Viral Hepatitis C Surveillance Report, 2022

SAN FRANCISCO, CALIFORNIA

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INTRODUCTION

The Viral Hepatitis C Surveillance Report for 2022 presents data collected by the San Francisco Department of Public Health's (SFDPH) Viral Hepatitis Surveillance Program from January 1, 2022 through December 31, 2022 on persons who have chronic hepatitis C infection. SFDPH receives confidential disease reports containing basic demographic information from laboratories and providers, as mandated by state regulation. This basic information comprises core surveillance for chronic hepatitis C infection. This report provides an overview of hepatitis C infection, a description of the SFDPH Viral Hepatitis Registry, and findings of chronic hepatitis C infection core surveillance.

ACKNOWLEDGEMENTS

This report summarizes information collected by the Viral Hepatitis Surveillance Program in 2022. The report was written by Amy Nishimura, MS, MPH, Melissa Sanchez, PhD, MA, and Shelley Facente, PhD, MPH. The data were curated and analyzed by Amy Nishimura and Melissa Ongpin, MPH. The geographic analysis was done by Valerie Caplan, MPP. We are grateful to Rachel Grinstein, SFDPH Viral Hepatitis Coordinator, and the End Hep C SF initiative for their support. We thank the Division of Viral Hepatitis, Centers for Disease Control and Prevention for their financial and technical support. Most of all, we thank the laboratorians, clinicians, community service providers, and persons living with chronic hepatitis C who provided the information that made this report possible.

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OVERVIEW OF HEPATITIS C INFECTION

Hepatitis C virus (HCV) is one of the most common bloodborne causes of chronic liver disease in the United States. HCV is transmitted primarily through contact with infected blood or blood products. Currently, injection drug use is the most common mode of HCV transmission in the United States and can be acquired from the use of shared, unsterilized needles, syringes or other injection equipment. Another possible mode of HCV transmission is mother-to-child transmission, which occurs in 4%-8% of infants born to mothers living with HCV.[1] Other possible, but less frequent, sources of exposure to HCV include needlestick injuries in healthcare settings; mishandling and/or contamination of injection equipment (e.g., diabetes testing equipment, multi-dose vials); sexual contact with a person living with HCV; and sharing personal items contaminated with infectious blood (e.g. razors, toothbrushes). Receipt of donated blood, blood products or organs was once a common means of HCV transmission; however, due to the implementation of routine blood screening in mid-1992, and the introduction of virus inactivation procedures for clotting factor concentrates in 1987, the risk of HCV infection from these procedures in the United States is now rare.[1]

HCV infection has an acute phase that can either resolve spontaneously or progress into a long-term chronic infection. Acute HCV infection is a short-term illness which occurs within the first six months after a person is exposed to the hepatitis C virus. Most people newly infected with HCV have mild symptoms or are asymptomatic. In those who do experience acute phase symptoms, symptoms typically occur 2-12 weeks after exposure and can include fever, fatigue, dark urine, light-colored stools, abdominal pain, loss of appetite, nausea, vomiting, joint pain, and jaundice.[1]

Acute HCV infection leads to chronic infection in more than half of people infected with HCV, while the remaining half of those newly infected are able to clear the virus without treatment and do not develop chronic infection. Chronic HCV infection progresses very slowly; most persons with chronic HCV infection are asymptomatic, and the infection is often not recognized until routine blood tests identify abnormal liver function.[1]

Many people with chronic HCV infection eventually develop chronic liver disease, including cirrhosis and liver cancer. Of those chronically infected with HCV, 5-25% will develop cirrhosis over a period of 10-20 years and, of those who develop cirrhosis, the annual risk of developing liver cancer is 1-4%.[1] Chronic HCV infection is the leading indicator for liver transplants and, in 2018, U.S. death certificates listed chronic HCV as either a contributing or underlying cause of death for 15,713 people in the United States.[1]

The Centers for Disease Control and Prevention (CDC) recommends universal HCV screening for all adults 18 years and older and for all pregnant people during each pregnancy. One-time hepatitis C testing is also recommended for everyone with known risk factors or exposures to HCV, including: persons with HIV; those who have ever injected drugs, even if it was only once in the remote past; persons with certain medical conditions, including those who have ever received long-term

hemodialysis; persons with persistently abnormal liver enzyme tests; recipients of blood transfusions or organ transplants in the United States before 1992; recipients of clotting factor concentrates made in the United States before 1987; healthcare workers after needlestick injuries involving HCV-positive blood; and children born to HCV-positive mothers. In addition, routine hepatitis C screening is recommended for persons with ongoing risk factors for hepatitis C infection, including persons who currently inject drugs and persons with certain medical conditions, including those who receive hemodialysis.[2]

Testing for HCV infection is often a multi-step process. A test for antibody to HCV virus (anti-HCV) is recommended for initial screening. A positive anti-HCV test identifies persons who were exposed to HCV but is unable to distinguish a past infection from a present infection. Therefore, to identify a current HCV infection, confirmation of positive anti-HCV tests is recommended with a nucleic acid test (NAT) to detect the amount or presence of HCV RNA. Distinguishing current from resolved HCV infections through a positive HCV NAT is a critical step in identifying people for hepatitis C counseling, preventive care, and, importantly, treatment.[3]

There is currently no vaccine for HCV.[1] However, in 2014, several new direct-acting antiviral (DAA) medications became available in the United States,[4] dramatically improving the options for non-toxic treatment and substantially improving HCV cure rates.[5] While extremely high costs of treatment with the new DAAs originally resulted in restrictive policies regarding treatment eligibility, by 2018 nearly all restrictions were lifted in California, allowing anyone age 18 or older with Medi-Cal to qualify for life-saving treatment, with the exception of those with a short life expectancy who were not expected to be mediated by HCV therapy.[6]

A recently updated estimate of the number of HCV cases in the U.S. from January 2017 – March 2020 found approximately 2.2 million adults with a current HCV infection (viral RNA positive).[7,8] In addition, the CDC estimates an acute HCV rate of infection of 1.6 acute cases per 100,000 population in 2021.[9] The largest increases in incidence were among individuals age 20 – 39,[10] and a similar trend has been seen in acute HCV infections among younger adults in the U.S.[11]

SAN FRANCISCO CHRONIC VIRAL HEPATITIS REGISTRY

In 2005, the SFDPH received funding from the CDC to develop a population-based registry of persons in San Francisco with chronic hepatitis B and/or hepatitis C infection. SFDPH was able to build upon a pre-existing database that contained limited information from the first laboratory report of possible lab markers of chronic hepatitis B or hepatitis C infection reported on an individual between 1984 and 2004. Beginning in 2005, standardized protocols were implemented for data entry into a longitudinal, person-based information system that contains all positive hepatitis B and hepatitis C test results that are reported for San Francisco County residents and for persons whose residence is not known to be in another jurisdiction. The data that SFDPH receives from laboratories and clinicians represent core surveillance for chronic hepatitis B and hepatitis C and includes basic demographic information (name,

sex, age, address) and hepatitis B or hepatitis C test results. Most of the data are reported by laboratories rather than clinicians. Laboratories have been mandated by the California Code of Regulations (CCR), Title 17, Section 2505[12] to report positive hepatitis B surface antigen results to public health since May 1995, while laboratory reporting of HCV test results was not required until July 2007.

METHODS

CORE SURVEILLANCE

Laboratorians, clinicians, and other mandated reporters report positive results of tests for hepatitis C to the SFDPH in compliance with Title 17, California Code of Regulations (CCR), Sections 2500 and 2505.[12] Additionally, according to the California Health and Safety Code (HSC) Section 120130, laboratories are required to submit lab results electronically to the state electronic reporting system.[13] Laboratories and providers are required to report test results, patient identifiers (e.g., name, date of birth, gender, address, phone number, medical record number) and provider identifiers (e.g., name, facility, address).[12] The SFDPH receives and stores the reported information in a secure electronic database, organized by the person reported.

The 2020 Centers for Disease Control and Prevention/Council of State and Territorial Epidemiologists (CDC/CSTE) laboratory criteria for diagnosis are applied to HCV test results to identify persons with probable and/or confirmed chronic hepatitis C. CDC/CSTE defines a probable case of chronic hepatitis C as a person with a positive test for antibodies to hepatitis C virus (anti-HCV), and no report of a positive HCV nucleic acid test (NAT). A confirmed case of chronic hepatitis C is a person who has a positive HCV RNA NAT, including qualitative, quantitative, or genotype testing. In addition to the laboratory criteria, both probable and confirmed case definitions require that cases are >36 months of age (unless exposure was known to be non-perinatally) and have no report of, or do not meet, clinical or laboratory criteria indicative of an acute infection. SFDPH does not routinely receive clinical information (e.g., jaundice, liver enzyme tests, etc.) or, historically, negative HCV results to identify acute cases based on symptoms or test conversion (a negative HCV result followed within 12 months by a positive HCV result) and therefore use the CDC/CSTE laboratory criteria for case classification.[14]

For this report, age is defined as the age of the person at the time their first positive hepatitis C result was received by the SFDPH in 2022. Age is calculated by subtracting the case's date of birth from the date the result was received by SFDPH, then dividing the difference by 365.25 (the .25 accounts for leap years). The number and percent of persons for whom age is unknown is shown in a table footnote.

Race/ethnicity is classified as American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian/Pacific Islander, White, or Other. Hispanic/Latino ethnicity includes all persons of Hispanic or Latino ethnicity regardless of race; all other race categories do not include persons of Hispanic or Latino ethnicity. The number and percent of persons for whom race/ethnicity is unknown is shown in a table footnote.

Address information was geo-coded using ArcMap to identify latitude and longitude and then matched to San Francisco neighborhoods. Cases that could not be geo-coded due to missing or unknown residential address information are excluded from the geographic distribution analysis. The number and percent of persons for whom address is unknown is shown in a table/figure footnote. Case rates were calculated as the number of chronic HCV cases reported to SFDPH in 2022 divided by the 2020 5-year American Community Survey (ACS) population estimate for San Francisco[15] multiplied by 10,000. Case counts and case rates are not disclosed for neighborhoods with a population of <1000 or for neighborhoods with a case count less than five. Neighborhoods with a case count of less than five are displayed as "<5" and case rates for these neighborhoods are displayed as less than the corresponding case rate for five cases.

Data collected and summarized in this report is kept strictly confidential. SFDPH is authorized by law to collect information on cases of chronic hepatitis C infection for the purpose of controlling or preventing disease including: the reporting of disease, the conduct of public health surveillance, public health investigation and public health intervention.[16] SFDPH employees have a legal and ethical responsibility to protect the confidentiality of protected health information and to use that information only in the performance of their jobs.

DATA LIMITATIONS

1. Surveillance data do not measure prevalence: The data presented are not an estimate of the prevalence of HCV infection in San Francisco residents. Prevalence cannot be calculated because some persons infected with HCV are not tested, and others were tested before consistent reporting to SFDPH was established. In addition, some persons who were tested anonymously may not have been reported to SFDPH. Finally, people who were included in these data may not live in San Francisco, either because their address information was not provided or because they have moved.

2. Surveillance data do not measure incidence: The data presented are not an estimate of the incidence rate of chronic hepatitis C cases in 2022. The incidence rate is the number of newly infected persons occurring within a defined time in a defined geographical area. While SFDPH does identify the first date the case was reported to them, this date is not necessarily the date the case became infected or was newly diagnosed. For example, some cases may have been infected many years ago but had no symptoms and were not tested when newly infected but were tested in 2022 because a clinician was following recommended screening practices or because symptoms of chronic hepatitis had developed.

3. HCV Infection: The HCV infection data presented potentially overestimate the number of reported persons who have chronic HCV infection. Acute HCV infections may be included because no single laboratory test distinguishes acute from chronic HCV infection, and acute infection is based on clinical symptoms and liver function tests that are not routinely reported to the health department. Resolved HCV infections may also be included, because no single laboratory test distinguishes chronic from resolved HCV infection; resolved HCV infection requires a clinician assessment and/or a pattern of

negative tests (e.g., HCV NATs) that, historically, have not been reported to public health. Distinguishing between acute, chronic, and resolved infections would require public health follow-up with clinicians and/or patients to collect symptom and additional laboratory test results. Due to the large volume of reports and limited resources for follow-up, SFDPH was limited to conducting HCV surveillance based on HCV test results that are required to be reported to public health and defines persons as having chronic hepatitis C according to CDC-defined laboratory criteria.

4. Reporting gaps: Complete identification of chronic hepatitis C cases depends on complete reporting by laboratories and clinicians. All reports of positive hepatitis C test results in this report were received electronically by SFDPH in 2022 from laboratories, which are mandated to report positive hepatitis C test results under Title 17, California Code of Regulations (CCR).[12] Under-reporting of electronic laboratory reports by laboratories is believed to be minimal as the majority have automated processes for fulfilling their legally mandated obligations to report to SFDPH. Although the California Health and Safety Code (HSC) Section 120130 paragraph (g) requires laboratories to submit lab results electronically[13], some laboratories are unable to do so and send positive hepatitis C results by fax or mail. These results are not included in this report and, therefore, underestimate the number of cases with chronic hepatitis C in San Francisco. After a systematic review of these positive hepatitis C results sent by fax or mail, it was estimated that these results represent less than 1% of newly reported cases for the 2022 period. Title 17, CCR also mandates clinicians to report cases of chronic hepatitis C to SFDPH;[12] however, the majority of cases are reported by laboratories and not by clinicians. In addition, there are likely San Francisco residents with chronic hepatitis C who did not receive laboratory testing for hepatitis C during this period and whose treating clinician did not report their condition. Information about these persons is therefore missing from this report. Finally, the data presented may include persons who have left San Francisco or who have died after they were reported to the SFDPH.

5. Missing information: Laboratory information systems frequently do not receive or store information about patient race and ethnicity, resulting in a large proportion of cases reported with unknown race and ethnicity.

Similarly, some laboratory reports are missing the case's address. Of the chronic hepatitis C cases reported to SFDPH in this period, approximately 7% were missing street address, city, and ZIP code information. Additionally, approximately 9% of cases were reported with a home address identical to the clinic or outpatient medical facility where they received care, and another 0.8% of cases were reported with a post office box mailing address; these cases' residences were considered unknown for this report. Information about cases whose county of residence was unknown was included in this report, along with cases that are known to live in San Francisco. Thus, the core surveillance data presented may overestimate the number of San Franciscans who were reported with chronic hepatitis C during this period.

Cases with unknown residential addresses were not included in the geographic distribution. While it is certain that this subset of cases includes people experiencing homelessness (PEH), the percentage of total PEH cases that are included in the subset is unknown, as housing status data is not reported to

SFDPH and cases cannot be reliably identified as homeless. PEH are disproportionately impacted by hepatitis C[17], and the omission of cases with unknown residences from the geographic distribution may cause underrepresentation of PEH in the geographic analysis.

6. Duplication: SFDPH follows procedures to minimize duplicate records for persons whose laboratory results may be submitted with slight variations in name spelling (e.g., use of middle initial, typographic error). However, in some instances it may not be obvious that two different names belong to the same person, so two cases will be recorded instead of one. This would lead to a slight overestimate of the number of persons who were reported with chronic hepatitis C in this period. Conversely, in some situations, information from a case may have been erroneously matched and joined to the information from another case, leading to potential underestimation of the number of chronic hepatitis C cases reported in this period.

EPIDEMIOLOGY OF CHRONIC HEPATITIS C INFECTION IN SAN FRANCISCO

CORE SURVEILLANCE DATA – 2022

From January 1, 2022 through December 31, 2022, SFDPH received over 5,040 positive hepatitis C laboratory reports for 3,109 individuals with probable or confirmed chronic hepatitis C infection. Of these 3,109 individuals, 1,019 (32.8%) were newly reported to SFDPH in 2022.

Data presented in the following tables and figures are for all persons who met laboratory criteria for probable or confirmed chronic hepatitis C infection with at least one test reported to SFDPH in 2022 (n=3,109) and for persons newly reported with probable or confirmed chronic hepatitis C to SFDPH in 2022 (n=1,019). Newly reported cases are those who were reported to SFDPH with chronic hepatitis C for the first time and for whom no positive HCV laboratory case report had previously been received. These data do not represent the number of incident or prevalent infections (see Limitations Section).

Sex and Age

Of the cases reported with chronic hepatitis C in 2022, more infections were reported in males among all individuals (70.1%) and newly reported individuals (65.5%) (Table 1). Cases between the ages of 45 and 64 years old comprised 43.5% of all cases reported in 2022, while cases between the ages of 25 and 44 years old comprised 29.3% of all individuals reported in 2022 (Table 2). In contrast, of the newly reported chronic hepatitis C cases, 34.9% were 45 to 64 years old in 2022, and 42.1% were 25 to 44 years old when first reported to SFDPH in 2022 (Table 2).

Table 1. Sex of reported cases with chronic hepatitis C, 2022

	All Cases Reported		Newly Reported Cases	
Sex	n	%	n	%
Female	926	29.8%	349	34.2%
Male	2180	70.1%	667	65.5%
Other	3	0.1%	3	0.3%
Total	3109	100.0%	1019	100.0%

Table 2. Age group of reported cases with chronic hepatitis C, 2022

	All Cases Reported		Newly Reported Cases	
Age Group (years)	n	%	n	%
<15	4	0.1%	1	0.1%
15-24	36	1.2%	27	2.6%
25-34	387	12.4%	193	18.9%
35-44	523	16.8%	236	23.2%
45-54	533	17.1%	170	16.7%
55-64	819	26.3%	186	18.3%
65-74	644	20.7%	157	15.4%
75+	163	5.2%	49	4.8%
Total	3109	100.0%	1019	100.0%

Figures 1 and 2 display the age and sex distributions of all individuals and newly reported individuals reported to SFDPH in 2022 with chronic hepatitis C, respectively. These figures highlight the differences in ages between all cases reported, which are more likely to be older, as opposed to the newly reported cases, which have a larger proportion of younger cases (<45 years old). Similarly, Figure 3 presents cases grouped by birthyear and shows 46.4% of all 2022 cases were born between 1945 and 1965 (baby boomer cohort), compared to 32.8% of newly reported cases in the baby boomer cohort. Newly reported cases had a larger proportion of cases born after 1984 (38 years or younger at first report), comprising 30.9% of newly reported cases, compared to 20.4% of all reported cases in the same 1984-2019 birth cohort.

Figure 1. Age and sex distribution of all cases reported with chronic hepatitis C in 2022

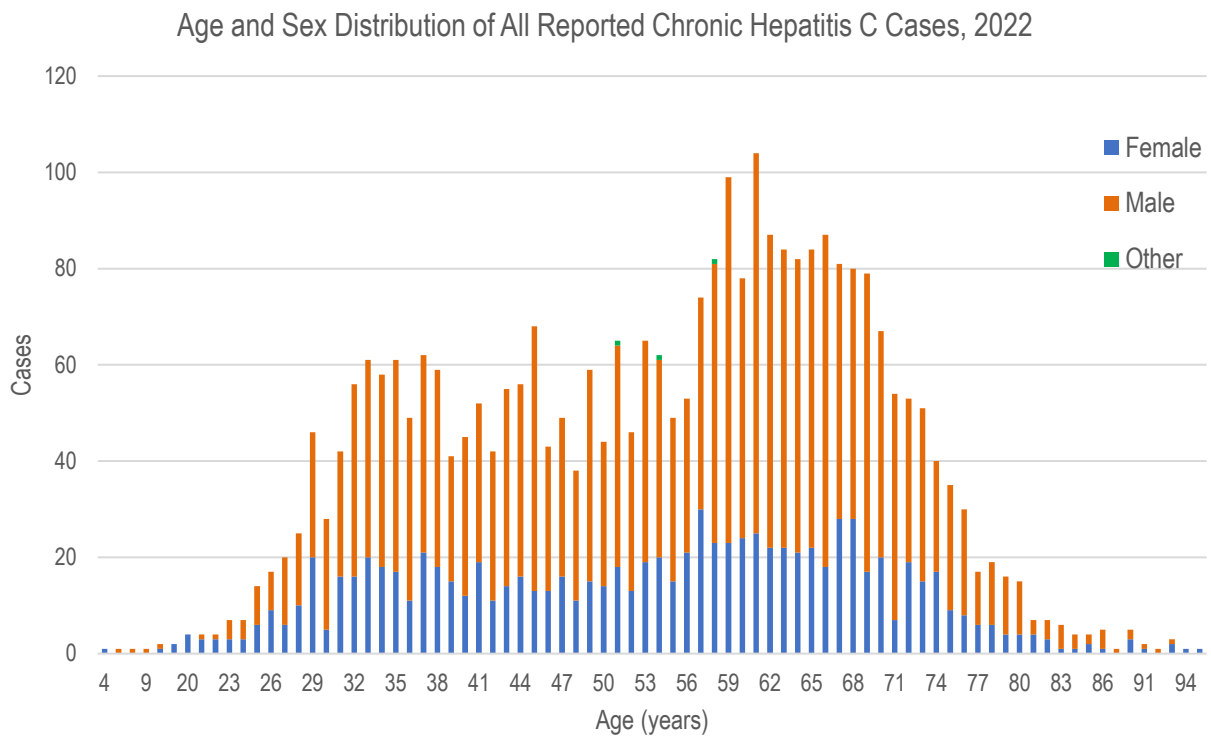


Figure 2. Age and sex distribution of cases newly reported with chronic hepatitis C in 2022

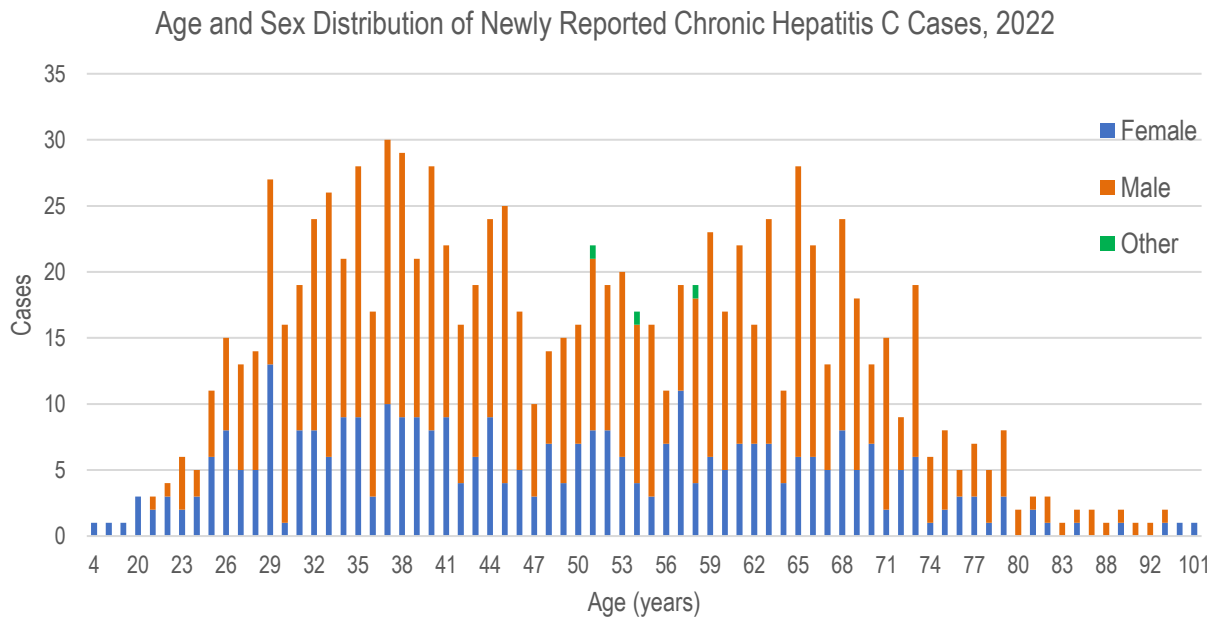
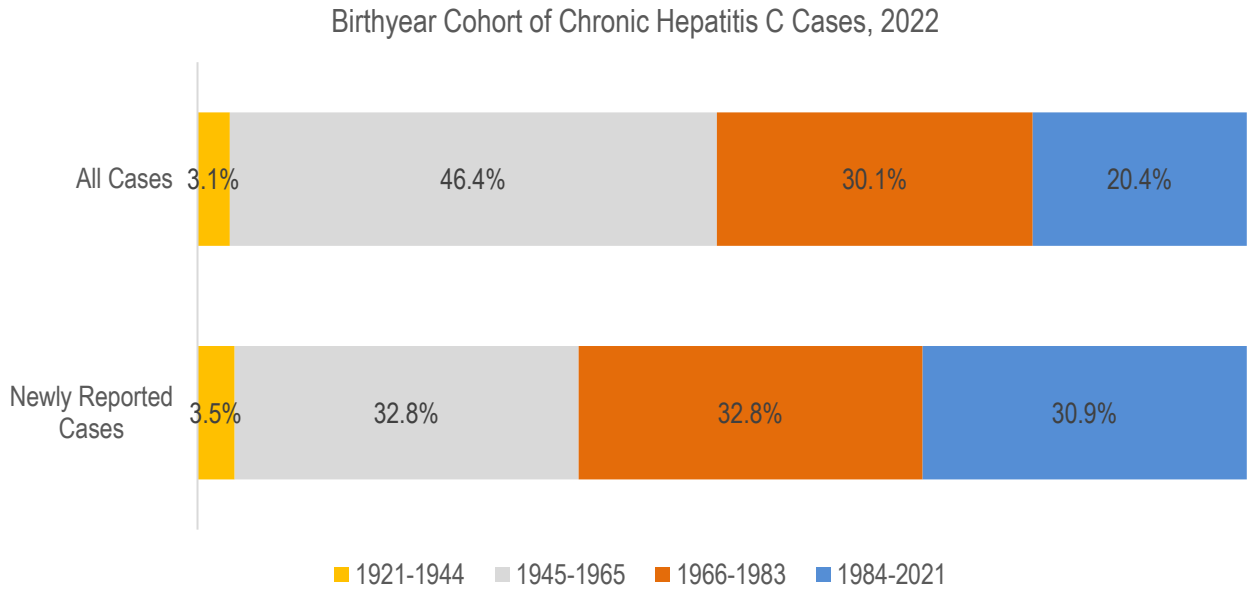


Figure 3. Birthyear cohort of all cases and newly reported cases with chronic hepatitis C in 2022



Race/Ethnicity

Of the total individuals reported with chronic hepatitis C in 2022, 48.1% were White and 22.5% were Black/African American, among the 84.8% of cases for whom race was known (Table 3, Figure 4). Among individuals newly reported in 2022, 47.0% were White and 12.5% were Black/African American, among the 74.8% of cases for whom race was known (Table 3, Figure 4). In San Francisco, Whites comprise 39.8% of the population, and Blacks/African Americans comprise 4.9% of the population[15], as shown in Table 3 and Figure 4, below.

Table 3. Race/Ethnicity of reported cases with chronic hepatitis C, 2022 and the San Francisco population

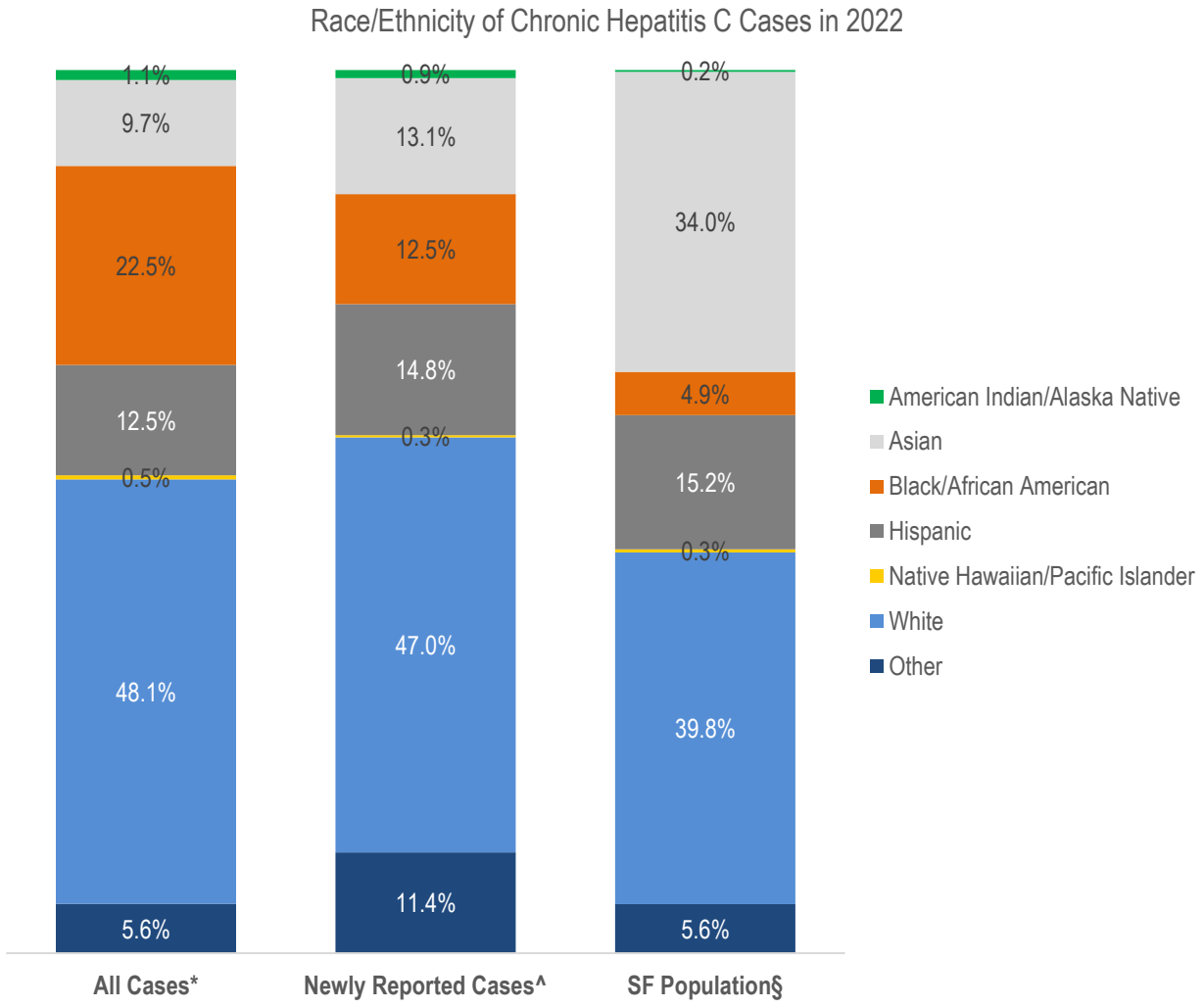
	All Cases Reported*		Newly Reported Cases^		San Francisco Population§	
Race/Ethnicity	n	%	n	%	n	%
American Indian/ Alaska Native	30	1.1%	7	0.9%	1796	0.2%
Asian	256	9.7%	100	13.1%	297279	34.0%
Black/ African American	594	22.5%	95	12.5%	42803	4.9%
Hispanic/Latino (all races)	330	12.5%	113	14.8%	132865	15.2%
Native Hawaiian/ Pacific Islander	12	0.5%	2	0.3%	3022	0.3%
White	1267	48.1%	358	47.0%	348449	39.8%
Other	147	5.6%	87	11.4%	48570	5.6%
Total	2636	100.0%	762	100.0%	874784	100.0%

* Race/Ethnicity data missing for 473/3109 (15.2%) of all cases reported in 2022.

^ Race/Ethnicity data missing for 257/1019 (25.2%) of cases newly reported in 2022.

§ San Francisco Population data source: American Community Survey 2020 5-year estimate [15]

Figure 4. Race/Ethnicity of all cases and newly reported cases with chronic hepatitis C in 2022 and the San Francisco population



* Race/Ethnicity data missing for 473/3109 (15.2%) of all cases reported in 2022.

^ Race/Ethnicity data missing for 257/1019 (25.2%) of cases newly reported in 2022.

§ San Francisco Population data source: American Community Survey 2020 5-year estimate [15]

HCV Laboratory Test Results

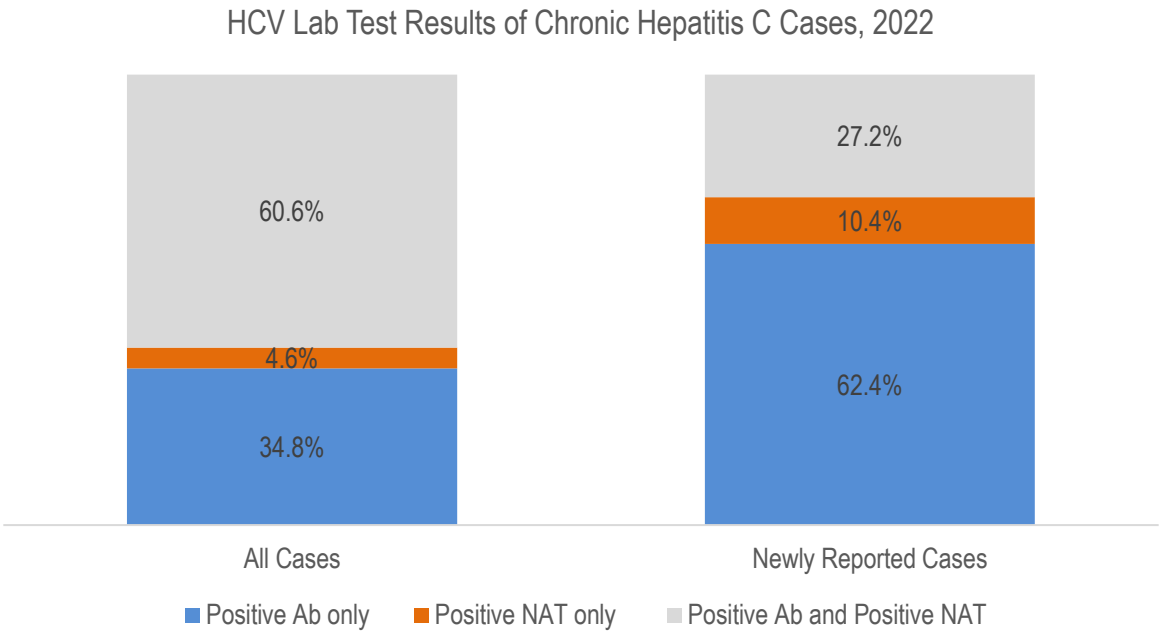
Table 4 and Figure 5 present the types of positive HCV laboratory test results ever received by SFDPH for all cases reported in 2022, and for cases newly reported in 2022, and includes all positive results reported through December 31, 2022. Per the CDC/CSTE case definition, cases reported with a positive HCV antibody (Ab) test and no report of a positive HCV nucleic acid test (NAT) are considered a probable chronic hepatitis C case. A confirmed chronic hepatitis C case is a person who has a positive HCV RNA NAT, including qualitative, quantitative, or genotype testing.

Table 4. Positive HCV lab test results of reported cases with chronic hepatitis C, 2022

	All Cases Reported		Newly Reported Cases	
HCV Lab Test Results	n	%	n	%
Positive Ab Only	1081	34.8%	636	62.4%
Positive NAT Only	144	4.6%	106	10.4%
Positive Ab and Positive NAT	1884	60.6%	277	27.2%
Total	3109	100%	1019	100%

Of the total cases reported in 2022, 34.8% were probable chronic hepatitis C cases with only ever having one or more positive HCV antibody reports, compared with 62.4% of probable chronic hepatitis C cases among newly reported cases. Confirmed chronic hepatitis C cases comprised the remaining 65.2% and 37.8% of total and newly reported 2022 cases, respectively. Of the total chronic hepatitis C cases reported in 2022, 4.6% had only positive NAT results ever, while 60.6% had both positive HCV antibody and NAT results. Of the chronic hepatitis C cases newly reported in 2022, 10.4% were reported with only positive NAT results, while 27.2% had both positive HCV antibody and NAT results.

Figure 5. HCV lab test results of all cases and newly reported cases with chronic hepatitis C in 2022

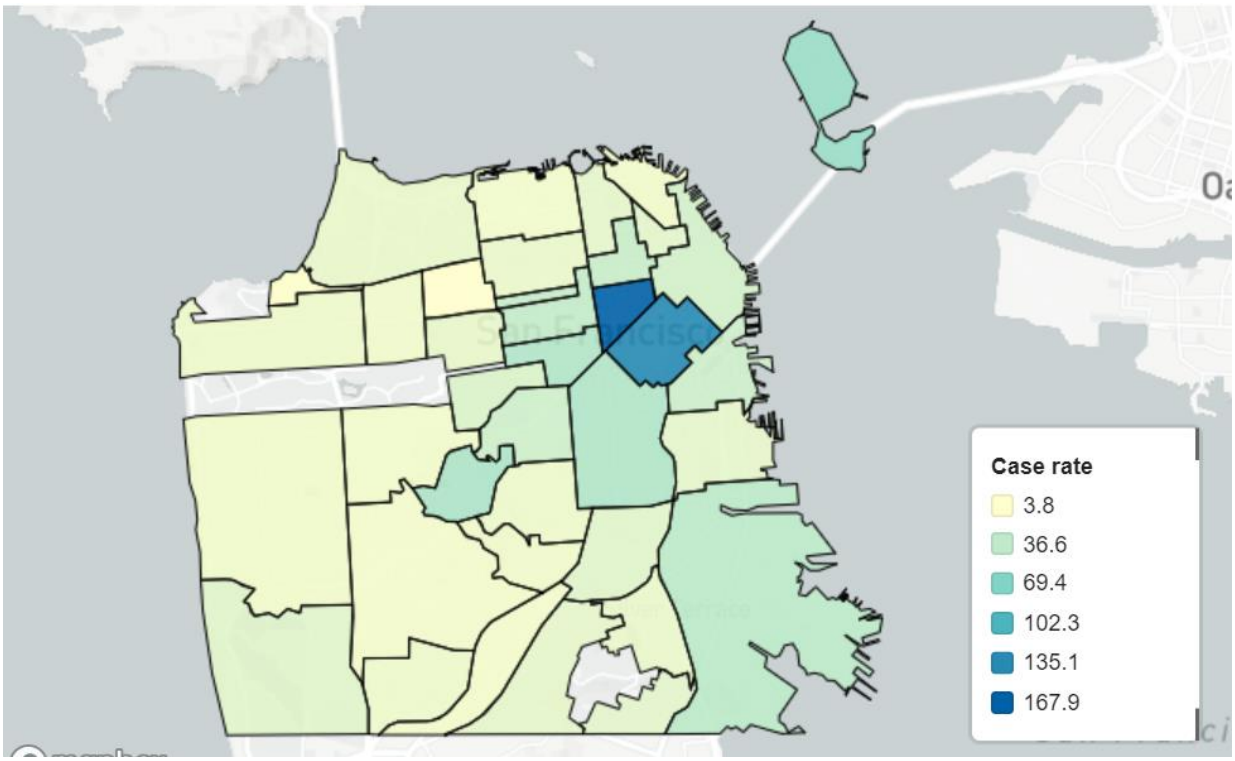


Geographic Distribution

To further understand trends of total cases of chronic hepatitis C infections in 2022, as well as those newly reported in 2022, the figures below map the number of reported cases by neighborhood.

Figure 6 and Table 5 each highlight the case rate and number of all reported chronic hepatitis C cases in each neighborhood during 2022, per 10,000 population. Cases were counted if any positive HCV laboratory report was received by SFDPH for that person in 2022, regardless of whether this was a new or previously known case. Figure 6 shows the number of reported HCV cases per 10,000 residents in 2022: neighborhoods with a higher case rate are darker blue while neighborhoods with a lower case rate are light yellow. The darkest shades of blue in Figure 6 represent the Tenderloin and South of Market neighborhoods with case rates of 167.9 and 135.7 cases of chronic hepatitis C per 10,000 population, respectively (Table 5). Treasure Island, the northeastern-most neighborhood of San Francisco has the next highest case rate with 56.5 cases of chronic hepatitis C per 10,000 population (Figure 6, Table 5).

Figure 6. Chronic hepatitis C cases reported in San Francisco by neighborhood, 2022*



*Additional data details:

- Not shown are 585/3109 (18.8%) of all reported cases who could not be geocoded.
- Case counts and case rates not shown for neighborhoods with fewer than five cases or for neighborhoods with a population fewer than 1,000 people.
- San Francisco Population data source: American Community Survey 2020 5-year estimate.[15]

Table 5. Case count, case rate, and population estimate of all reported cases of chronic hepatitis C by San Francisco neighborhood, 2022 *

San Francisco neighborhood	Case count	Case rate	Population estimate
Tenderloin	499	167.9	29,726
South of Market	341	135.7	25,132
Treasure Island	18	56.5	3,184
Twin Peaks	37	45.9	8,068
Hayes Valley	88	44.4	19,818
Mission	256	43.8	58,424
Bayview Hunters Point	149	38.7	38,480
Western Addition	78	35.0	22,299
Japantown	12	33.1	3,624
Nob Hill	84	32.0	26,247
Mission Bay	40	30.0	13,330
Castro/ Upper Market	68	29.4	23,138
Financial District/ South Beach	62	27.0	22,963
Haight Ashbury	44	22.9	19,181
Lakeshore	29	20.2	14,368
Bernal Heights	51	19.5	26,149
Visitacion Valley	38	19.1	19,875
Chinatown	27	18.9	14,310
Russian Hill	32	17.5	18,237

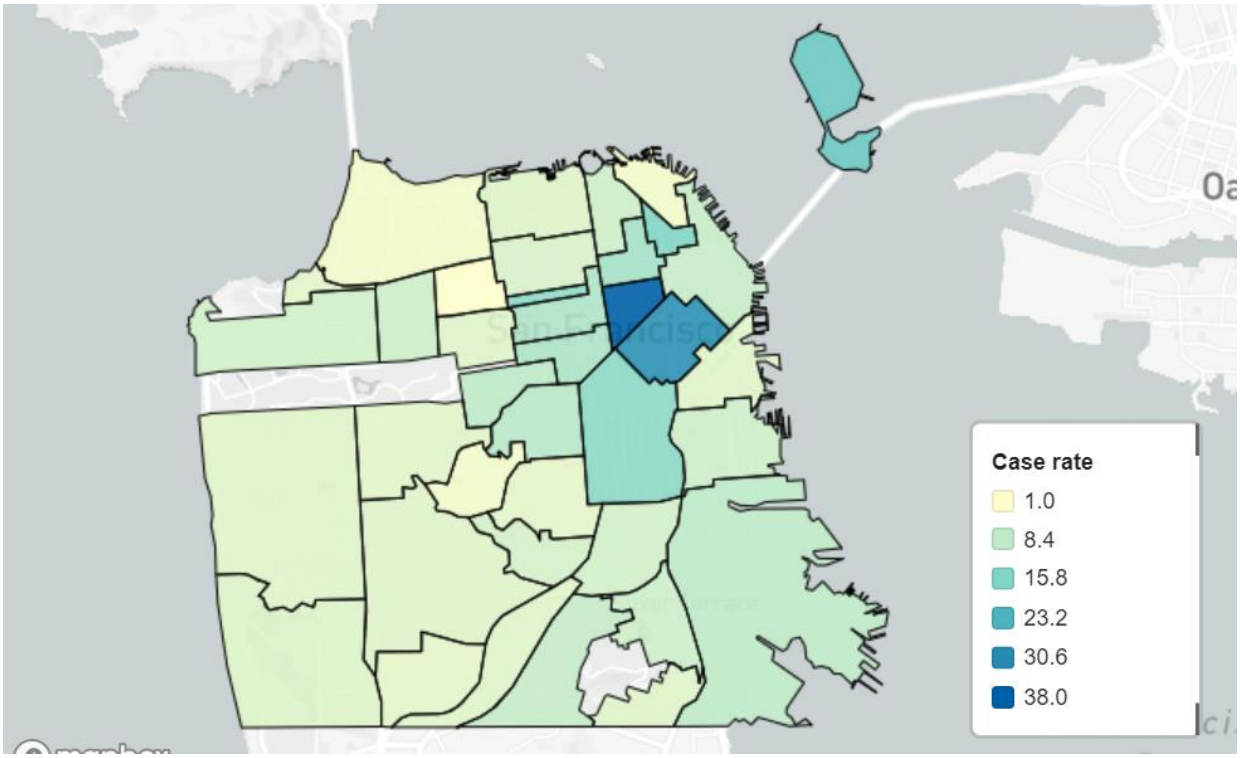
San Francisco neighborhood	Case count	Case rate	Population estimate
Potrero Hill	26	17.5	14,845
Excelsior	71	17.3	40,980
Lone Mountain/ USF	26	15.0	17,350
Portola	24	14.8	16,243
Presidio	6	14.7	4,073
Pacific Heights	35	14.6	23,953
Noe Valley	30	13.3	22,628
Outer Richmond	57	12.5	45,745
Oceanview/ Merced/Ingleside	34	12.4	27,335
Inner Richmond	27	11.9	22,753
Glen Park	10	11.6	8,654
Sunset/Parkside	89	10.9	81,639
North Beach	13	10.9	11,934
Marina	27	10.7	25,186
Inner Sunset	30	10.5	28,551
Outer Mission	25	10.1	24,646
West of Twin Peaks	36	9.4	38,485
Presidio Heights	<5	<4.8	10,445
Seacliff	<5	<20.7	2,416

*Additional data details:

- Not shown are 585/3109 (18.8%) of all reported cases who could not be geocoded.
- Case counts and case rates not shown for neighborhoods with fewer than five cases or for neighborhoods with a population fewer than 1,000 people.
- San Francisco Population data source: American Community Survey 2020 5-year estimate.[15]

Figure 7 and Table 6 include only chronic hepatitis C cases who were newly reported in 2022 in each neighborhood per 10,000 population (people for whom no positive HCV laboratory report had previously been received by SFDPH). Neighborhoods with a higher case rate are darker blue while neighborhoods with a lower case rate are light yellow. From Figure 7, we see that the rate of new cases is highest again for the Tenderloin, South of Market, and Treasure Island neighborhoods with case rates of 38.0, 29.4, and 18.8 cases per 10,000 population, respectively (Table 6).

Figure 7. Newly reported chronic hepatitis C cases in San Francisco by neighborhood, 2022*



*Additional data details:

- Not shown are 266/1019 (26.1%) of newly reported cases who could not be geocoded.
- Case counts and case rates not shown for neighborhoods with fewer than five cases or for neighborhoods with a population fewer than 1,000 people.
- San Francisco Population data source: American Community Survey 2020 5-year estimate.[15]

Table 6. Case count, case rate, and population estimate of newly reported cases of chronic hepatitis C by San Francisco neighborhood, 2022*

San Francisco neighborhood	Case count	Case rate	Population estimate
Tenderloin	113	38.0	29,726
South of Market	74	29.4	25,132
Treasure Island	6	18.8	3,184
Chinatown	22	15.4	14,310
Mission	84	14.4	58,424
Japantown	5	13.8	3,624
Nob Hill	30	11.4	26,247
Hayes Valley	21	10.6	19,818
Western Addition	23	10.3	22,299
Castro/ Upper Market	21	9.1	23,138
Haight Ashbury	16	8.3	19,181
Bayview Hunters Point	32	8.3	38,480
Excelsior	31	7.6	40,980
Financial District/ South Beach	17	7.4	22,963
Portola	11	6.8	16,243
Potrero Hill	10	6.7	14,845
Inner Richmond	15	6.6	22,753
Russian Hill	12	6.6	18,237
Outer Richmond	29	6.3	45,745

San Francisco neighborhood	Case count	Case rate	Population estimate
Bernal Heights	16	6.1	26,149
Glen Park	5	5.8	8,654
Pacific Heights	13	5.4	23,953
Lakeshore	7	4.9	14,368
Marina	12	4.8	25,186
West of Twin Peaks	18	4.7	38,485
Sunset/Parkside	37	4.5	81,639
Visitacion Valley	9	4.5	19,875
Mission Bay	6	4.5	13,330
Outer Mission	11	4.5	24,646
Inner Sunset	12	4.2	28,551
Lone Mountain/ USF	7	4.0	17,350
Oceanview/ Merced/Ingleside	11	4.0	27,335
Noe Valley	9	4.0	22,628
Twin Peaks	<5	<6.2	8,068
Presidio Heights	<5	<4.8	10,445
North Beach	<5	<4.2	11,934
Seacliff	<5	<20.7	2,416
Presidio	<5	<12.3	4,073

*Additional data details:

- Not shown are 266/1019 (26.1%) of newly reported cases who could not be geocoded.
- Case counts and case rates not shown for neighborhoods with fewer than five cases or for neighborhoods with a population fewer than 1,000 people.
- San Francisco Population data source: American Community Survey 2020 5-year estimate.[15]

DISCUSSION

The San Francisco core surveillance data for cases reported in 2022 with chronic hepatitis C were comparable to the latest findings on the national level;[7-11,17] approximately two thirds were male, with newly reported cases trending younger relative to previously reported cases. Specifically, 30.9% of newly reported San Francisco cases were born after 1984 (38 years or younger at first report), compared to 20.4% of all reported San Francisco cases in the same 1984-2019 birth cohort. Inversely, 32.8% of newly reported San Francisco cases were born between 1945 and 1965 (the baby boomer cohort), compared to 46.4% of all reported San Francisco cases in the same baby boomer cohort.

African Americans continued to be disproportionately affected in 2022; comprising 22.5% of all reported San Francisco cases and 12.5% of newly reported cases but only 4.9% of the overall San Francisco population.[15] The geographic analysis of the surveillance data also highlights another notable disparity. San Francisco neighborhoods with the lowest median household incomes are more likely to have a higher number of HCV cases. Identified priority areas include the Tenderloin, South of Market, and Treasure Island neighborhoods, with the Tenderloin and Treasure Island neighborhoods having the second and third highest poverty rates in San Francisco, respectively.[18]

Comparing HCV lab test results of all San Francisco cases to HCV lab test results of newly reported San Francisco cases, both groups had a large percentage of cases who only ever had positive HCV antibody reports. In addition, while both groups had a large percentage, there was a significant difference in the magnitude of these percentages between the two groups. Of the total cases reported in 2022, 34.8% were probable chronic hepatitis C cases with only positive HCV antibody reports ever, compared with 62.4% of probable chronic hepatitis C cases among newly reported cases. These large percentages highlight the fact that many cases who are identified as reactive by an HCV antibody test might not subsequently be evaluated for the presence of HCV RNA in their blood to determine if they have current HCV infection. Consequently, those currently infected with HCV who do not receive follow-up HCV RNA NAT testing will not receive the crucial preventive services, medical care, and curative treatment. Therefore, it is imperative that testing and laboratory strategies, such as auto-reflex HCV RNA testing, ensure the identification of those persons with current HCV infection.[3] Following up with reporting labs in 2024 will be the next critical step towards ensuring that all reporting labs provide reflex HCV RNA testing.

The San Francisco core surveillance data do not estimate the prevalence of HCV across San Francisco; however, a recent paper by researchers within the Community Research & Data Stewardship (CoRDS) Workgroup of *End Hep C SF* estimated the overall prevalence of HCV in San Francisco, regardless of whether people had been diagnosed and reported to SFDPH since the HCV case registry began.[19] They found an estimated 22,585 San Franciscans who are HCV antibody positive in 2019. If this estimate is accurate, San Francisco had a much higher seroprevalence in 2019 (2.6%)[19] than that for the country overall (1.7% per National Health and Nutrition Examination Survey (NHANES)).[17] According to this estimate, almost three-fourths of chronic HCV cases (72.9%) in San Francisco were among men and

26.5% were among people born between 1945 and 1964, who made up 21.1% of San Francisco's population as of 2019.[19] People who inject drugs (PWID) are the most disproportionately affected group in San Francisco, comprising an estimated 73.1% of all HCV cases but only 2.8% of the San Francisco population. Low socio-economic status trans women were also significantly disproportionately affected: despite being only 0.1% of the San Francisco population, they represent 1.4% of HCV cases overall. Also disproportionately affected were men who have sex with men (MSM), with 11.7% of cases, and only 7.8% of the population.[19]

To address these trends in San Francisco, in 2016, the SFDPH, University of California San Francisco (UCSF), and more than 30 other community partners established *End Hep C SF* (http://www.endhepcsf.org), a collective impact initiative with a mission to support all San Franciscans living with and at risk for HCV and to maximize their health and wellness. *End Hep C SF* achieves this through prevention, education, testing, treatment, and linkage to reduce morbidity, mortality, and stigma related to HCV. More than 190 individuals and 38 organizations have signed on to be a part of *End Hep C SF*, and the initiative's work has been featured in numerous venues throughout the Bay Area, California, and nationally – including in a series of short videos that illustrate the *End Hep C SF* model and the important impact community members have had on the work to eliminate HCV in San Francisco: https://endhepcsf.org/about-us/#videos. *End Hep C SF* continues to use multiple tools to evaluate San Francisco's progress toward HCV elimination, including a data dashboard that tracks a variety of local HCV indicators, available online here: https://endhepcsf.org/evaluation-dashboard/.

The opportunity to easily cure almost all HCV infections has energized clinical and community service providers, resulting in increased efforts to understand local HCV epidemiology and work collaboratively toward elimination of HCV infection, including in San Francisco. To this end, public health surveillance efforts have also taken on increased importance. New HCV surveillance efforts have included the recent shift to require reporting of negative HCV RNA tests in California, which has been nearly fully implemented in 2023. The submission of non-positive HCV RNA lab results will help us to better understand clearance and cure patterns in the City. Initial analyses of the negative HCV RNA results will help to answer the following three critical questions: (1) Who needs treatment? (2) Who no longer has active HCV and consequently does not need treatment? and (3) Who had a treatment failure or re-infection? Preliminary results of these analyses will be published in 2024.

Additionally, SFDPH is in the initial planning stages of establishing a SFDPH perinatal HCV program in order to better monitor the burden of perinatal HCV in San Francisco, to identify potential prevention opportunities, and to ensure that universal HCV testing guidelines for pregnant people in San Francisco are implemented.

Finally, SFDPH is embarking on new HCV surveillance efforts to improve completeness of demographic information for all cases. Given the incompleteness of lab reporting of key demographic information for cases such as home address and race and ethnicity, SFDPH has begun implementing registry matches to improve on completeness of demographic information. The Hepatitis Surveillance Program's match

with the California Department of Public Health's CalREDIE surveillance system this year resulted in improving the race/ethnicity completeness percentage by 7%. Registry matches in 2024 will include an SFDPH HIV Surveillance registry match, an annual CalREDIE match, and a San Francisco Vital Records match. In addition, the Hepatitis Surveillance Program will continue to pursue other registry match options to continue to enhance the Program's surveillance data to help inform clinical and community service providers and SFDPH outreach efforts to those living with HCV.

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