

# Chronic Hepatitis B in California

## 2016 Technical Notes

### DATA SOURCES & DEFINITIONS

The California Department of Public Health (CDPH) received cumulative data on chronic hepatitis B infections from various sources, including case reports and laboratory results submitted by local health jurisdictions (LHJs), laboratories, and health care providers. Another data source consisted of case reports submitted through the CDPH Perinatal Hepatitis B Prevention Program, which included positive hepatitis B virus (HBV) test results among pregnant women, as well as infants born to infected women who became infected and developed chronic hepatitis B infection.

Given that multiple case reports regarding the same individual could have been submitted over time, information from multiple data sources was merged and analyzed to identify matched records. Duplicate case reports were removed (“deduplicated”) to identify cases newly reported to CDPH each year.

Only newly reported cases with positive test results dated on or before December 31, 2016 were counted in this report. However, data reported to CDPH through June 30, 2017 were included in the analysis to allow for delays in data entry at the local level.

Key information sources and definitions used in this report are explained below.

#### A. Case Definitions

##### *Chronic Hepatitis B*

This report uses the term, “chronic hepatitis B infection” to describe cases meeting the Council of State and Territorial Epidemiologists (CSTE) case definition for “hepatitis B, chronic”. These include persons with no evidence of acute hepatitis B who have had any of the following found in the blood: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), or HBV deoxyribonucleic acid (DNA).

LHJs reported cases of chronic hepatitis B infection to CDPH as either *probable* or *confirmed* based on the CSTE case definition for “hepatitis B, chronic” current at the time of the case report. (Minor changes in the CSTE case definition for chronic hepatitis B over time did not affect how cases were counted.) This surveillance report accepted LHJs’ case classifications at face value. It is not currently possible for CDPH to independently verify that each chronic hepatitis B case met the laboratory criteria for the CSTE case definition using laboratory test results. For surveillance purposes, LHJs presumed hepatitis B cases were chronic unless the cases were reported by a health care provider as acute.

#### B. Other Report Definitions

##### *Newly Reported Cases*

For the purposes of this report, a newly reported case of chronic hepatitis B is defined as a person who is being reported to CDPH for the first time because they meet the CDC/CSTE case definition for chronic hepatitis B infection.

#### *Date of First Report*

The report date for each case was defined as the date the first confirmed or probable chronic hepatitis B case report was submitted to a LHJ or to CDPH.

#### *Rate of Newly Reported Cases*

This report defines the “rate of newly reported cases” as the number of newly reported cases in a defined population, divided by the number of people in the defined population, and multiplied by 100,000 in order to report the rate per 100,000 persons. This method was applied to populations defined by specific demographic groups (e.g., age and gender) to calculate group-specific rates. As described in the Data Limitations section, these rates do not describe incidence of new viral hepatitis infections.

#### *Local Health Jurisdictions*

Individual cases of chronic hepatitis B were attributed to the LHJ in which they resided at the time of their first confirmed or probable chronic hepatitis B case report. CDPH calculated county-specific rates using data published by the California Department of Finance in December 2016.<sup>1</sup> Data for the three city health jurisdictions (Berkeley, Long Beach, and Pasadena) enclosed in larger counties are included in the county totals and also displayed separately from their respective county totals. These rates include individual cases in state prisons because few chronic hepatitis B cases are reported in state prisons, but exclude cases whose jurisdiction at the time of contact was outside of California. Rates were not calculated for LHJs with five or fewer cases. To protect confidentiality, numbers greater than zero in the local health jurisdiction data summaries are suppressed if the population denominator minus the number of cases is less than or equal to 50. If a cell is suppressed, one or more complementary cells are suppressed to avoid recalculation of the suppressed cell.

#### *Age and Gender*

For this report, age is defined as the age of the person at the time that a LHJ or CDPH received the first confirmed or probable chronic hepatitis B case report for that individual. The actual time of infection is not possible to approximate without continuous testing because people may have been infected with hepatitis B for many years prior to their first confirmed case report. Rates of newly reported cases by age and gender were calculated using data published by the California Department of Finance in February 2017.<sup>2</sup> Rates by gender are presented for females and males only. Although LHJs began reporting transgender as a separate gender category in 2011, data on transgender identify are inconsistently reported, and California population denominator data for transgender persons are uncertain. Rates were thus not calculated for transgender persons.

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<sup>1</sup> State of California, Department of Finance, *California County Population Estimates and Components of Change by Year, July 1, 2010-2016*. Sacramento, California, December 2016.

<sup>2</sup> State of California, Department of Finance, *Report P-3: State and County Population Projections by Race/Ethnicity, Detailed Age, and Gender, 2010-2060*. Sacramento, California, February 2017.

## Race/Ethnicity

Race/ethnicity was categorized as American Indian/Alaska Native, Asian/Pacific Islander (API), African American/Black, Hispanic/Latino, White, and Multi-race/Other Race. For the purposes of this report, Hispanic/Latino encompasses patients of Hispanic or Latino ethnicity, regardless of reported race; all other race categories presented do not include persons of Hispanic or Latino ethnicity. Information regarding identification of API individuals within specific API groups (e.g., Chinese, Hmong, Vietnamese, Native Hawaiians) was available for approximately 17 percent of hepatitis B cases reported as API, largely due to the availability of API subgroup information collected by the CDPH Perinatal Hepatitis B Program. Thus, the data presented are more complete for chronic hepatitis B cases reported through the CDPH Perinatal Hepatitis B Program and are not considered representative of the state overall.

The race/ethnicity data in this report should be interpreted with caution because approximately 60 percent of chronic hepatitis B cases were missing race/ethnicity information in 2016. For this reason, percentages, rather than rates, were used to describe newly reported cases for which race/ethnicity is known. Rates and percentages of newly reported cases were not calculated for “Other Race” and “Multi-race” groups because current California population denominator data do not allow for differentiating between Other Race, Multi-race, and racial categories that are not specified.

## DATA LIMITATIONS

**For a number of reasons, chronic hepatitis B surveillance data do not represent the true prevalence of chronic hepatitis B infections in California.** First, surveillance data only include those persons reported to CDPH. Cases not reported to CDPH include: (1) persons unaware of their infection (i.e., those who have not been tested, including due to lack of access to care), (2) persons who were tested before the state required that providers and laboratories report cases to the LHJ, (3) individuals whose provider or testing laboratory did not report the results to the LHJ, and (4) individuals residing in LHJs where some cases are not reported.

Second, the migration of individuals with hepatitis B infection, either between counties within California or outside of California, might limit the accuracy of case counts for the state, as well as by LHJ.

Third, these data include both living and deceased persons with chronic hepatitis B in California. In order to determine prevalence, only currently living cases should be counted, a task that requires a match to state and national death records and which was beyond the scope of this surveillance report.

Fourth, because this report includes cases as classified by the LHJ, variation in resources dedicated to hepatitis B surveillance and classification in each LHJ may affect trends over time and limit comparisons between LHJs. At least one LHJ with a high-burden of chronic HBV stopped investigating male chronic HBV cases and two others reported limited capacity for HBV case-classification during this report period.

**These data describe the number of newly reported cases per year; they do not measure the actual rate of new infections in the population per year (incidence).** Incidence is the measure of new infections in a defined, at-risk population during a specified time period, usually a year. These data represent cases that LHJs newly reported to CDPH each year. Although the date that

LHJs report a case to CDPH is used to measure newly reported infections, it does not necessarily reflect the actual date a person was initially infected or diagnosed with hepatitis B. Due to the asymptomatic nature of chronic viral hepatitis infection, individuals may have been infected many years ago, but only tested and diagnosed when they began to experience symptoms of viral hepatitis. Individuals may have also been tested—even if they lacked symptoms—due to implementation of CDC screening guidelines for persons at risk for hepatitis B.

**These data are more complete for chronic hepatitis B cases reported via the California Perinatal Hepatitis B Prevention Program.** Starting in 2015, CDPH included chronic hepatitis B cases reported through the CDPH Perinatal Hepatitis B Prevention Program (which promotes prenatal testing of all pregnant women for hepatitis B infection, appropriate immunoprophylaxis of infants born to hepatitis B surface antigen positive women, and post-vaccination serologic testing of exposed infants) in its statewide chronic hepatitis B registry. Thus the data presented in this report provide a more complete picture of hepatitis B cases reported by the local health jurisdictions who engage in perinatal hepatitis B surveillance than in the state overall.

**Information is missing from these data.** Despite state regulations (California Code of Regulations, Title 17, Section 2500 and Section 2505) that require providers and laboratories, respectively, to provide race/ethnicity information in case reports, this information is often missing from provider reports and is almost always missing from laboratory reports. Since the majority of viral hepatitis cases in California are reported by laboratories, and not health care providers, approximately 60 percent of chronic hepatitis B cases were missing race/ethnicity information in 2016. Patients' addresses are also often missing in case report forms and laboratory reports. LHJs typically do not have sufficient resources to obtain information missing for reported cases due to the high volume of HBV-related laboratory reports. As a result, CDPH is currently unable to provide a complete description of the demographic characteristics of chronic hepatitis B infections in California.

**These data may differ from local public health estimates.** For unknown reasons, there was a gap in reporting of chronic hepatitis B cases to CDPH during 1993-1994. Thus chronic hepatitis B case counts may differ widely between LHJs and CDPH during this time period.

Due to CDPH's ability to match and deduplicate cases across time and LHJs, case counts provided in local health jurisdiction data summaries and/or California chronic viral hepatitis data summaries will often differ from local public health estimates. The extent to which state and local case counts may differ is influenced by a number of factors, including access to legacy data sources, use of methods to match and deduplicate cases, and methods for counting cases (e.g. definition of first report date). CDPH provides deduplicated chronic hepatitis B case counts to LHJs, annually.

**These data may contain errors in matching and deduplication.** A probabilistic record linkage algorithm was used to determine which records from multiple data sources refer to the same individual. The algorithm uses a set of demographic variables to calculate scores for each pair of records. Pairs of records with a score above a certain threshold are considered a match. It is possible that records for the same person were incorrectly matched (e.g., due to aliases or slight variations in name spelling), and thus two cases were counted instead of one. The opposite may also be true; it is possible that records for two separate persons were determined to be a match and were thus inappropriately counted as a single case. Although the matching algorithm was checked for accuracy, the large volume of records made it impossible to verify all matches and non-matches determined by the algorithm were correct prior to deduplication. In addition, our use of probabilistic determination methods to ascertain the most likely value for demographic

variables might not accurately determine correct values for age, race, sex, and other variables in all instances. However, the record linkage methodology applied here is robust and has been used for CDPH human immunodeficiency virus (HIV), sexually transmitted disease (STD), and viral hepatitis surveillance reports.

**Rates for small populations are unstable. They could be either inflated or deflated.** Caution should be used when interpreting county-specific rates of newly reported cases for counties of population size fewer than 100,000; rates fluctuate widely due to their small population size. The same caution applies when interpreting rate changes over time in small subpopulations.

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