

# EPIDEMIOLOGY OF HEPATITIS C

San Luis Obispo County, California | June 2018



COUNTY OF SAN LUIS OBISPO  
HEALTH AGENCY  
PUBLIC HEALTH DEPARTMENT

# INTRODUCTION

## Overview

Viral Hepatitis is an infection with any of the five known (but distinct) viral strains that can cause hepatitis: A, B, C, D or E. Hepatitis C virus (HCV) and Hepatitis B virus (HBV) are the two strains that chronically infect the liver, causing the most significant long-term liver disease. HCV infection is a leading cause of cirrhosis and hepatocellular carcinoma, and was the reason for 24% of all California liver transplants in 2017<sup>1</sup>. An estimated 41,200 cases of acute hepatitis C occur in the US each year; while approximately 19,000 people die every year from hepatitis C related liver disease.<sup>2</sup> In San Luis Obispo County, reported cases of hepatitis C have been declining from a high 1,140 in 2008 to 376 in 2017. However, most of the HCV cases have been reported as chronic HCV, while acute HCV cases, although small in number, are rising.

## Demographic Characteristics of San Luis Obispo County

San Luis Obispo (SLO) County is located on the Central Coast of California, approximately 230 miles south of San Francisco and 200 miles north of Los Angeles. The County covers 3,316 square miles, and according to the United States Census Bureau, has an estimated population of 278,680 in 2016<sup>3</sup>.

According to the 2010 Decennial Census, San Luis Obispo County has a population that is 71.1% white, non-Hispanic, 20.8% Hispanic, 2.6% African-American, 4.5% Asian, and 8.3% comprised of other categories, including Native American, Alaskan Native and Pacific Islander. 15.2% of the population is above the age of 65, while approximately 33.5% is below the age of 24.

Demographic distributions of SLO County are quite different from that of the State. Although gender distribution is similar, SLO County has a considerably more homogeneous racial make-up than the State, with almost three-fourths of the County's population classifying themselves as white, non-Hispanic. The County has

also attracted a significant retirement population, with approximately 29% of the population being 55 years or older. California as a whole has a slightly younger population distribution, with ~23% of the population being 55 years or older. Table 1 shows the age, race and gender distributions of San Luis Obispo County vs that of California.

**Table 1:** San Luis Obispo County and Calif. Populations by Gender, Race and Age, 2010\*

	San Luis Obispo County		California
	Number	% of Population	% of Population
<b>Gender</b>			
Male	137,999	51.2%	49.7%
Female	131,638	48.8 %	50.3%
<b>Race and Hispanic Origin*</b>			
White, Non-Hispanic	191,696	71.1%	40.1%
Hispanic	55,973	20.8%	37.6%
Black	5,550	2.1%	6.2%
Asian	8,507	3.2%	13.0%
Other	12,649	4.7%	18.0%
<b>Age</b>			
< 5	13,343	4.9%	6.8%
5 - 14	27,974	10.4%	13.7%
15 - 24	49,069	18.2%	15.0%
25 - 34	32,108	11.9%	14.3%
35 - 44	29,752	11.0%	13.9%
45 - 54	39,253	14.6%	14.1%
55 - 64	37,116	13.8%	10.8%
65 +	41,022	15.2%	11.4%
Total	269,637	100%	100.0%

Source: 2010 U.S. Census

\*It should be noted that the Race and Ethnicity columns will not sum to 100%, as the Hispanic category includes White, Black, Asian and other races.

# HCV IN SAN LUIS OBISPO COUNTY

In 1989, HCV was discovered as the cause of non-A, non-B hepatitis. Blood screening became available in the early 1990s, leading to the rapid decline in cases of HCV caused by contaminated blood transfusion and organ donation.<sup>4</sup> Today, the leading cause of HCV transmission is believed to be needle sharing among IV drug users. This has caused a rapid rise of cases since 2010, paralleling the course of the opioid epidemic in the United States.

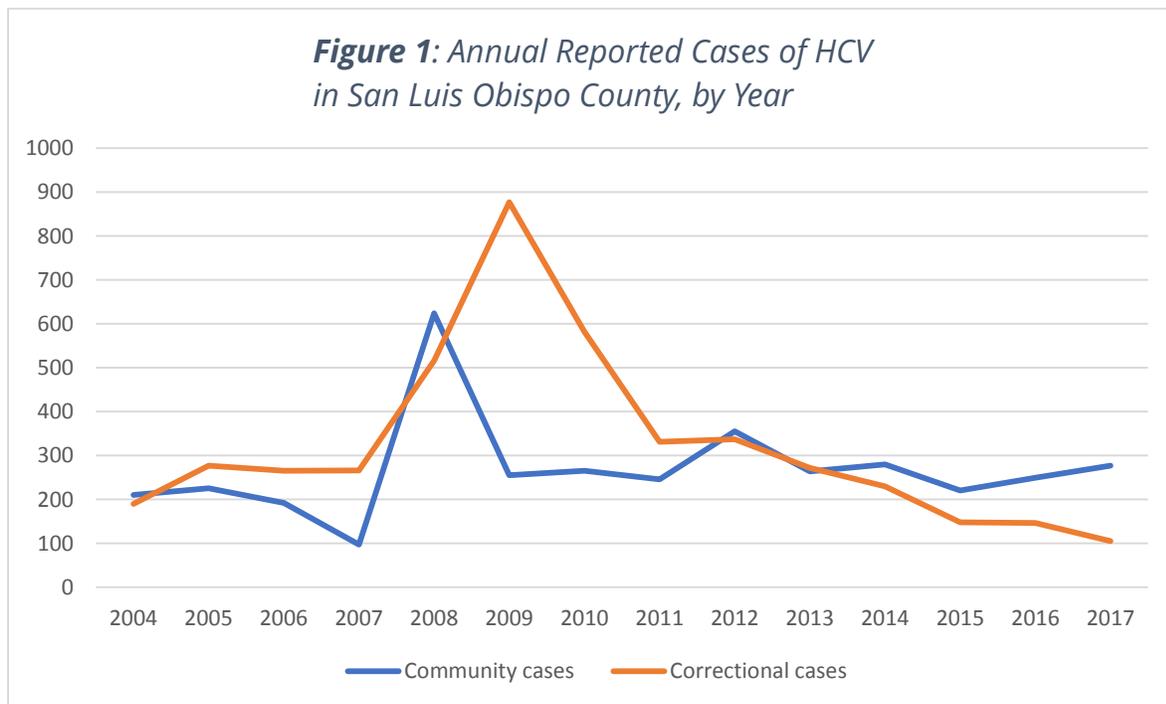
In San Luis Obispo County, cases of HCV declined until 2004, when they began to rise again, as shown in Table 2. Prior to 2012, there was not a distinction between chronic and acute cases of HCV. In the correctional community, the decline in diagnosed cases continues, while the community-diagnosed cases are slowly increasing, as shown in Figure 1. The community numbers are consistent with national data, which show that the opioid epidemic is causing cases of HCV to rise again, primarily due to needle sharing among IV drug users.

**Table 2:** Reported Chronic and Acute HCV Cases by Year, San Luis Obispo County

Year	Community	Correctional	Total	Chronic	Acute
2004	210	190	<b>400</b>	-	-
2005	225	277	<b>502</b>	-	-
2006	192	265	<b>457</b>	-	-
2007	97	266	<b>363</b>	-	-
2008	624	516*	<b>1140*</b>	-	-
2009	255	877*	<b>1132*</b>	-	-
2010	265	582	<b>847</b>	-	-
2011	246	331	<b>577</b>	-	-
2012	355	337	<b>692</b>	692	0
2013	264	272	<b>536</b>	535	1
2014	280	230	<b>510</b>	508	2
2015	220	148	<b>368</b>	367	1
2016	249	146	<b>395</b>	391	4
2017	277	105	<b>382</b>	376	6

\*A backlog of case reports were entered from CMC, creating a spike in cases reported in those years.

The number of cases reported to the San Luis Obispo County Public Health Department is not necessarily reflective of newly diagnosed infections. Many persons are tested for HCV more than once, in different counties. The State of California regularly de-duplicates cases that have been reported in multiple jurisdictions, and publishes this number for each county. Table 3 below shows the number of cases reported in SLO County vs the number of cases the State has determined are newly diagnosed cases for selected years. As can be seen in Table 3, the actual number of newly diagnosed cases in SLO County is much lower than is reported by laboratory testing and SLO County medical providers. These lower numbers as reported by the State would still be a significant underestimation of actual cases in our community, as many people at risk for infection are not tested, and are unaware that they may be positive for HCV. The actual number of cases of HCV is estimated to be ~ 3.5 times the number of reported cases.<sup>4</sup>



**Table 3:** Chronic HCV in San Luis Obispo County, reported by County Providers vs. De-duplicated Case Counts by State of California

	<b>Chronic HCV cases reported to SLO County Public Health Department</b>	<b>Chronic HCV infections reported for SLO County as determined by California Department of Public Health</b>
2011	577	274
2013	535	187
2015	367	186

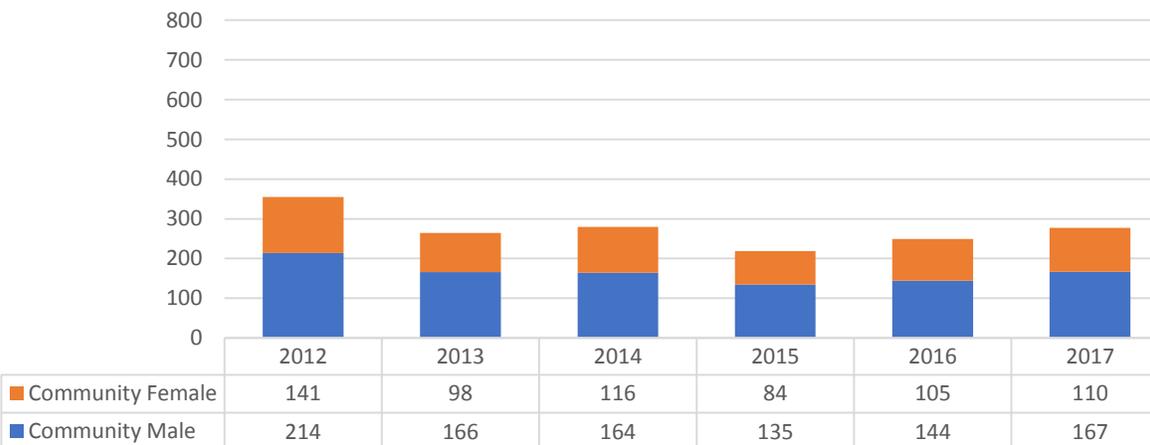
## Gender

Males in San Luis Obispo County account for the majority of cases. In Figure 2 below, the number of male vs female cases of chronic HCV are shown by year. The percentage of all cases who are female has been rising steadily from a low of 18% in 2013 to a high of 28.7% in 2017. This is reflective of national and state trends, where male cases outnumber female cases.<sup>5</sup> The two State institutions, California Men’s Colony (CMC) and Atascadero State Hospital (ASH) are male only, thus skewing the overall totals towards men. In the correctional community, only four cases were female (all from County jail). The community cases show a much smaller discrepancy in gender disparity, as shown in Figure 3.

**Figure 2: Gender of Reported Chronic HCV Cases in San Luis Obispo County, by Year**



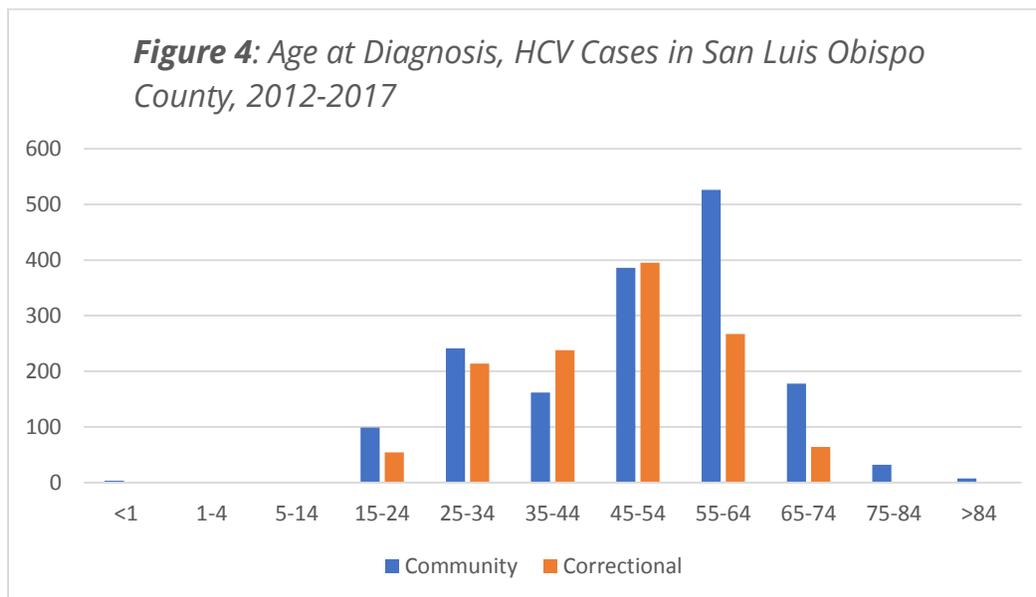
**Figure 3: Gender of Reported Community HCV Cases in San Luis Obispo County, by Year**



In community cases, the percentage of females ranges from a low of 37% in 2013 to a high of 40% in 2017.

## Age

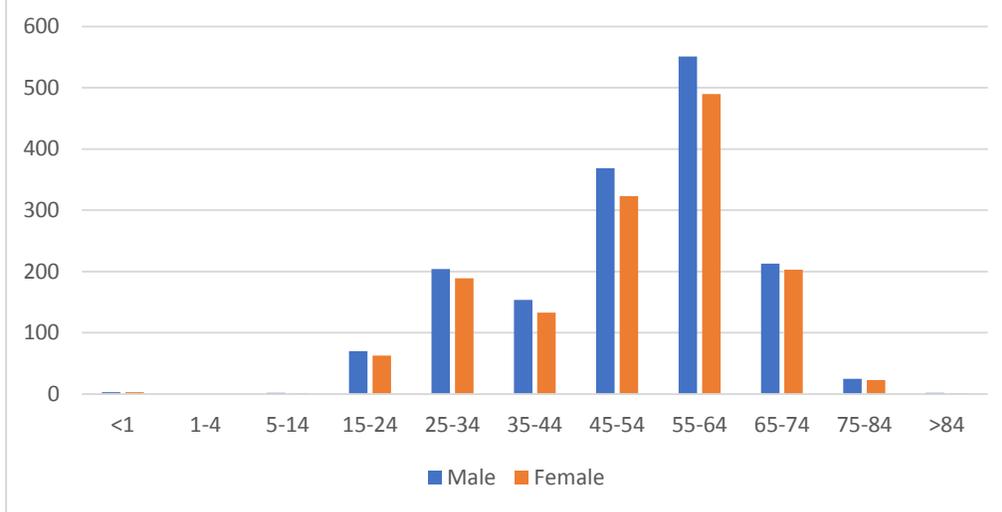
In San Luis Obispo County, there is a slight difference in the age of diagnosis for community vs. correctional cases. In the community, the largest age group of cases diagnosed is 55-64 years of age, the “baby-boomers,” as shown below in Figure 4. For the correctional cases, a younger age at diagnosis is more likely. The Centers for Disease Control and Prevention (CDC) recommends that all persons born between 1945 and 1965 be tested for HCV. It is estimated that approximately 75% of all persons chronically infected with HCV were born between 1945 and 1965, and prevalence data shows that people born during these years are five times more likely than other adults to be infected with HCV.<sup>6</sup>



## Gender

As seen below in Figure 5, there is no significant difference in the age of diagnosis for males vs. females in community cases of HCV. However, females are slightly less likely to have HCV diagnosed after the age of 55. It is unknown if this difference is due to actual lower risks for this cohort of females in their previous years, or lack of testing in this age group.

**Figure 5: HCV Age at Diagnosis by Gender, San Luis Obispo County, 2012-2017**



## CONCLUSION

Hepatitis C virus infection is a leading cause of cirrhosis, hepatocellular carcinoma and liver transplantation.<sup>7,8</sup> Although new infection rates are on the decline, the prevalence rate of infections continues to be high, with many cases undiagnosed. In 2007, over 15,000 deaths in the U.S. were attributed to HCV infection.<sup>9</sup> In addition, the prevalence of more advanced liver diseases has been increasing.<sup>10</sup> In 2011, the costs of healthcare associated with HCV infection was estimated to be \$6.5 billion. The lifetime cost of an individual infected in 2011 was estimated to be \$64,490.<sup>10</sup>

A key strategy in any HCV program is the prevention of new infection in individuals. Outreach to at-risk populations, with messaging on prevention, testing and treatment will be critical to continue our progress in reducing the burden of disease.

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<sup>1</sup> US Dept. of Health and Human Services, Organ Procurement and Transplantation Network Liver Transplant data. Available at: <https://optn.transplant.hrsa.gov/data/view-data-reports/national-data>

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<sup>2</sup> Centers for Disease Control and Prevention, Hepatitis C FAQs for Health Professionals. Available at: <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section1>

<sup>3</sup> US Census Bureau, American Community Survey, 2008-2012 five year estimates. <http://factfinder.census.gov>

<sup>4</sup> University of Washington, HCV Epidemiology in the United States. Available at: [https://www.google.com/search?q=hcv+epidemiology+in+the+united+states&rlz=1C1GGRV\\_enUS782US782&oq=hcv+epidemiology+in+the+united+states&aqs=chrome..69i57j69i60.5743j1j7&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=hcv+epidemiology+in+the+united+states&rlz=1C1GGRV_enUS782US782&oq=hcv+epidemiology+in+the+united+states&aqs=chrome..69i57j69i60.5743j1j7&sourceid=chrome&ie=UTF-8)

<sup>5</sup> Armstrong GL, Wasley A, Simard EP, McQuillan GM, Kuhnert WL, Alter MJ. The prevalence of hepatitis C virus infection in the United States, 1999-2002, *Ann Intern Med*, 2006, vol. 144 (705-14)

<sup>6</sup> Centers for Disease Control and Prevention. People Born 1945-1965 (Baby Boomers). Available at: <https://www.cdc.gov/hepatitis/populations/1945-1965.htm>

<sup>7</sup> El-Serag HB, Mason AC. Rising incidence of hepatocellular carcinoma in the United States. *N Engl J Med*. 1999;340:745–750.

<sup>8</sup> Poynard T, Yuen MF, Ratziu V, Lai CL. Viral hepatitis C. *Lancet*. 2003;362:2095–2100

<sup>9</sup> Ly KN, Xing J, Klevens RM, Jiles RB, Ward JW, Holmberg SD. The increasing burden of mortality from viral hepatitis in the United States between 1999 and 2007. *Ann Intern Med*. 2012;156:271–278.

<sup>10</sup> Razavi H, ElKhoury AC, Elbasha E, et al. Chronic Hepatitis C Virus (HCV) Disease Burden and Cost in the United States. *Hepatology (Baltimore, Md)*. 2013;57(6):2164-2170. doi:10.1002/hep.26218.