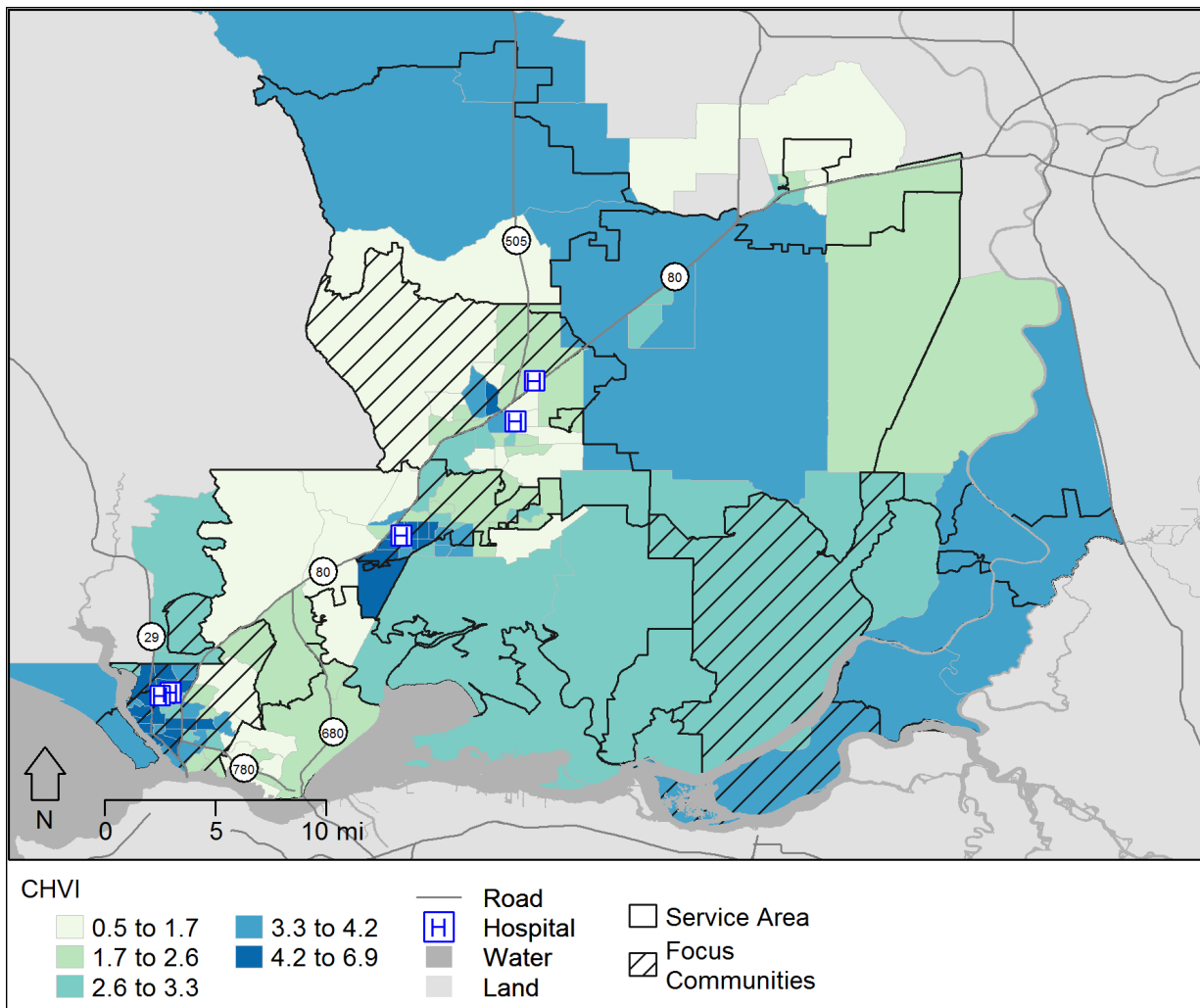


Figure 3: Community Health Vulnerability Index for Solano County

Infant Mortality Rate

Infant mortality rate reports the number of infant deaths per 1,000 live births. It was calculated by dividing the number of deaths for those with ages below 1 from 2010 - 2012 by the total number of live births for the same time period (using smoothed EBR), and multiplying the result by 1,000.

Teen Pregnancy Rate

Teen Pregnancy Rate reports the number of live births to mothers under the age of 20 per 1,000 females between the ages of 15 and 19. It was calculated by dividing the number of live births to mothers whose age at delivery was under 20 reported in 2010 – 2012 by three times the total population of females from ages 15 to 19 in 2011 (using smoothed EBR), and multiplying the result by 1,000.

Life Expectancy at Birth

Life expectancy at birth values are reported in years, and were derived from period life tables created in the statistical software program R¹² using the Human Ecology, Evolution, and Health Lab's¹³ example period life table function. This function was modified to calculate life tables for each ZCTA, and to allow the life table to be calculated from submitted age stratified mortality rates. The age stratified mortality rates were calculated for each ZIP code by dividing the total

¹² R Development Core Team. (2015). R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org>.

¹³ Human Ecology, Evolution, and Health Lab. (2009, March 2). *Life tables and R programming: Period Life Table Construction*. Retrieved February 16, 2013, from Formal Demography Workshops, 2006 Workshop Labs: <http://www.stanford.edu/group/heelh/cgi-bin/web/node/75>

number of deaths in a given age category from 2010 - 2012 by three times the ZCTA population for that age group in 2010 (smoothed to EBR). The age group population was multiplied by three to match the three years of mortality data that were used to derive the rates. Multiple years were used to increase the stability of the estimates.

Diversity Index

The diversity index was calculated to measure the racial and ethnic diversity of geographic regions within the HSA. It was calculated using concepts from Iceland¹⁴, but using the Shannon's evenness index (Beals, Gross, & Harrell, 2000) rather than the specific methodology described therein. The diversity index represents how evenly population within a given geographic unit is divided between the following seven racial/ethnic groups (described previously): Asian, Black, Hispanic, American Indian, Pacific Islander, White, Other or Two or More Races. Diversity index values range between 0 and 1, with a value of 0 in areas where the entire population belongs to just one racial/ethnic group and a value of 1 in areas with population evenly divided between the seven groups. Readers interested in the specifics of index calculation are referred to the previously listed sources.

Major Crime and Domestic Violence Rates

Major crimes and domestic violence related calls for assistance reported in the State of California Department of Justices' Crime Data reports are listed by reporting police agency. In order to estimate major crime and domestic violence rates, these values need to be associated with particular geographic areas, and then divided by those area populations. This was done for this report by comparing the names of police agencies to populations reported for "places" (including both incorporated and unincorporated areas) by the US Census. Both crime and population data were obtained for 2013.

Many reporting agencies, such as those associated with hospitals, transit and freight rail lines, university campuses, and state and federal agencies, did not correspond to a specific census place. Internet searches were used to identify the Census places they were associated with, and their cases were added to those places. For example, the crimes or calls for assistance reported by a University police department were added to the city or county that the university campus was located in. For areas where this was unclear based on the name alone, internet searches were conducted to determine the place an agency fell inside of. Because reported crimes or calls for agencies were organized by county, if the crimes for an agency could not be associated with any specific place, its reported crimes were grouped together with those for the county sheriff's department.

To calculate rates, the total number of crimes or calls for assistance for each Census place resulting from the process described above were divided by the population of that place and multiplied by 10,000 to report the number of crimes per 10,000 in that place. For crimes reported for (or grouped with) the county sheriff's department, the county population was modified by subtracting the total population of all Census places with reported crimes. This meant that the major crime rate reported for the county was reporting not the total county's crime rate, but the rate of crimes occurring in those portions of the county that were not otherwise covered by another reporting agency.

Overall county major crime rates and domestic violence related calls for assistance were, however, calculated for benchmarking purposes by summing the total number of major crimes reported by any agency within the county, dividing that by the total population of the county, and multiplying the result by 10,000. For further detail as to which specific crimes are covered within the "major crime" category, interested readers are referred to the State of California Department of Justices' Crime Data reports, available online at: <http://oag.ca.gov/crime>.

Park Access

¹⁴ Iceland, J. (2004). *The Multigroup Entropy Index (Also Known as Theil's H or the Information Theory Index)*. US Census Bureau. Retrieved June 20, 2015, from http://www.census.gov/housing/patterns/about/multigroup_entropy.pdf

The park access variable reports the percent of the 2010 population residing within each ZCTA that lives in a Census block that intersects a ½ mile buffer around the closest park. ESRI's U.S. Parks data set¹⁵, which includes the location of local, county, regional, state, and national parks and forests, was used to determine park locations.

Modified Retail Food Environment Index (mRFEI)

The Modified Retail Food Environment Index (mRFEI) variable reports the percentage of the total food outlets in a ZCTA that are considered healthy food outlets. Values below 0 are given for ZCTAs with no food outlets. The mRFEI variable was calculated using a modification of the methods described by the National Center for Chronic Disease Prevention and Health Promotion¹⁶ using ZIP code level data obtained from the US Census Bureau's 2013 County Business Pattern datasets. Healthy food retailers were defined based on North American Industrial Classification Codes (NAICS), and included:

- Large grocery stores: NAICS code 445110, with 50 or more employees
- Fruit and vegetable markets: NAICS 445230
- Warehouse clubs: NAICS 452910

Food retailers that were considered less healthy included:

- Small grocery stores: NAICS code 445110, with 1 – 4 employees
- Limited-service restaurants: 722513
- Convenience stores: 445120

To calculate the mRFEI, ZIP code values were converted to ZCTAs using previously described processes. The total number of health food retailers was then divided by the total number of healthy and less healthy food retailers for each ZCTA, and the result was multiplied by 100 to calculate the final mRFEI value for the ZCTA. HSA mRFEI benchmark values were calculated by first summing the total number of each type of food retailer that fell within the HSA, and then by following the same approach.

¹⁵ ESRI. (2010). U.S. and Canada Detailed Streets. *ESRI Data & Maps: StreetMap* (10 edition)

¹⁶ National Center for Chronic Disease Prevention and Health Promotion. (2011). *Census Tract Level State Maps of the Modified Retail Food Environment Index (mRFEI)*. Centers for Disease Control. Retrieved Jan 11, 2016, from http://ftp.cdc.gov/pub/Publications/dnpao/census-tract-level-state-maps-mrfei_TAG508.pdf

