Viral Hepatitis Surveillance

United States, 2015

Contents

Surveillance of Viral Hepatitis – United States, 2015

SUMMARY

The Centers for Disease Control and Prevention's (CDC) National Notifiable Diseases Surveillance System (NNDSS) (1) receives viral hepatitis case reports electronically each week from state and territorial health departments in the United States (U.S.) via CDC's National Electronic Telecommunications System for Surveillance (NETSS), a computerized public health surveillance system. The surveillance system accepts case reports of acute and chronic infections from all states and the District of Columbia, though not all jurisdictions report their data. In 2015, a total of 48 states submitted reports of acute hepatitis B virus (HBV) infection, 40 submitted reports of acute hepatitis C virus (HCV) infection, 40 submitted reports of chronic HBV infection, and 40 submitted reports of chronic HCV infection.

Viral hepatitis cases reported to NNDSS represent persons who were tested for and diagnosed with viral hepatitis infection based on specific surveillance case definitions (https://wwwn.cdc.gov/nndss/conditions/). Most persons infected with viral hepatitis are asymptomatic and so are not identified or reported. In 2011, CDC developed a statistical method to account for cases that were neither diagnosed nor reported in estimating the actual number of new (acute) cases of hepatitis A virus (HAV), HBV, and HCV infections from the number of cases reported for each disease (2); estimates in this report were derived using this method. Since estimates before 2011 were obtained using a different, unpublished method, they cannot be compared with those since 2011. This Summary describes estimated trends during 2011-2015 and reported cases of acute HAV, HBV, and HCV infections in 2015.

Hepatitis A: The number of reported cases of hepatitis A increased by 11.7% from 2011 to 2012 (n=1,398 and 1,562, respectively), increased 14% to 1,781 cases in 2013, decreased 30.4% to 1,239 cases in 2014, and increased 12.2% to 1,390 cases in 2015. The 2013 increase was partially due to a large 2013 hepatitis A outbreak among persons who consumed imported pomegranate seeds in several southwestern states and Hawaii (3). Although a few states (i.e., California, Florida, New York, Oregon, Texas, and Washington) reported increased cases in 2015, no hepatitis A outbreaks were reported. Infant hepatitis A vaccination was first recommended for states west of the Mississippi in 1996, and universal infant vaccination was recommended in 2006. Since then, vaccination rates and evidence of vaccine-induced immunity in young persons have increased in the past decade (4, 5). Yet hepatitis A vaccination coverage levels remain lower than those for other routinely recommended vaccines (6). Additionally, many older adults remain unvaccinated and susceptible to infection. International travel is the most commonly reported risk for HAV infection (7). After adjusting for under-ascertainment and under-reporting (2), the estimated number of new HAV infections in 2015 was 2,800 (95% confidence interval [CI] =1,900–3,100).

Hepatitis B: The number of reported cases of acute hepatitis B decreased by 0.3% from 2011 to 2012 (n=2,903 and 2,895 cases, respectively), increased 5.4% to 3,050 cases in 2013, decreased 8.5% to 2,791 cases in 2014, and increased 20.7% to 3,370 cases in 2015. After adjusting for under-ascertainment and under-reporting (2), the estimated number of new HBV infections in 2015 was 21,900 (95% CI= 12,500–53,600).

In addition to new cases of hepatitis B, chronic HBV infection remains a major public health challenge. CDC, using most recent national prevalence data, estimates that approximately 850,000 persons are living with HBV in the U.S. (8, 9), although other studies have estimated this number to be as high as 2.2 million (10). Unpublished surveillance data from seven CDC-funded sites indicate about one-half of chronic HBV infections were among Asian/Pacific Islanders, and three quarters of chronic HBV infections were among persons born outside of the U.S. Other data reveal that 47%–70% of persons with HBV infection living in the U.S. were born in other countries where routine hepatitis B immunization was introduced more recently than in the U.S. Among persons born outside of the U.S. with chronic HBV infection, an estimated 58% migrated from Asia (10, 11). CDC mortality data show that disproportionate numbers of Asian/Pacific Islanders are dying with hepatitis B. CDC and the U.S. Preventive Services Task Force (USPSTF) recommend HBV testing for persons born in countries where HBV infection is endemic and for persons with sexual or bloodborne risks for infection because diagnosis of infection is the first step towards receipt of recommended care and treatment (12-14).

Hepatitis C: Reported cases of acute HCV infection increased more than 2.9-fold from 2010 through 2015, rising annually throughout this period. Examining annual trends beginning in 2011, reported cases of acute HCV infection increased 44.3% from 2011 to 2012 (n=1,232 and 1,778 cases, respectively), increased 20.3% to 2,138 cases in 2013, increased 2.6% to 2,194 cases in 2014, and increased 11% to 2,436 cases in 2015. The increase in acute HCV case reports reflects new infections associated with rising rates of injection-drug use, and, to a much lesser extent, improved case detection (15). Several early investigations of newly acquired HCV infections reveal that most occur among young, white persons who live in non-urban areas (particularly in states within the Appalachian, Midwestern, and New England regions of the country) (16); trends in these states likely indicate an overall increase in HCV incidence throughout the country (15, 17). States with the highest rate of new HCV infections (e.g., West Virginia, Kentucky, and Tennessee) did not receive CDC support for case finding during these reporting years (2011-2015). After adjusting for under-ascertainment and under-reporting (2), an estimated 33,900 (95% CI=26,800–115,000) new HCV infections occurred in 2015.

Based on the data from national health surveys conducted in the 2003-2010 time period, approximately 3.5 million persons are currently infected with HCV (18). Mortality among HCV-infected persons—primarily adults aged 55–64 years—increased during 2006-2010 (19, 20). In 2013, HCV associated deaths exceeded the combined number of deaths with 60 other infectious diseases as underlying causes (21). CDC data indicate the number of HCV-associated deaths increased 10.9% from 2011 through 2014 and decreased 0.2% to 19,629 in 2015. Approximately one-half of all deaths in 2015 occurred among persons aged 55-64 years. However, deaths associated with HCV are largely underestimated; the only large U.S. study of deaths among persons with confirmed HCV infection indicated that only 19% had HCV listed anywhere on the death certificate despite 75% having evidence of substantial liver disease (20). To increase the proportion of persons with HCV who are tested and linked to recommended care including curative treatment for HCV (12, 13), CDC and USPSTF recommend one-time testing for HCV infection among all adults born during 1945–1965 and among others at increased risk for HCV infection (22).

BACKGROUND

Viral hepatitis is caused by infection with any of at least five distinct viruses: hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV), and hepatitis E virus (HEV). Most viral hepatitis infections in the United States are attributable to HAV, HBV, and HCV. All three of these unrelated viruses can produce acute illness characterized by nausea, malaise, abdominal pain, and jaundice, although many of these acute infections are asymptomatic or cause only mild disease. Both HBV and HCV can also cause chronic disease that remains largely asymptomatic; thus, many persons infected with HBV or HCV are unaware they are infected and have clinically silent infections for decades until developing cirrhosis, end-stage liver disease, or hepatocellular carcinoma (HCC).

Hepatitis A

Transmitted through the fecal-oral route, HAV is acquired in the United States primarily through close personal contact with an infected person and during foodborne outbreaks (21). Unlike hepatitis B and C, hepatitis A does not cause chronic infection. Since 1995, effective vaccines to prevent HAV infection have been available in the United States, increasing feasibility of eliminating indigenous transmission. In 1996, CDC's Advisory Committee on Immunization Practices (ACIP) recommended administration of hepatitis A vaccine to persons at increased risk for the disease, including international travelers, men who have sex with men (MSM), persons who use drugs and persons who inject drugs (PWID), and children living in communities with high rates of disease (23). In 1999, ACIP expanded these recommendations to include children living in 11 states with average hepatitis A rates of $\geq$20 cases per 100,000 population and recommended that vaccination be considered for children in an additional six states with rates of 10–20 cases per 100,000 population (24). In 2006, ACIP expanded these recommendations to include routine vaccination of children aged $\geq$1 year in all 50 states (4).

Hepatitis B

HBV is transmitted by percutaneous or mucosal exposure to blood or body fluids of an infected person, such as from an infected mother to her newborn during childbirth, through close personal contact within households, through unscreened blood transfusion or unsafe injections in health-care settings, through injection drug use, and from sexual contact with an infected person. Adults with diabetes mellitus are at an increased risk for acquiring HBV infection if they share diabetes-care equipment such as blood glucose meters, finger stick devices, syringes and/or insulin pens. Hepatitis B vaccination is recommended for persons with diabetes s between 19-59 years of age (25).

Risk for chronic HBV infection decreases with increasing age at onset of infection. Of infants who acquired HBV infection from their mothers at birth, as many as 90% become chronically infected compared with 30%–50% of children infected at age 1–5 years. This percentage is smaller among adults, for whom approximately 5% of all acute HBV infections progress to chronic infection (26, 27).

Effective vaccines to prevent HBV infection have been available in the United States since 1981. Ten years later, a comprehensive strategy was recommended for the elimination of HBV transmission in the United States (28, 29); the strategy was revised to include catch-up

vaccination of older children, adolescents, and other populations. The current vaccine-based strategy for the elimination of HBV transmission encompasses the following four components:

- Universal vaccination of infants beginning at birth;
- Prevention of perinatal HBV infection through routine screening of all pregnant women for HBV infection and provision of hepatitis B vaccine and immunoprophylaxis to infants born to hepatitis B surface antigen (HBsAg)-positive mothers;
- Routine vaccination of previously unvaccinated children and adolescents; and
- Vaccination of adults at increased risk for infection (including health-care workers, dialysis patients, adults with diabetes, household contacts and sex partners of persons with chronic HBV infection, recipients of certain blood products, persons with a recent history of having multiple sex partners concurrently, those infected with a sexually transmitted disease, MSM, and PWID).

In addition to hepatitis B vaccination, efforts have been made to improve care and treatment for the estimated 850,000 persons living with hepatitis B in the United States. This number is likely substantially higher: an analysis based on census data and surveys conducted in the country of origin for persons migrating to the United States estimate that as many as 2.2 million persons are living with HBV infection. Many HBV-infected persons are unaware of their infection status (11). Because testing is the first critical step towards receipt of recommended care and treatment (10), in 2008 CDC and USPSTF recommended HBV testing for persons born in countries where HBV infection is endemic and for other persons at risk. These guidelines stress the need for testing persons at high risk for infection, conducting contact management, educating patients, and administering FDA- approved therapies for treating hepatitis B. Other recent guidelines address the appropriate management of chronic HBV infection among surgeons, other health-care workers, and students (30).

Hepatitis C

HCV is transmitted primarily through percutaneous (parenteral) exposure that can result from injection-drug use, needle stick injuries, and inadequate infection control in health-care settings. Much less often, HCV transmission occurs among HIV-positive persons, especially MSM, as a result of sexual contact with an HCV-infected partner (31, 32), among persons who receive tattoos in unregulated settings (32), and among infants born to HCV-infected mothers (33). After adjustment for populations not sampled in the 2003-2010 National Health and Nutrition Examination Survey (NHANES) household surveys (e.g., incarcerated and homeless populations), an estimated 3.5 million persons are living with HCV infection in the United States (15).

Approximately 75%–85% of newly infected adults and adolescents develop chronic HCV infection (34). A single positive anti-HCV result cannot distinguish between acute and chronic HCV infection or between current or resolved (cleared) HCV infection. To detect current infection, the revised CDC algorithm for HCV testing includes anti-HCV testing and if positive, a nucleic acid test (NAT) (35). For reporting purposes, health departments must make the distinction between acute and chronic HCV infection based on both 1) laboratory testing to detect whether anti-HCV is positive or negative; and 2) clinical criteria from providers regarding the presence of signs and symptoms indicative of liver disease or acute HCV infection. Repeat laboratory tests may be used to determine serologic conversion from anti-HCV negative to anti-HCV positive. The 2012 case

definition for “past or present” HCV infection requires that a case meet one or more of the following laboratory criteria: anti-HCV positive (repeatedly reactive) by enzyme-linked immunosorbent assay EIA, verified by at least one more specific assay, or HCV Recombinant Immunoblot Assay RIBA positive, or HCV NAT positive, or anti-HCV screening-test positive with an assay-specific signal-to-cutoff ratio predictive of a true case. The assessment process used to classify cases as acute or chronic requires, on average, review of at least four records by hepatitis surveillance staff in health departments (36). No clinical symptoms are required; however, the case must be known to not be acute.

National recommendations for preventing HCV infection (37) include screening and testing donors of blood, other tissues and organs, inactivating HCV in plasma-derived products, testing persons at risk for HCV infection, providing risk-reduction counseling and recommended care and treatment, increasing access to safe injection equipment for PWID, and consistently implementing and practicing infection control in health-care settings. In 2010, FDA approved point-of-care tests for HCV infection that yield prompt results available to patients during the same clinical visit (38). In 2012, CDC augmented existing recommendations for HCV screening based on risk to include recommendations for one-time screening for HCV infection among all persons born during 1945–1965 (39); persons born during these years have an estimated 3% prevalence of HCV antibodies, which is six times higher than the prevalence seen in adults born in other years (39). Of all persons living with HCV infection, about 75% were born during 1945–1965; a similar percentage of HCV-associated deaths can be attributed to this birth cohort (40). The goal of birth-cohort HCV testing is to identify unrecognized infections among the segment of the population at highest risk for HCV-associated morbidity and mortality, thereby increasing opportunities for persons infected with HCV to benefit from appropriate care and treatment.

Linkage to care and treatment is critical to improving health outcomes for persons found to be infected with HCV. Such linkage is particularly important in light of major advancements that have been made in HCV treatments. For patients infected with HCV, treatment previously consisted of pegylated interferon (PEG-INF) combined with oral doses of ribavirin (41). Approximately 40%--50% of HCV-infected patients receiving this therapy cleared their infection (41). However, HCV treatment improved drastically in 2011 with development of the initial direct-acting oral agents telaprevir and boceprevir, which were capable of achieving a sustained virologic response (SVR) rate of $\geq$80% (41, 42). In the United States, these two drugs were replaced with all-oral direct-acting antiviral agents (DAAs), simeprevir and sofosbuvir, which were approved by FDA in 2013 (43). When given in combination with PEG-INF and ribavirin or as an all-oral combination regimen for a duration of 8-12 weeks, these agents increase SVR rates to $\geq$90% (44, 45). In 2014, two all-oral regimens, Harvoni (ledipasvir/sofosbuvir) and Viekira Pak (ombitasvir, paritaprevir, and ritonavir tablets; dasabuvir tablets), were licensed for the treatment of HCV. Daklinza (daclatasvir), was approved in July 2015 for use with sofosbuvir as the first 12-week, all-oral treatment option for patients with chronic hepatitis C virus genotype 3. Also approved in July 2015 was Technivie (ombitasvir, paritaprevir and ritonavir), used in combination with ribavirin for the treatment of HCV genotype 4 infections in patients that do not have scarring or poor liver function (cirrhosis). Newer, all oral agents are being continually added and have become the standard of care in the United States. In 2016, Zepatier (elbasvir/grazoprevir) and Epclusa (sofosbuvir/velpatasvir) (46) were FDA approved, the latter drug for all HCV genotypes. Evidence-based guidance is available from the American Association for the Study of Liver Diseases (AASLD)/ Infectious Disease Society of America (IDSA) to assist providers caring for HCV-infected patients (47). The AASLD/IDSA HCV guidance is continuously updated to incorporate new information regarding HCV testing, linkage

to care, and treatment (http://www.hcvguidelines.org).

Sources of Information

CDC relies on several sources of information to determine the incidence, prevalence, trends, and burden of viral hepatitis A, B, and C disease.

National Notifiable Diseases Surveillance System (NNDSS)

The basis for most case reports is passive surveillance through the National Notifiable Diseases Surveillance System (NNDSS). State, local, and territorial health departments report acute (incident) cases of hepatitis A, hepatitis B, and hepatitis C through this system on a weekly basis. Some but not all states also report cases of chronic hepatitis B cases and past or present infections of hepatitis C through NNDSS. Since 1990, states have been electronically submitting individual case reports (absent of personal identifiers) to CDC. States' participation in notifying CDC of cases of nationally notifiable diseases, including viral hepatitis, is voluntary. Collecting, verifying, and reporting the many cases of hepatitis B and C in the United States (estimated at more than 4 million) are beyond the capability of many health departments. Reports of chronic hepatitis B and C are included in this Surveillance Summary only from those states granting CDC permission to publish those counts.

National surveillance for viral hepatitis (including acute hepatitis A, hepatitis B, and hepatitis C; chronic hepatitis B; and past or present hepatitis C) is based on case definitions developed and approved by the Council of State and Territorial Epidemiologists (CSTE) and CDC. Reported cases of acute and chronic viral hepatitis are required to meet specific clinical and laboratory criteria (available at: https://wwwn.cdc.gov/nndss/conditions/notifiable/2014/. However, these criteria are evaluated at state or local health departments and are not validated by CDC. Although states may classify cases as confirmed, probable, and suspect, only confirmed cases of acute viral hepatitis are presented in this report. Updated CSTE Case definitions are available at the CSTE website: https://wwwn.cdc.gov/nndss/case-definitions.html.

Adjustments to Reported Cases from the National Notifiable Diseases Surveillance System

To better estimate the incidence of acute hepatitis A, hepatitis B, and hepatitis C in the United States, CDC developed a model to account for under-ascertainment and under-reporting of cases of viral hepatitis. The model factored in the probabilities of an infected person developing symptoms such as jaundice, referral to care and treatment, and rates of reporting to local and state health departments. Results of the analysis estimated that reported cases represent 1 of every 2 hepatitis A cases, 1 of every 6.5 acute hepatitis B cases, and 1 of every 13.9 acute hepatitis C cases (2). To obtain the estimated number of cases of acute HAV, HBV, and HCV infections after accounting for under-ascertainment and under-reporting, these new estimators were applied to the acute hepatitis case data from NNDSS beginning in 2011. Incidence data reported in Surveillance Summaries from 2011 onward, including this report, reflect these estimators. Because earlier estimates were based on different (and unpublished) calculations, current estimates cannot be used to deduce trends by comparison with estimations obtained in years prior to 2011; still, trends in reported cases can be evaluated (e.g., the trend in the increase in acute hepatitis C first observed in 2011 among nationally reported cases).

Enhanced Viral Hepatitis Surveillance Sites

Background

In November 2012, CDC funded seven health departments to conduct enhanced viral hepatitis surveillance. Each quarter, a dataset of cumulative cases from each site is sent to CDC through the CDC Secure Access Management System (SAMS), a secure electronic file transfer portal.

Methods

The seven funded sites (the states of Florida, Massachusetts, Michigan, New York, and Washington and cities of Philadelphia and San Francisco) represent a combined population of approximately 57.8 million persons. In each of these jurisdictions, clinical laboratories are mandated to submit laboratory reports from persons with positive HBV and HCV test results to state or local health departments. Participating health departments routinely review each report to assess whether current case definitions are met as established by CSTE and CDC. Sites are also required to de-duplicate all chronic cases of viral hepatitis. To determine whether a case is new, each site matches new case reports to existing cases in the surveillance registry using personal identifying information. New cases are added to an electronic registry, whereas duplicate cases are used to update previous reports. Most health departments collect basic demographic data (e.g., age and sex) from the laboratory reports. Efforts vary by site regarding the level of investigation undertaken to collect and store supplemental information (e.g., risk factor data) from patients or their providers. Health departments in all funded sites conduct follow-up for a sample of cases (and all cases in some sites such as New York State) to obtain clinical, laboratory, and epidemiologic information, including risk exposures and behaviors.

Data analyses from participating enhanced surveillance sites presented in this surveillance report were conducted on all serologically confirmed cases of chronic hepatitis B and chronic (past or present) hepatitis C infection reported for the year 2015. Rates were calculated using appropriate jurisdiction-specific (state, county, or city) 2015 population estimates obtained from the U.S. Census Bureau.

Limitations

The number of cases of chronic HBV infection and past or present HCV infection from participating enhanced surveillance sites included in this report is likely an underestimate of the true burden of disease, because cases of chronic infection are generally asymptomatic and less likely to be identified and reported. Additionally, data from these sites are not representative of the U.S. population; because not all sites conduct comprehensive follow-up, data regarding race/ethnicity, place of birth, and risk exposures and behaviors are missing for some case reports.

Mortality/Death Certificates

Background

Death certificates are completed for all deaths registered in the United States. Information from death certificates is provided by funeral directors, attending physicians, medical examiners, and coroners; certificates are filed in vital statistics offices within each state and the District of Columbia. Through a program called the National Vital Statistics System (NVSS) (48), information from death certificates is compiled by CDC's National Center for Health Statistics (NCHS) to produce national multiple-cause-of-death (MCOD) data (48); causes of death are coded in accordance with the International Classification of Diseases, Tenth Revision (ICD-10) (49). MCOD data are used to determine the national burden of mortality associated with viral hepatitis and to characterize decedents.

A major study of death certificates from 1999–2007 revealed that in 2007, the annual number of deaths associated with HCV infection exceeded the annual number of deaths associated with HIV infection (18). A more recent study using death certificate data from 2003--2013 showed that the number of deaths associated with HCV infection continued to increase and in 2012 surpassed the combined number of deaths associated with 60 other nationally notifiable infectious conditions that are routinely reported to CDC (50).

Methods

We obtained and analyzed 2011–2015 national multiple-cause mortality data through NVSS. The following case definitions were used to identify a death associated with hepatitis A, B, and C.

Any death record with a report of any of the following ICD-10 codes listed as the underlying or one of the multiple (e.g., contributing) causes of death in the record axis:

- Hepatitis A (ICD-10: B15),
- Hepatitis B (ICD-10: B16, B17.0, B18.0, and B18.1), or
- Hepatitis C (ICD-10: B17.1 and B18.2).

Demographic information on age, race/ethnicity, and sex were examined. Deaths were divided into six age categories: 0–34, 35–44, 45–54, 55–64, 65–74, and ≥75 years. Race was divided into the following categories: white, non-Hispanic; black, non-Hispanic; Hispanic; Asian/Pacific Islander (API); and American Indian/Alaska Native (AI/AN). To calculate national mortality rates, the number of deaths associated with each type of hepatitis was divided by the total U.S. Census population for each demographic characteristic. Rates on race/ethnicity, sex, and overall total were standardized to the age distribution of the U.S. standard population in 2000 (50).

Limitations:

The following limitations to the mortality data should be taken into account when interpreting these data.

- Differences in recording practices of death certificate information may cause misclassification of ICD-10 codes and demographic information.
- Certain racial/ethnic populations likely are underrepresented in U.S. Census data (the

denominator for calculating rates), potentially causing overestimated rates for these populations.

- HBV and HCV infections are often underreported as causes of death on death certificates. These analyses do not adjust for deaths resulting from undiagnosed viral hepatitis infections.
- Death records listing more than one type of viral hepatitis infection were counted once for each type of infection. For example, a death with ICD-10 codes for both hepatitis B and C virus infections is counted once as a hepatitis B death and once as a hepatitis C death.

INVESTIGATION OF HEALTHCARE-ASSOCIATED OUTBREAK CASES

In 2015, CDC participated in 12 state-based investigations of healthcare-associated outbreaks of HCV infection with two or more confirmed outbreak-related cases. Additional information may be found at the following link that summarizes known outbreaks that occurred during 2008–2015 (http://www.cdc.gov/hepatitis/statistics/healthcareoutbreaktable.htm).

Table 1.1. Hepatitis C Outbreaks by Setting — United States, 2015

Hepatitis C (HCV) Outbreaks by Setting				
Setting	**State**	**Persons Notified for Screening**	**Outbreak-Associated Infections**	**Known or suspected mode of transmission**
Outpatient				
Prolotherapy clinic	California	>1,500	5	Syringe reuse contaminating medication vials used for >1 patient and use of single-dose vials for >1 patient
Insulin infusion clinic	California	92	9	Unsafe practices related to assisted blood glucose monitoring including use of finger stick devices for >1 person and inadequate cleaning and disinfection of glucometer before reuse.
Pain management clinic	Michigan	122	2	Syringe reuse contaminating medication vials used for >1 patient
Cardiology clinic	West Virginia	>2,000	5	Use of single-dose vials for >1 patient
Hospital				
Hospital	Utah	7,217	>7	Drug diversion by nurse (* Investigation ongoing)

Table 1.1 (cont'd). Hepatitis C Outbreaks by Setting — United States, 2015

Hepatitis C (HCV) Outbreaks by Setting				
Setting	**State**	**Persons Notified for Screening**	**Outbreak-Associated Infections**	**Known or suspected mode of transmission**
Hemodialysis				
Outpatient hemodialysis facility	New Jersey	237	2	Multiple lapses in infection control identified, including hand hygiene and glove use, vascular access care, medication preparation, cleaning and disinfection
Outpatient hemodialysis facility	New Jersey	84	2	Multiple lapses in infection control identified, vascular access care, medication preparation, cleaning and disinfection
Outpatient hemodialysis facility	New Jersey	98	2	Multiple lapses in infection control identified, including hand hygiene and glove use, vascular access care, medication preparation, cleaning and disinfection
Outpatient hemodialysis facility	Pennsylvania	115	3	Multiple lapses in infection control identified, medication preparation close to treatment area
Outpatient hemodialysis facility	Pennsylvania	130	3	Multiple lapses in infection control identified, medication preparation close to treatment area
Outpatient hemodialysis facility	Pennsylvania	97	2	Multiple lapses in infection control identified, medication preparation close to treatment area, Use of single-dose vials for >1 patient, no separation of dirty and clean areas (*Philadelphia)
Outpatient hemodialysis facility	California	28	3	Breaches in environmental cleaning and disinfection practices

Additional information may be found at the following link that summarizes known outbreaks that occurred during 2008–2015: http://www.cdc.gov/hepatitis/statistics/healthcareoutbreaktable.htm.

HEPATITIS A

Hepatitis A

In 2015, a total of 1,390 cases of hepatitis A were reported to CDC from 50 states (Table 2.1). The overall incidence rate in 2015 was 0.4 cases per 100,000 population. Actual acute cases are estimated to be 1.96 times the number of reported cases in any year. After adjusting for under-ascertainment and under-reporting, an estimated 2,800 hepatitis A cases (95% CI=1,900--3,100) occurred in 2015. (Data for 2015 were unavailable for the District of Columbia.)

2012 CSTE/CDC Case Definition (NNDSS)

Clinical Description

Acute hepatitis is defined as acute illness with 1) discrete onset of symptoms (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain) and 2) jaundice, elevated serum alanine aminotransferase (ALT), or aspartate aminotransferase (AST) levels.

Laboratory Criteria

Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive.

Table 2.1. Reported cases of hepatitis A, nationally and by state or jurisdiction — United States, 2011–2015

State	2011		2012		2013		2014		2015	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
Alabama	8	0.2	19	0.4	10	0.2	15	0.3	23	0.5
Alaska	4	0.6	1	0.1	1	0.1	1	0.1	4	0.5
Arizona	77	1.2	93	1.4	66	1.0	29	0.4	54	0.8
Arkansas	3	0.1	8	0.3	9	0.3	2	0.1	10	0.3
California	186	0.5	209	0.5	255	0.7	142	0.4	179	0.5
Colorado	21	0.4	28	0.5	51	1.0	23	0.4	25	0.5
Connecticut	18	0.5	23	0.6	19	0.5	23	0.6	9	0.3
Delaware	2	0.2	9	1.0	4	0.4	1	0.1	2	0.2
District of Columbia	U	U	U	U	U	U	U	U	U	U
Florida	87	0.5	87	0.5	115	0.6	90	0.5	108	0.5
Georgia	27	0.3	46	0.5	36	0.4	24	0.2	30	0.3
Hawaii	8	0.6	5	0.4	16	1.1	5	0.4	6	0.4
Idaho	6	0.4	11	0.7	8	0.5	7	0.4	9	0.5
Illinois	73	0.6	67	0.5	79	0.6	82	0.6	57	0.4
Indiana	24	0.4	11	0.2	32	0.5	20	0.3	19	0.3
Iowa	8	0.3	7	0.2	17	0.6	12	0.4	16	0.5
Kansas	4	0.1	15	0.5	11	0.4	7	0.2	7	0.2
Kentucky	10	0.2	25	0.6	24	0.5	19	0.4	16	0.4
Louisiana	5	0.1	7	0.2	14	0.3	5	0.1	5	0.1
Maine	6	0.5	9	0.7	10	0.8	8	0.6	8	0.6
Maryland	26	0.4	28	0.5	29	0.5	27	0.5	19	0.3
Massachusetts	39	0.6	40	0.6	43	0.6	43	0.6	34	0.5
Michigan	70	0.7	100	1.0	83	0.8	45	0.5	51	0.5
Minnesota	27	0.5	29	0.5	32	0.6	19	0.3	21	0.4
Mississippi	7	0.2	11	0.4	5	0.2	3	0.1	2	0.1
Missouri	13	0.2	20	0.3	8	0.1	20	0.3	9	0.1
Montana	3	0.3	6	0.6	6	0.6	5	0.5	2	0.2
Nebraska	5	0.3	16	0.9	13	0.7	9	0.5	6	0.3
Nevada	5	0.2	10	0.4	19	0.7	5	0.2	11	0.4
New Hampshire	0	0.0	6	0.5	9	0.7	5	0.4	2	0.2
New Jersey	79	0.9	60	0.7	68	0.8	59	0.7	59	0.7
New Mexico	7	0.3	10	0.5	20	1.0	8	0.4	6	0.3
New York	113	0.6	111	0.6	167	0.8	84	0.4	123	0.6

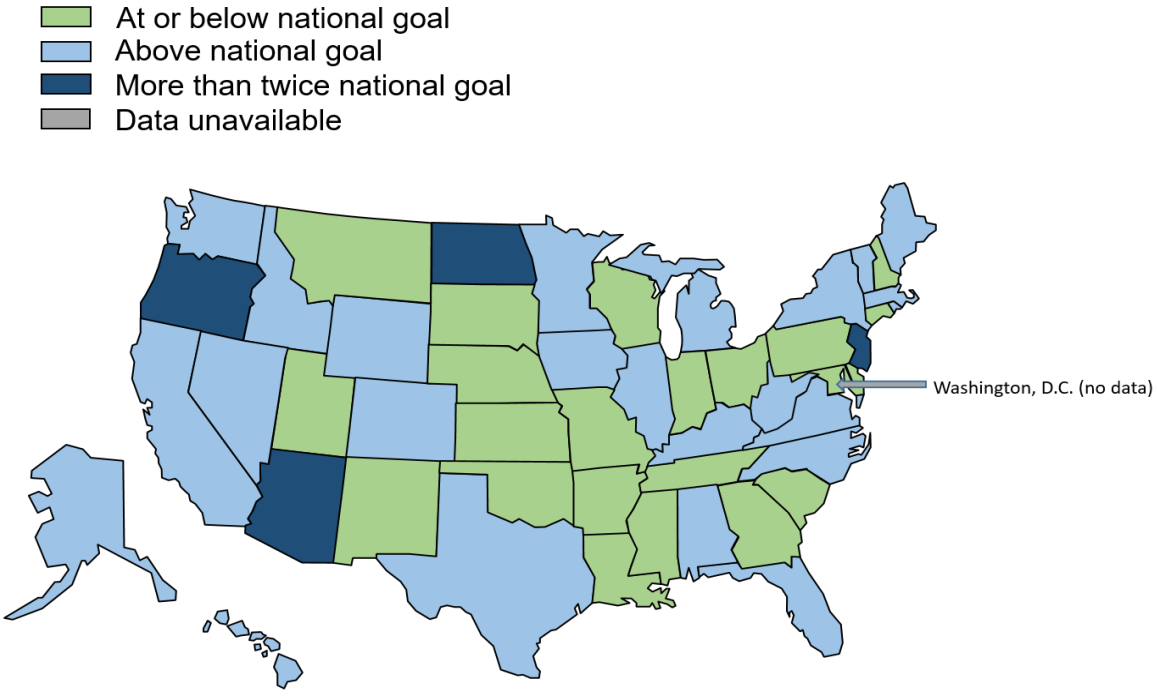
Table 2.1 (cont'd). Reported cases of hepatitis A, nationally and by state or jurisdiction — United States, 2011–2015

State	2011		2012		2013		2014		2015	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
North Carolina	31	0.3	34	0.3	46	0.5	38	0.4	45	0.4
North Dakota	0	0.0	2	0.3	9	1.2	9	1.2	5	0.7
Ohio	39	0.3	36	0.3	59	0.5	32	0.3	36	0.3
Oklahoma	11	0.3	12	0.3	14	0.4	17	0.4	11	0.3
Oregon	11	0.3	9	0.2	29	0.7	13	0.3	28	0.7
Pennsylvania	60	0.5	62	0.5	53	0.4	48	0.4	43	0.3
Rhode Island	8	0.8	3	0.3	4	0.4	8	0.8	4	0.4
South Carolina	11	0.2	6	0.1	14	0.3	6	0.1	16	0.3
South Dakota	2	0.2	0	0.0	4	0.5	3	0.4	2	0.2
Tennessee	23	0.4	23	0.4	20	0.3	12	0.2	14	0.2
Texas	138	0.5	134	0.5	109	0.4	124	0.5	147	0.5
Utah	8	0.3	4	0.1	12	0.4	8	0.3	8	0.3
Vermont	6	1.0	2	0.3	7	1.1	1	0.2	3	0.5
Virginia	30	0.4	49	0.6	36	0.4	27	0.3	50	0.6
Washington	31	0.5	29	0.4	45	0.6	26	0.4	26	0.4
West Virginia	8	0.4	8	0.4	4	0.2	12	0.6	8	0.4
Wisconsin	8	0.1	21	0.4	37	0.6	7	0.1	9	0.2
Wyoming	2	0.4	1	0.2	0	0.0	1	0.2	3	0.5
U.S.	**1398**	**0.4**	**1562**	**0.5**	**1781**	**0.6**	**1239**	**0.4**	**1390**	**0.4**

Source: CDC, National Notifiable Diseases Surveillance System.
*Rate per 100,000 population.
U=No data available for reporting.

- The number of hepatitis A cases reported in the United States increased 11.7% from 2011 through 2012 (1,398 cases to 1,562 cases), increased 14.0% from 2012 through 2013, and declined 30.4% from 2013 through 2014. Compared with data for 2014, cases of acute hepatitis A increased 12.2% to 1,390 cases in 2015.
- The national rate of hepatitis A remained the same from 2014 through 2015 at 0.4 cases/100,000 population.
- By state, in 2015, rates of hepatitis A ranged from 0.1 cases per 100,000 in Louisiana, Mississippi, and Missouri to 0.8 cases per 100,000 population in Arizona.

Map 2.1. 2015 State Hepatitis A Incidence Compared to Healthy People 2020 National Goal*



- Of the 50 reporting states, 22 (44%) met the *Healthy People 2020* goal (https://www.healthypeople.gov/) of reducing hepatitis A incidence to ≤0.3 cases/100,000 population: Arkansas, Connecticut, Delaware, Georgia, Indiana, Kansas, Louisiana, Maryland, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Mexico, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, and Wisconsin.
- The incidence of hepatitis A was above the *Healthy People 2020* goal for 28 states: Alabama, Alaska, Arizona, California, Colorado, Florida, Hawaii, Idaho, Illinois, Iowa, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, New York, North Carolina, North Dakota, Oregon, Rhode Island, Texas, Vermont, Virginia, Washington, West Virginia, and Wyoming.
- Of the 28 states with rates above the *Healthy People 2020* goal, four states (Arizona, New Jersey, North Dakota, and Oregon) had rates more than twice the national goal.

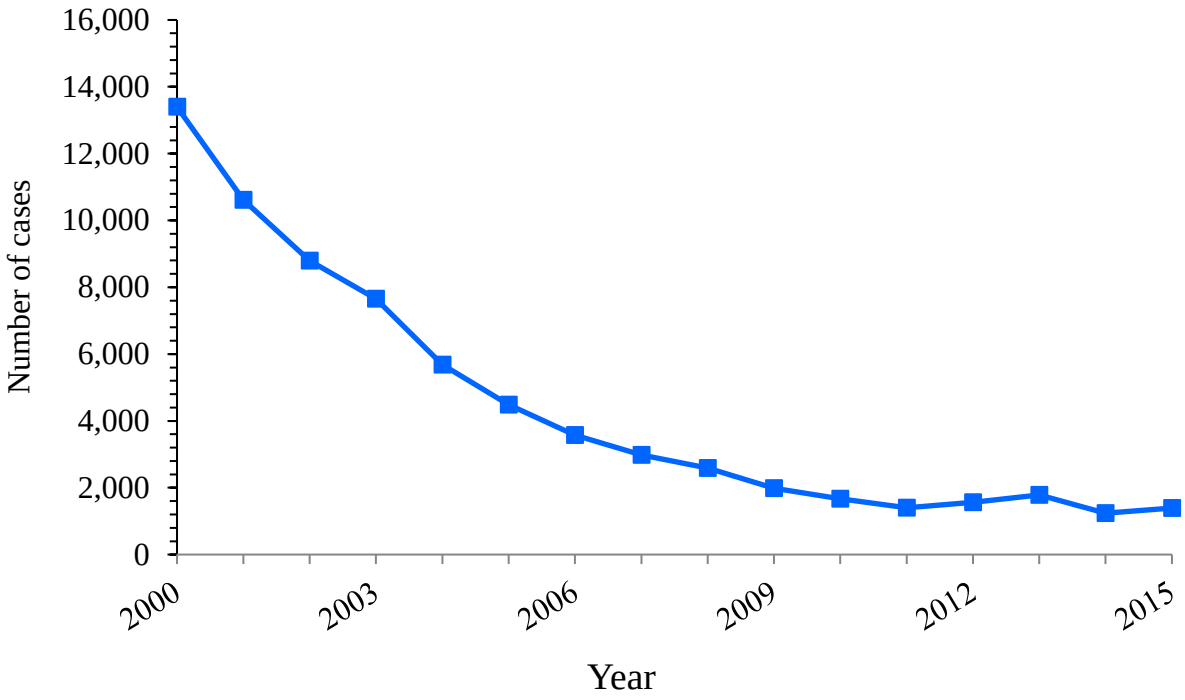
Table 2.2. Select clinical characteristics of hepatitis A cases* reported in the United States, 2015

Clinical characteristic	Availability of valid data† for clinical characteristic		Cases with clinical characteristic§	
	No.	%	No.	%
Jaundice	865	62.2	541	62.5
Hospitalized for hepatitis A	870	62.6	411	47.2
Died from hepatitis A	801	57.6	8	1.0

Source: CDC, National Notifiable Diseases Surveillance System.
*A total of 1,390 hepatitis A cases were reported during 2015.
†Case reports for which questions regarding clinical characteristics were answered with "yes" or "no." Reports with any other response were excluded.
§Numbers and percentages represent only those case reports for which data regarding clinical characteristics were available; numbers likely are underestimates.

- Of the 1,390 case reports of acute hepatitis A received during 2015, 62.2% included information about whether the patient had jaundice, 62.6% included information regarding hospitalization caused by hepatitis A, and 57.6% included information on deaths from hepatitis A.
- Jaundice was reported for 541 (62.5%) of the 865 hepatitis A case reports that included information about jaundice.
- Hospitalization as the result of hepatitis A was reported for 411 (47.2%) of the 870 hepatitis A case reports that included information about hospitalization.
- Death as the result of hepatitis A was reported for 8 (1.0%) of the 801 hepatitis A case reports that included information about death.

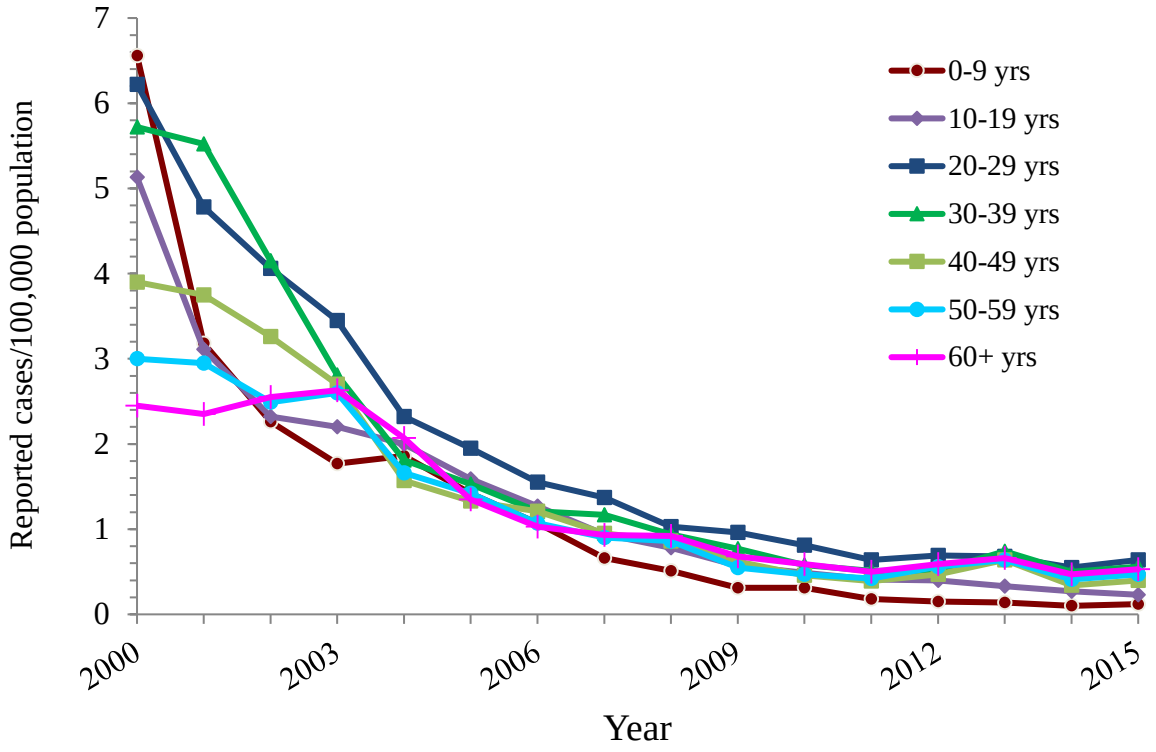
Figure 2.1. Reported number of hepatitis A cases — United States, 2000-2015



Source: CDC, National Notifiable Diseases Surveillance System.

- The number of reported hepatitis A cases declined 88.3%, from 13,397 in 2000 to 1,562 in 2012; increased 14% (to 1,781 cases) from 2012 through 2013; declined 30.4% (to 1,239 cases) from 2013 through 2014; and increased 12.2% (to 1,390 cases) from 2014 through 2015.

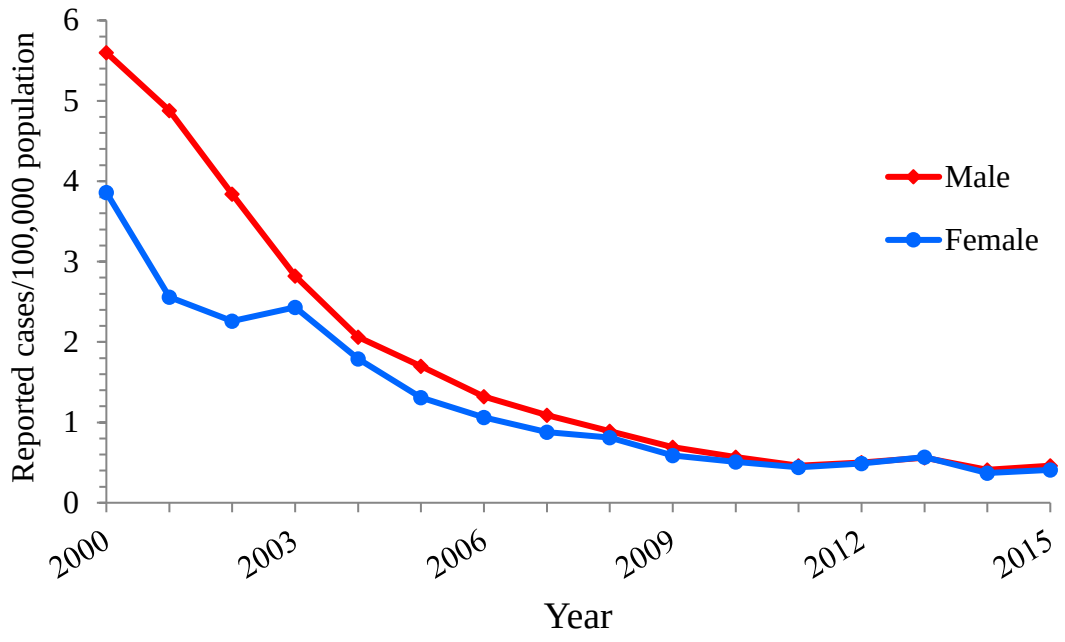
Figure 2.2. Incidence of hepatitis A, by age group — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2000 through 2015, rates of reported hepatitis A declined, except for a slight increase in 2012 and 2013 among all age groups except those aged 0–9 and 10–19 years.
- When comparing the 2015 hepatitis A rates of all age groups, persons aged 20–29 years had the highest rate (0.6 cases per 100,000 population); persons aged 0–9 years had the lowest rate (0.1 cases per 100,000 population).

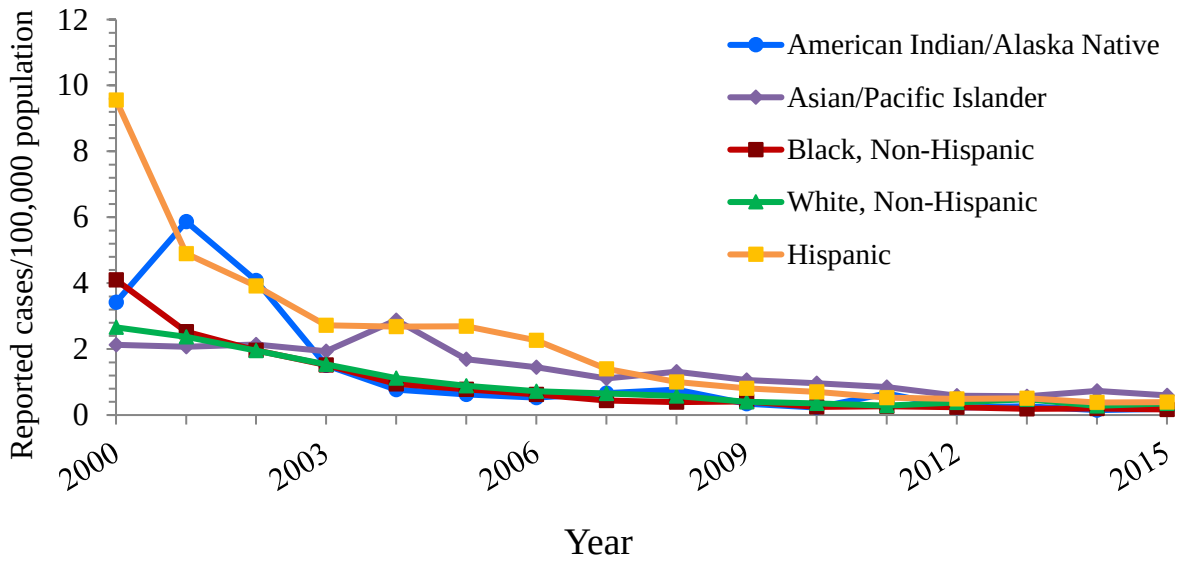
Figure 2.3. Incidence of hepatitis A, by sex — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2000 through 2011, reported rates of hepatitis A among males and females declined, and by 2011, rates in these two groups were similar.
- In 2015, the incidence rate was 0.5 cases per 100,000 population for males and 0.4 cases per 100,000 population for females.

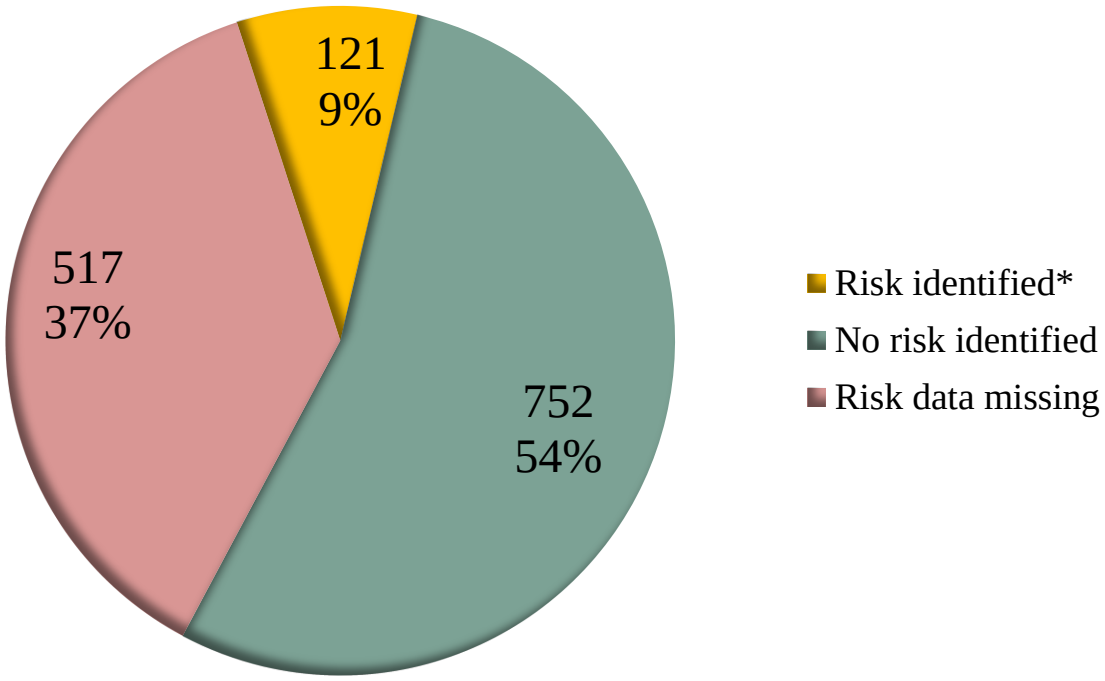
Figure 2.4. Incidence of hepatitis A, by race/ethnicity — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2000 through 2007, the incidence rate of hepatitis A among Hispanics was higher than that among other racial/ethnic populations.
- Since 2008, the incidence rate of hepatitis A has been higher for Asians/Pacific Islanders (0.6 cases per 100,000 population in 2015) than for other racial/ethnic populations.

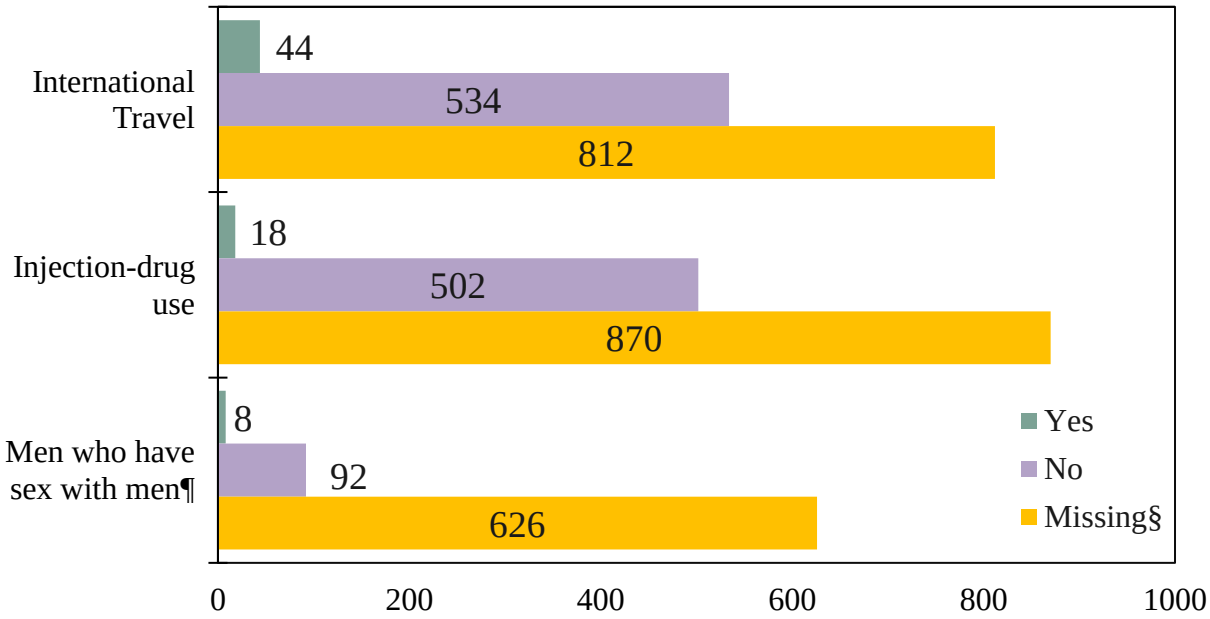
Figure 2.5. Availability of information on risk exposures/behaviors associated with hepatitis A — United States, 2015



Source: CDC, National Notifiable Diseases Surveillance System.
*Includes case reports indicating the presence of at least one of the following risks 2–6 weeks prior to onset of acute, symptomatic hepatitis A: 1) having traveled to hepatitis A-endemic regions of Mexico, South/Central America, Africa, Asia/South Pacific, or the Middle East; 2) having sexual/household or other contact with suspected/confirmed hepatitis A patient; 3) being a child/employee in day-care center/nursery/preschool or having had contact with such persons; 4) being involved in a foodborne/waterborne outbreak; 5) being a man who has sex with men; and 6) using injection drugs.

- Of the 1,390 case reports of hepatitis A received by CDC during 2015, a total of 517 (37%) did not include a response (i.e., a "yes" or "no" response to any of the questions about risk exposures and behaviors) to enable assessment of risk exposures or behaviors.
- Of the 873 case reports that contained risk exposure/behavior information:
    - 752 (86.1%) indicated no risk exposures/behaviors for acute hepatitis A and
    - 121 (13.9%) indicated at least one risk exposure/behavior for acute hepatitis A during the 2–6 weeks prior to onset of illness.

Figure 2.6a. Hepatitis A reports*, by risk exposure/behavior† — United States, 2015



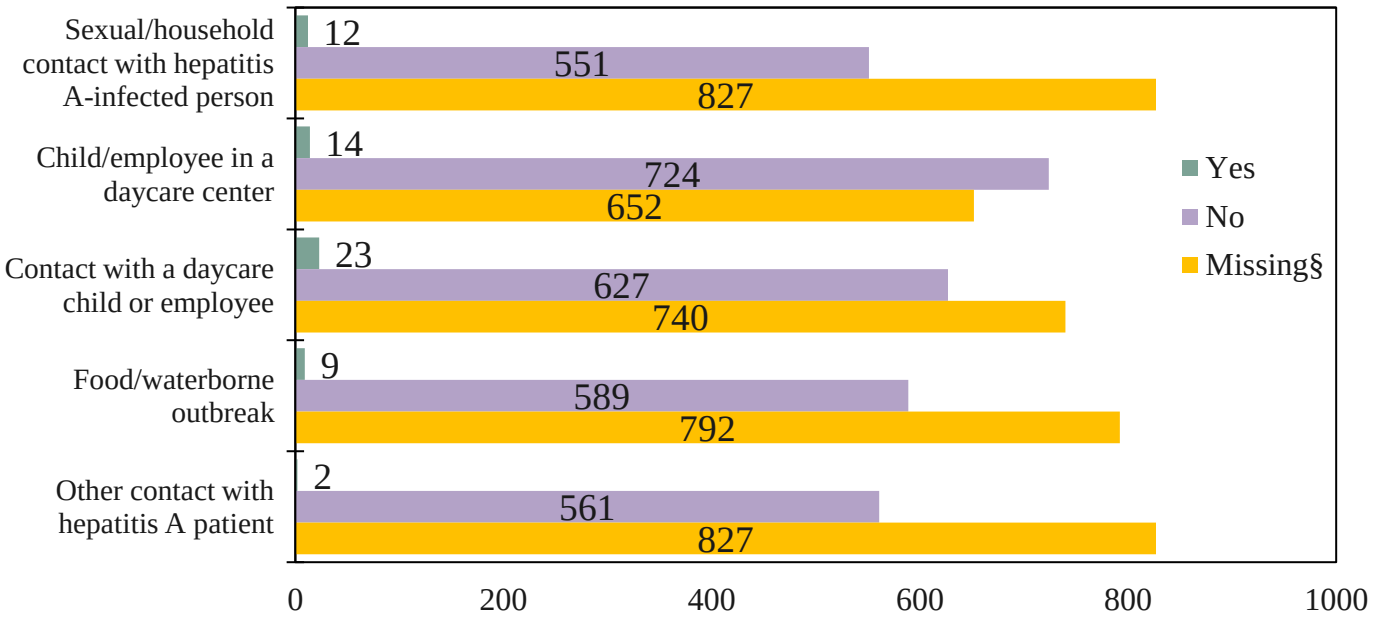
Source: CDC, National Notifiable Diseases Surveillance System.

*A total of 1,390 case reports of hepatitis A were received in 2015.
†More than one risk exposure/behavior may be indicated on each case report.
§No risk data reported.
¶A total of 726 hepatitis A cases were reported among males in 2015. Source: CDC.

Figure 2.6a presents reported risk exposures/behaviors for acute hepatitis A during the incubation period, 2–6 weeks prior to onset of symptoms:

- Of the 578 case reports that included information about travel, 7.6% (n= 44) indicated travel outside of the United States or Canada.
- Of the 520 case reports that included information about injection-drug use, 3.5% (n=18) indicated use of injection drugs.
- Of the 100 case reports from males that included information about sexual preference/practices, 8.0% (n=8) indicated having sex with another man.

Figure 2.6b. Hepatitis A reports*, by risk exposure/behavior†– United States, 2015



Source: CDC, National Notifiable Diseases Surveillance System.

*A total of 1,390 case reports with hepatitis A were received in 2015.
†More than one risk exposure/behavior may be indicated on each case report.
§No risk data reported.

Figure 2.6b presents reported risk exposures/behaviors for acute hepatitis A during the incubation period, 2–6 weeks prior to onset of symptoms:

- Of the 563 case reports that contained information about sexual/household contact with a hepatitis A-infected person, 2.1% (n=12) indicated such contact.
- Of the 738 case reports that included information about employment or attendance at a nursery, day-care center, or preschool, 1.9% (n=14) indicated working at or attending one of these facilities.
- Of the 650 case reports that included information about household contact with an employee of or a child attending a nursery, day-care center, or preschool, 3.5% (n=23) indicated such contact.
- Of the 598 case reports that included information about linkage to an outbreak, 1.5% (n=9) indicated exposure that may have been linked to a common-source foodborne or waterborne outbreak.
- Of the 563 case reports that included information about additional contact (i.e., other than household or sexual contact) with a person confirmed or suspected of having hepatitis A, 0.4% (n=2) indicated such contact.

Table 2.3. Number and rate* of hepatitis A-related deaths†, by demographic characteristics and year — United States, 2011–2015

Demographic characteristic		2011		2012§		2013		2014		2015	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Age Group (years)	0–34	0	0.00	2	0.00	2	0.00	0	0.00	1	0.00
	35–44	1	0.00	5	0.01	2	0.00	4	0.01	4	0.01
	45–54	11	0.02	12	0.03	13	0.03	7	0.02	6	0.01
	55–64	16	0.04	23	0.06	30	0.08	28	0.07	19	0.05
	65–74	12	0.05	17	0.07	19	0.08	19	0.07	16	0.06
	≥75	29	0.15	18	0.09	14	0.07	18	0.09	21	0.10
Race/ethnicity§	White, NH (non-Hispanic)	44	0.02	51	0.02	63	0.02	51	0.02	45	0.02
	Black, NH	10	0.03	8	0.02	6	0.01	11	0.03	7	0.02
	Hispanic	6	0.02	8	0.02	8	0.02	10	0.02	10	0.03
	Asian/Pacific Islander	8	0.06	7	0.05	3	0.02	2	0.01	4	0.02
	American Indian/Alaskan Native	1	0.04	2	0.08	0	0.00	2	0.10	1	0.04
Sex	Male	37	0.02	46	0.03	50	0.03	42	0.02	38	0.02
	Female	32	0.02	31	0.02	30	0.01	34	0.02	29	0.02
Overall		**69**	**0.02**	**77**	**0.02**	**80**	**0.02**	**76**	**0.02**	**67**	**0.02**

Source: CDC, National Vital Statistics System.
*Rates for race, sex, and overall total are age-adjusted per 100,000 U.S. standard population in 2000.
†Cause of death is defined as the underlying cause of death or one of the multiple causes of death and is based on the International Classification of Diseases, 10th Revision (ICD-10) codes B15 (hepatitis A).
§One death in 2012 is not represented under the race/ethnicity category due to missing data.

- In 2015, the overall hepatitis A-related mortality rate was 0.02 deaths per 100,000 population (n=67).
- From 2011–2015, the hepatitis A-related mortality rate remained steady at 0.02 deaths/100,000 population each year.
- In 2015, age-specific mortality rates for hepatitis A increased with advancing age: no deaths/100,000 population among persons aged 0–34 years, 0.01 deaths/100,000 population among persons aged 35–54 years, 0.05 deaths/100,000 population among persons 55–64 years, 0.06 deaths/100,000 population among persons 65–74 years, and 0.10 deaths/100,000 population among persons aged ≥75 years.
- In 2015, American Indians/Alaska Natives had the highest hepatitis A-related mortality rate at 0.04 deaths/100,000 population.
- In 2015, hepatitis A-related mortality rates were the same for both females and males (0.02 deaths/100,000 population). From 2011–2015, the hepatitis A-related mortality rate remained relatively stable for males and females.

HEPATITIS B

Acute Hepatitis B

In 2015, a total of 3,370 cases of acute hepatitis B were reported to CDC from 48 states (Table 3.1); the actual number of acute cases is estimated to be 6.48 times the number of reported cases in any year. The overall incidence rate for 2015 was 1.1 cases per 100,000 population. After adjusting for under-ascertainment and under-reporting, an estimated 21,900 acute hepatitis B cases (95% CI=12,500–53,600) occurred in 2015. (Data for 2015 were unavailable for the District of Columbia, Rhode Island, and Wyoming.)

2012 CSTE/CDC Case Definition (NNDSS)

Clinical Description

Acute hepatitis is defined as acute illness with 1) discrete onset of symptoms* (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain) and 2) jaundice or elevated serum alanine aminotransferase (ALT) >100 IU/L.

Laboratory Criteria

- Hepatitis B surface antigen (HBsAg) positive

AND

- Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive (if done).

*A documented negative HBsAg laboratory test result within 6 months prior to a positive test result (either by HBsAg, hepatitis B "e" antigen [HBeAg], or hepatitis B virus nucleic acid testing [HBV NAT] including genotype) does not require an acute clinical presentation to meet the surveillance case definition.

Table 3.1. Reported cases of acute hepatitis B, nationally and by state or jurisdiction — United States, 2011–2015

State	2011		2012		2013		2014		2015	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
Alabama	119	2.5	79	1.6	90	1.9	117	2.4	101	2.1
Alaska	3	0.4	1	0.1	1	0.1	3	0.4	3	0.4
Arizona	14	0.2	14	0.2	28	0.4	31	0.5	25	0.4
Arkansas	57	1.9	74	2.5	50	1.7	28	0.9	36	1.2
California	157	0.4	136	0.4	138	0.4	110	0.3	160	0.4
Colorado	23	0.4	24	0.5	24	0.5	29	0.5	28	0.5
Connecticut	19	0.5	15	0.4	8	0.2	9	0.3	6	0.2
Delaware	13	1.4	11	1.2	14	1.5	8	0.9	8	0.8
District of Columbia	U	U	U	U	U	U	U	U	U	U
Florida	213	1.1	247	1.3	323	1.7	313	1.6	432	2.1
Georgia	142	1.4	109	1.1	104	1.0	103	1.0	119	1.2
Hawaii	6	0.4	5	0.4	4	0.3	6	0.4	14	1.0
Idaho	2	0.1	5	0.3	13	0.8	6	0.4	8	0.5
Illinois	85	0.7	86	0.7	94	0.7	58	0.5	55	0.4
Indiana	70	1.1	90	1.4	101	1.5	126	1.9	133	2.0
Iowa	15	0.5	13	0.4	11	0.4	9	0.3	16	0.5
Kansas	15	0.5	9	0.3	11	0.4	11	0.4	19	0.7
Kentucky	151	3.5	180	4.1	214	4.9	164	3.7	162	3.7
Louisiana	62	1.4	44	1.0	82	1.8	87	1.9	87	1.9
Maine	8	0.6	9	0.7	11	0.8	12	0.9	9	0.7
Maryland	62	1.1	52	0.9	43	0.7	40	0.7	40	0.7
Massachusetts	67	1.0	75	1.1	71	1.1	30	0.4	25	0.4
Michigan	91	0.9	81	0.8	53	0.5	50	0.5	56	0.6
Minnesota	20	0.4	17	0.3	19	0.4	16	0.3	19	0.3
Mississippi	57	1.9	78	2.6	55	1.8	48	1.6	50	1.7
Missouri	60	1.0	48	0.8	61	1.0	31	0.5	35	0.6
Montana	0	0.0	2	0.2	4	0.4	0	0.0	4	0.4
Nebraska	12	0.7	10	0.5	9	0.5	8	0.4	3	0.2
Nevada	29	1.1	28	1.0	29	1.0	21	0.7	25	0.9
New Hampshire	3	0.2	4	0.3	2	0.2	4	0.3	0	0.0
New Jersey	73	0.8	70	0.8	65	0.7	77	0.9	85	0.9
New Mexico	10	0.5	3	0.1	3	0.1	2	0.1	2	0.1
New York	134	0.7	113	0.6	117	0.6	95	0.5	80	0.4

Table 3.1 (cont'd). Reported cases of acute hepatitis B, nationally and by state or jurisdiction — United States, 2011–2015

State	2011		2012		2013		2014		2015	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
North Carolina	109	1.1	73	0.7	75	0.8	100	1.0	165	1.6
North Dakota	0	0.0	0	0.0	0	0.0	0	0.0	2	0.3
Ohio	90	0.8	178	1.5	225	1.9	171	1.5	409	3.5
Oklahoma	100	2.6	79	2.1	40	1.0	57	1.5	37	0.9
Oregon	32	0.8	25	0.6	32	0.8	32	0.8	24	0.6
Pennsylvania	84	0.7	63	0.5	43	0.3	68	0.5	61	0.5
Rhode Island	U	U	U	U	U	U	U	U	U	U
South Carolina	39	0.8	37	0.8	58	1.2	37	0.8	30	0.6
South Dakota	2	0.2	2	0.2	5	0.6	3	0.4	2	0.2
Tennessee	192	3.0	240	3.7	262	4.0	232	3.5	243	3.7
Texas	204	0.8	170	0.7	142	0.5	122	0.5	159	0.6
Utah	10	0.4	13	0.5	5	0.2	11	0.4	10	0.3
Vermont	0	0.0	2	0.3	2	0.3	4	0.6	3	0.5
Virginia	84	1.0	84	1.0	72	0.9	61	0.7	69	0.8
Washington	35	0.5	34	0.5	33	0.5	44	0.6	34	0.5
West Virginia	113	6.1	141	7.6	195	10.5	186	10.1	272	14.7
Wisconsin	17	0.3	22	0.4	9	0.2	11	0.2	5	0.1
Wyoming	0	0.0	0	0.0	U	U	U	U	U	U
Total	**2903**	**0.9**	**2895**	**0.9**	**3050**	**1.0**	**2791**	**0.9**	**3370**	**1.1**

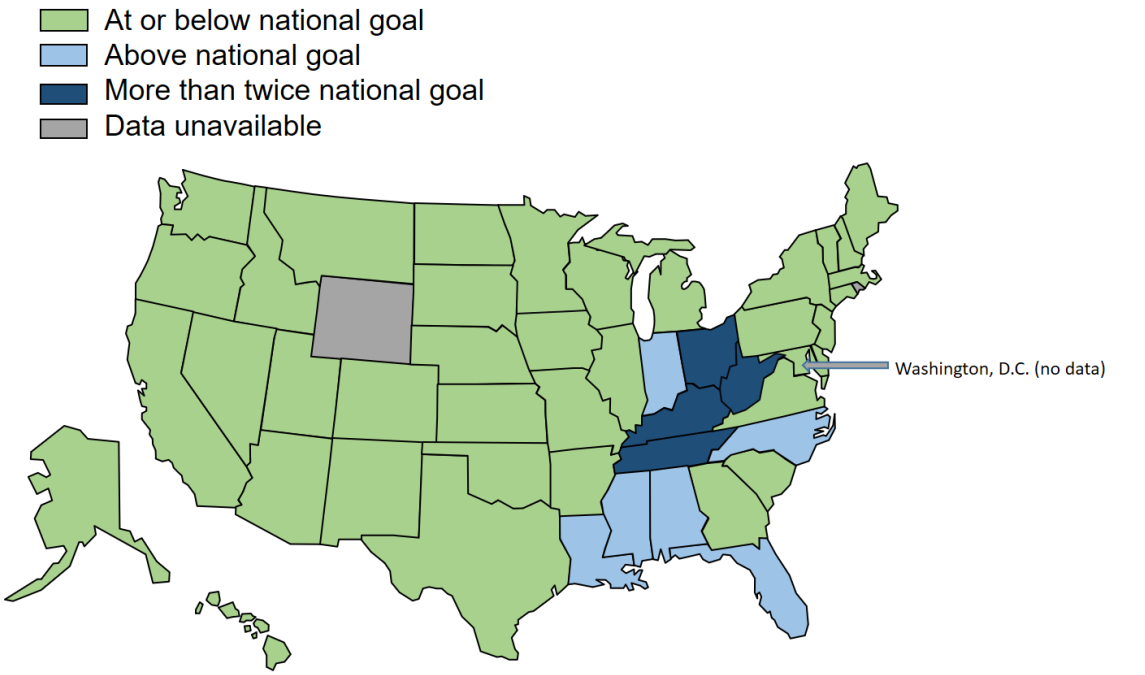
Source: CDC, National Notifiable Diseases Surveillance System.
*Rate per 100,000 population.
U=No data available for reporting.

- The number of acute hepatitis B cases reported in the United States decreased 0.3% from 2011 through 2012 (2,903 cases to 2,895 cases), increased 5.3% (to 3,050 cases) from 2012 through 2013, and decreased 8.5% (to 2,791 cases) from 2013 through 2014. Compared with data for 2014, cases of acute hepatitis B increased 20.7% to 3,370 cases in 2015.
- The national rate of acute hepatitis B increased from 0.9 cases/100,000 population in 2014 to 1.1 cases/100,000 population in 2015.
- By state, 2015 rates of acute hepatitis B ranged from no cases reported in New Hampshire to 14.7 cases per 100,000 population in West Virginia.
    - A 2.4-fold increase was observed in the number of acute hepatitis B cases reported in Ohio, from 171 cases in 2014 to 409 cases in 2015.
    - While Hawaii and Montana reported 2- and 4-fold increases from 2014 through 2015,

respectively, the number of reported cases remains <15, and rates remain lower than those at the national level.

- Of the 48 states reporting cases of acute hepatitis B in 2015, a total of eight (i.e., California, Florida, Kentucky, North Carolina, Ohio, Tennessee, Texas, and West Virginia) accounted for 59.4% of acute hepatitis B cases.

Map 3.1 2015 State Acute Hepatitis B Incidence Compared to Healthy People 2020 National Goal*



- Of the 48 reporting states, 38 (79.2%) met the *Healthy People 2020* goal (https://www.healthypeople.gov/) of reducing hepatitis B incidence to ≤1.5 cases/100,000 population among adults, including: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Hawaii, Idaho, Illinois, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Vermont, Virginia, Washington, and Wisconsin.
- The incidence of acute hepatitis B was above the *Healthy People 2020* goal for 10 states: Alabama, Florida, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, Ohio, Tennessee, and West Virginia.
- Of the 10 states with rates above the *Healthy People 2020* goal, four (Kentucky, Ohio, Tennessee, and West Virginia) had rates of acute hepatitis B more than twice the national goal.

Table 3.2. Select clinical characteristics of acute hepatitis B cases* reported in the United States, 2015.

Clinical characteristic	Availability of valid data† for clinical characteristic		Cases with clinical characteristic§	
	No.	%	No.	%
Jaundice	2,526	75.0	1,891	74.9
Hospitalized for hepatitis B	2,515	74.6	1,502	59.7
Died from hepatitis B	2,311	68.6	20	0.9

Source: CDC, National Notifiable Diseases Surveillance System.

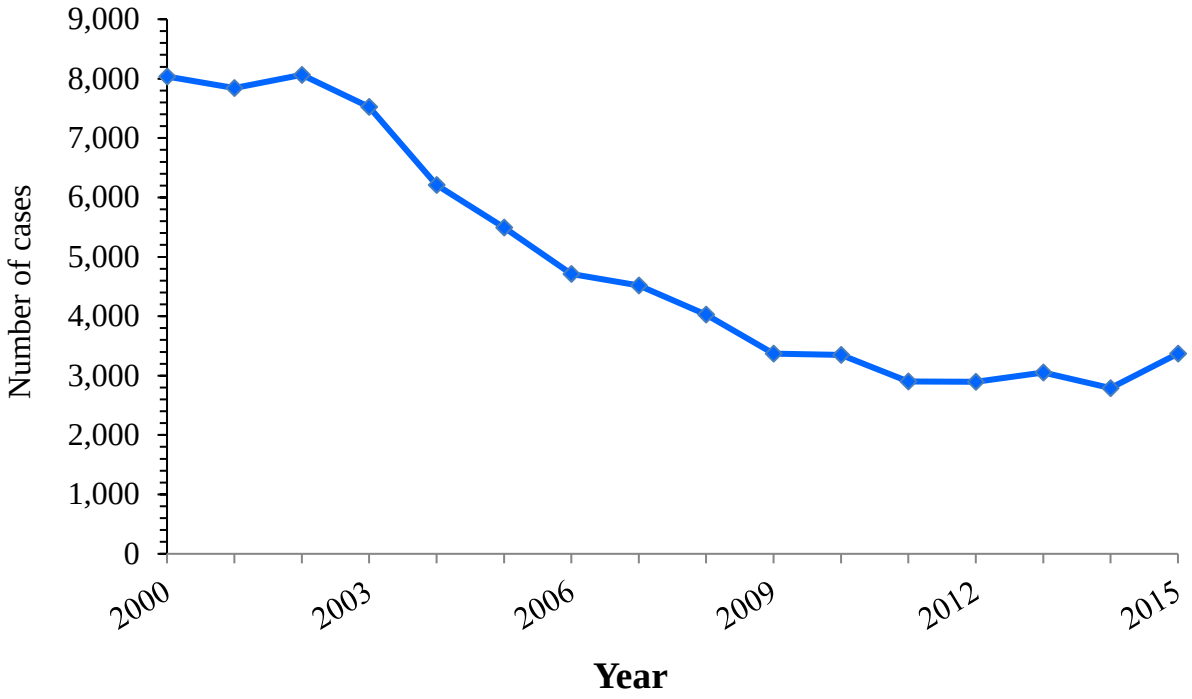
*A total of 3,370 hepatitis B cases were reported during 2015.

†Case reports for which questions regarding clinical characteristics were answered with "yes" or "no." Reports with any other response were excluded.

§Numbers and percentages represent only those case reports for which data regarding clinical characteristics were available; numbers likely are underestimates.

- Of the 3,370 case reports of acute hepatitis B received in 2015, 75.0% included information regarding whether the patient had jaundice, 74.6% included information regarding hospitalization caused by hepatitis B, and 68.6% included information on death from hepatitis B. (Note: more severe cases are likely to be ascertained and reported.)
- Jaundice was reported for 1,891 (74.9%) of the 2,526 acute hepatitis B case reports that included information about jaundice.
- Hospitalization as the result of acute hepatitis B was reported for 1,502 (59.7%) of the 2,515 acute hepatitis B case reports that included information about hospitalization.
- Death from hepatitis B was reported for 20 (0.9%) of the 2,311 acute hepatitis B case reports that included information about death

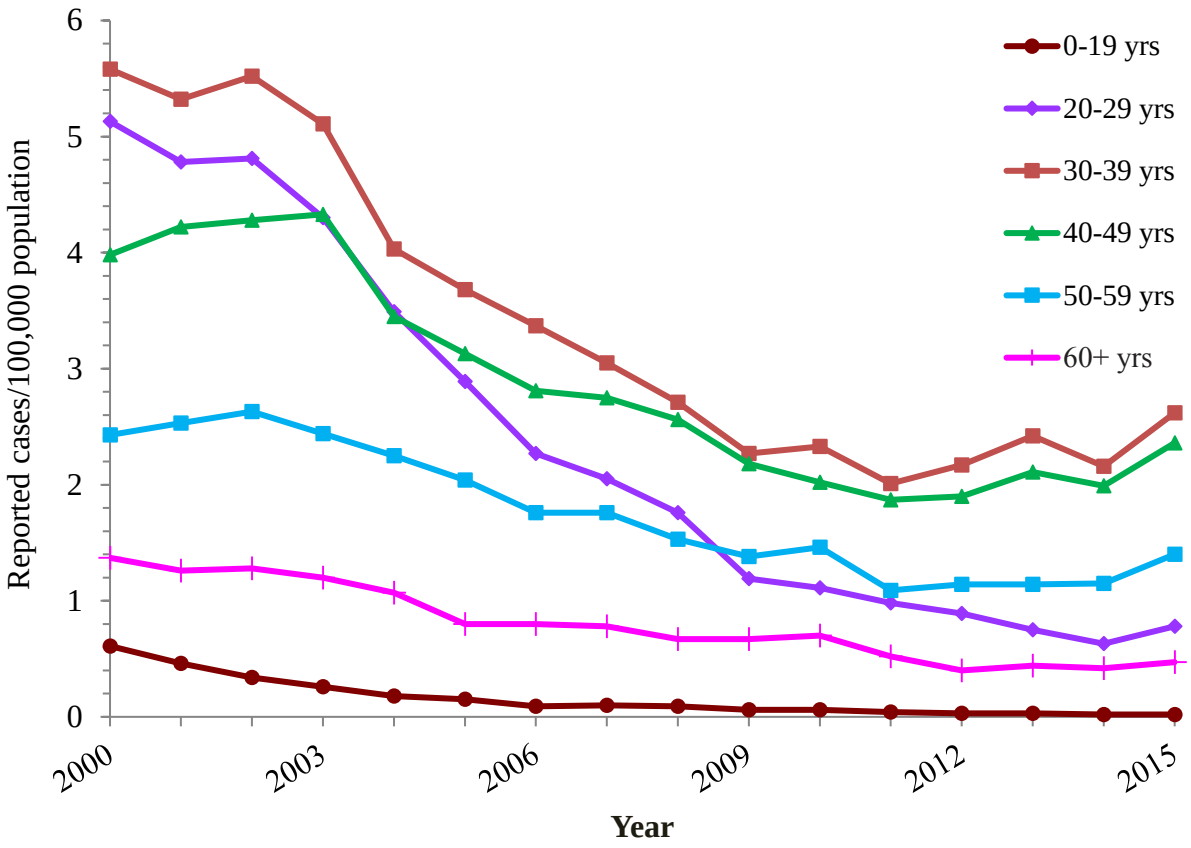
Figure 3.1. Reported number of acute hepatitis B cases — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- The number of reported acute hepatitis B cases declined 64.0%, from 8,036 in 2000 to 2,895 in 2012; increased 5.3% (to 3,050 cases) from 2012 through 2013; and declined 8.5% (to 2,791 cases) from 2013 through 2014. Compared with 2014, cases increased 20.7% to 3,370 cases in 2015.

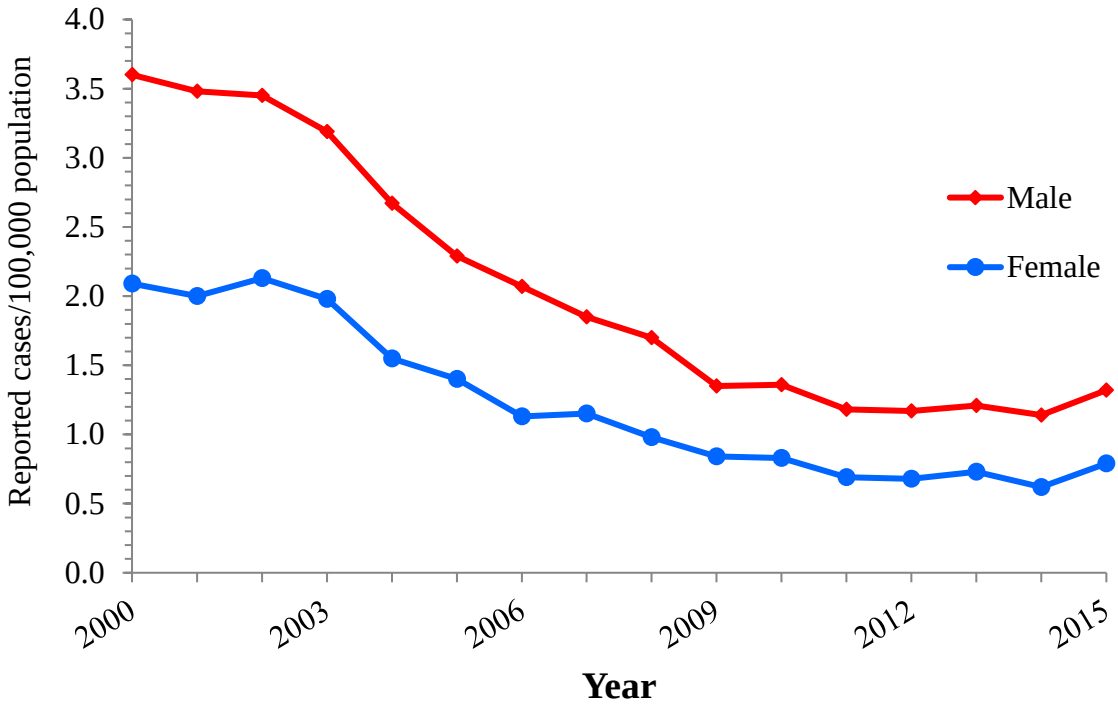
Figure 3.2. Incidence of acute hepatitis B, by age group — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2000 through 2015, the incidence of HBV cases reported in the United States was consistently highest among the 30–39 year age group and lowest among the 0–19 year age group.
- From 2014 through 2015, the incidence of HBV cases reported in the United States increased for persons in each of the age groups, except among those in the 0–19 year age group.
- In 2015, rates were highest for persons aged 30–39 years (2.6 cases/100,000 population); the lowest rates were among children and adolescents aged <19 years (0.0 cases/100,000 population).

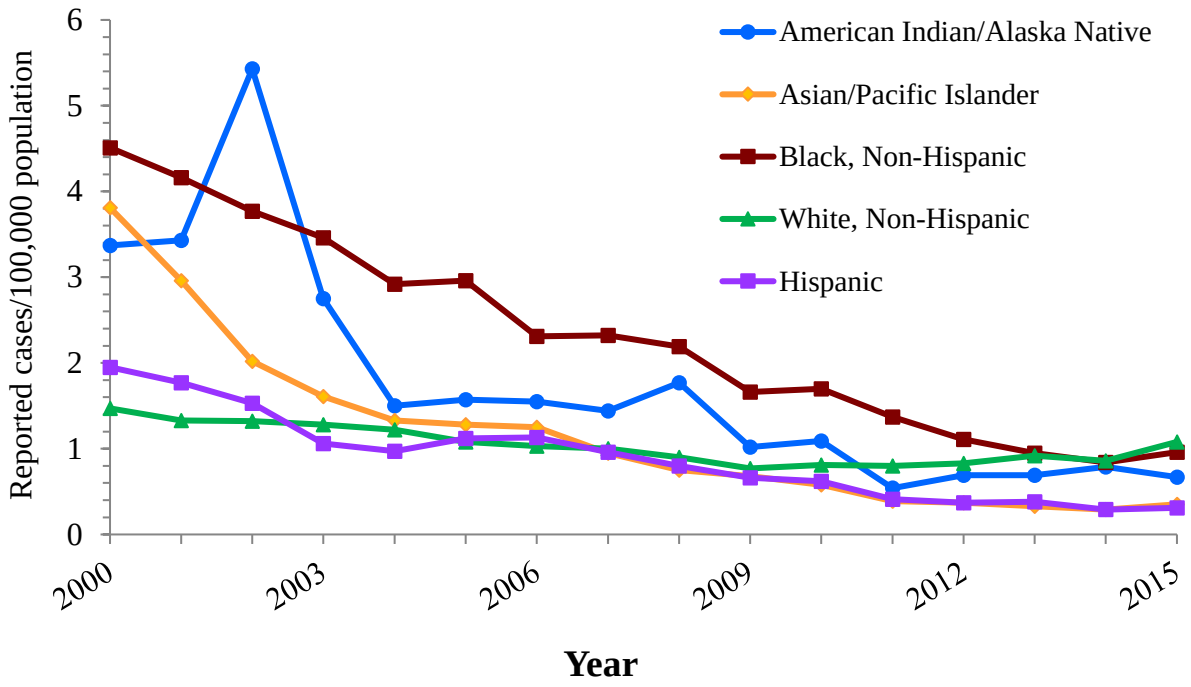
Figure 3.3. Incidence of acute hepatitis B, by sex — United States, 2000-2015



Source: CDC, National Notifiable Diseases Surveillance System.

- While the incidence of reported acute hepatitis B remained higher for males than for females from 2000 through 2015, the gap narrowed from 2002 through 2015.
- In 2015, the rate for males was approximately 1.6 times higher than that for females (1.3 cases and 0.8 cases per 100,000 population, respectively).

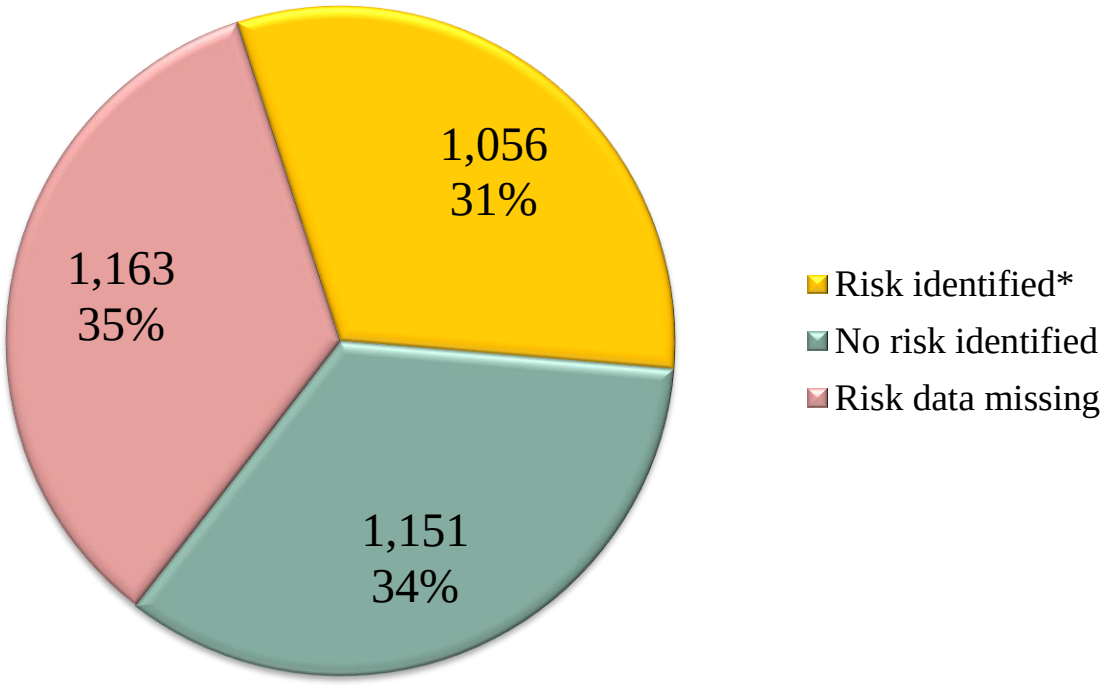
Figure 3.4. Incidence of acute hepatitis B, by race/ethnicity — United States, 2000-2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2000 through 2015, the Asian/Pacific Islander population experienced the steepest decline in the incidence rate of acute hepatitis B cases reported in the United States, from 3.8 cases/100,000 population in 2000 to 0.4 cases/100,000 in 2015. The non-Hispanic black and American Indian/Alaska Native populations also experienced a notable decline in the incidence rate of acute hepatitis B.
- In 2015, the rate of acute hepatitis B was highest for non-Hispanic Whites (1.1 cases per 100,000 population) and lowest among Hispanics and Asian/Pacific Islanders (0.31 cases per 100,000 population and 0.35 cases per 100,000, respectively).

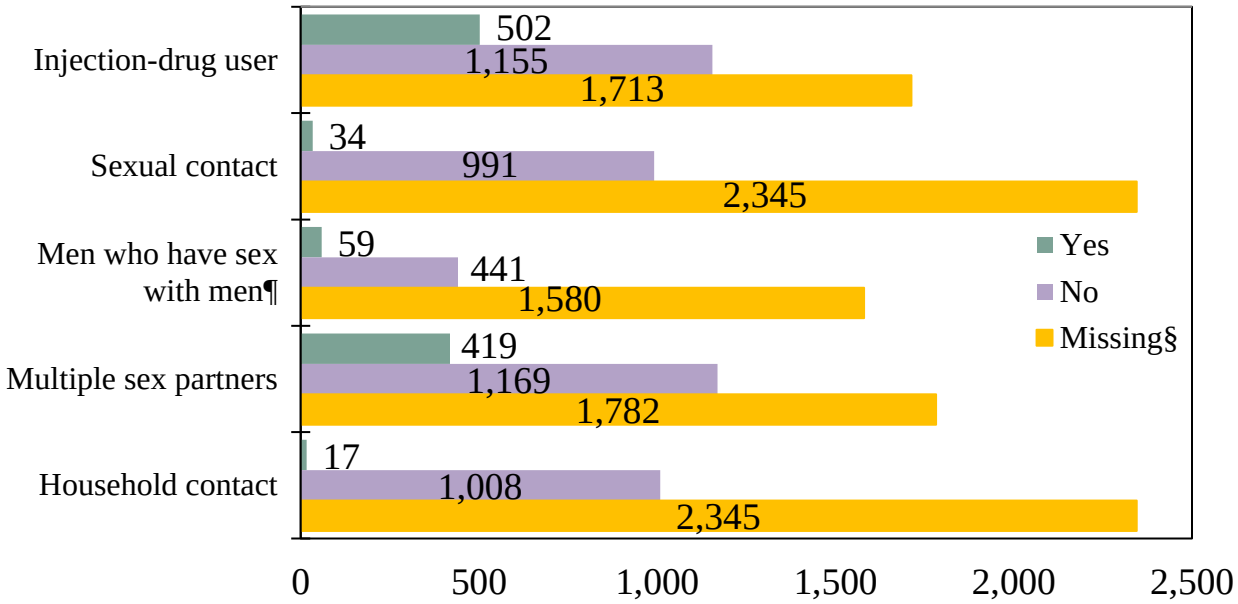
Figure 3.5. Availability of information on risk exposures/behaviors associated with acute hepatitis B — United States, 2015



Source: CDC, National Notifiable Diseases Surveillance System.
*Includes case reports indicating the presence of at least one of the following risks 6 weeks to 6 months prior to onset of acute, symptomatic hepatitis B: 1) using injection drugs; 2) having sexual contact with suspected/confirmed hepatitis B patient; 3) being a man who has sex with men; 4) having multiple sex partners concurrently; 5) having household contact with suspected/confirmed hepatitis B patient; 6) occupational exposure to blood; 7) being a hemodialysis patient; 8) having received a blood transfusion; 9) having sustained a percutaneous injury; and 10) having undergone surgery.

- Of the 3,370 case reports of acute hepatitis B received by CDC during 2015, a total of 1,163 (35%) did not include a response (i.e., a "yes" or "no" response to any of the questions about risk exposures and behaviors) to enable assessment of risk exposures or behaviors.
- Of the 2,207 case reports that contained risk exposure/behavior information:
    - 1,151 (52.2%) indicated no risk exposure/behavior for acute hepatitis B.
    - 1,056 (47.8%) indicated at least one risk exposure/behavior for acute hepatitis B during the 6 weeks to 6 months prior to illness onset**.**

Figure 3.6a. Acute hepatitis B reports*, by risk exposure/behavior† —United States, 2015

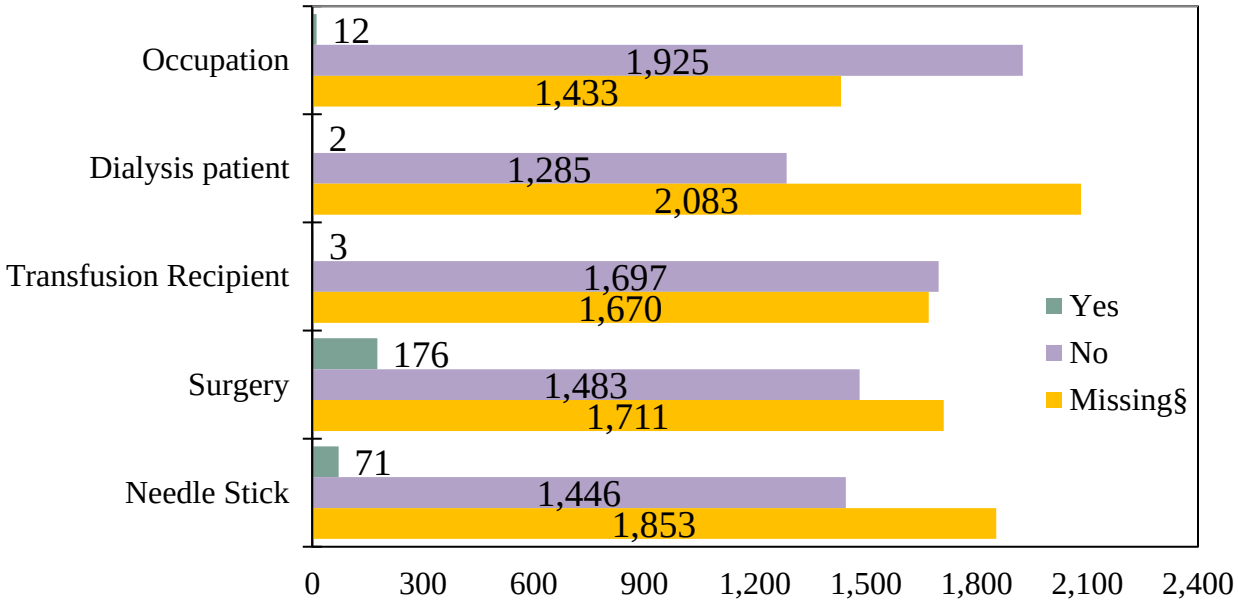


Source: CDC, National Notifiable Diseases Surveillance System.
*A total of 3,370 case reports of acute hepatitis B were received in 2015.
†More than one risk exposure/behavior may be indicated on each case report.
§No risk data reported.
¶A total of 2080 acute hepatitis B cases were reported among males in 2015.

Figure 3.6a presents reported risk exposures/behaviors for acute hepatitis B during the incubation period, 2 weeks to 6 months prior to onset of symptoms.

- Of the 1,657 case reports that included information about injection-drug use, 30.3% (n=502) indicated use of injection drugs.
- Of the 1,025 case reports that included information about sexual contact, 3.3% (n=34) indicated sexual contact with a person with confirmed or suspected hepatitis B.
- Of the 500 case reports from males that included information about sexual preference/practices, 11.8% (n=59) indicated sex with another man.
- Of the 1,588 case reports that had information about number of sex partners, 26.4% (n=419) indicated having ≥2 sex partners.
- Of the 1,025 case reports that included information about household contact, 1.7% (n=17) indicated household contact with a person with confirmed or suspected hepatitis B.

Figure 3.6b. Acute hepatitis B reports*, by risk exposure/behavior† — United States, 2015



Source: CDC, National Notifiable Diseases Surveillance System.
*A total of 3,370 case reports of hepatitis B were received in 2015e.
†More than one risk exposure/behavior may be indicated on each case report
§No risk data reported..

Figure 3.6b presents reported risk exposures/behaviors for acute hepatitis B during the incubation period, 2 weeks to 6 months prior to onset of symptoms.

- Of the 1,937 case reports that included information about occupational exposures, 0.6% (n=12) indicated employment in a medical, dental, or other field involving contact with human blood.
- Of the 1,287 case reports that included information about receipt of dialysis or kidney transplant, 0.2% (n=2) indicated patient receipt of these procedures.
- Of the 1,700 case reports that included information about receipt of blood transfusion, 0.2% (n=3) indicated patient receipt of a blood transfusion.
- Of the 1,659 case reports that included information about surgery, 10.6% (n=176) indicated having surgery.
- Of the 1,517 case reports that included information about needle stick injury, 4.7% (n=71) indicated having an accidental needle stick/puncture.

Chronic Hepatitis B

In 2015, a total of 14,416 case reports of chronic hepatitis B were reported to CDC from 40 states (Table 3.3). Despite increasing immune protection in young persons vaccinated in infancy, an analysis of chronic hepatitis B prevalence in racial and ethnic populations indicates that during 2011–2012, a total of 847,000 persons were living with HBV infection (which included ~400,000 non-Hispanic Asians) in the noninstitutionalized U.S. population (8).

2012 CSTE/CDC Case Definition (NNDSS)

Clinical Description

No symptoms are required. Persons with chronic HBV infection may have no evidence of liver disease or may have a spectrum of disease ranging from chronic liver disease to cirrhosis or liver cancer.

Laboratory Criteria

- IgM antibodies to IgM anti-HBc negative AND a positive result on one of the following tests: HBsAg, HBeAg, or nucleic acid test for hepatitis B virus DNA (including qualitative, quantitative and genotype testing), OR
- HBsAg positive or nucleic acid test for HBV DNA positive (including qualitative, quantitative, and genotype testing) or HBeAg positive two times when tested least 6 months apart. (Any combination of these tests performed 6 months apart is acceptable.)

Table 3.3. Number of newly reported case* reports† of confirmed chronic hepatitis B submitted by states and jurisdictions, 2015

State/Jurisdiction	No. chronic hepatitis B case reports submitted †
Alabama	N
Alaska	N
Arizona	133
Arkansas	N
California§	1,008
Colorado	163
Connecticut	38
Delaware	122
District of Columbia	U
Florida	1,423
Georgia	1,867
Hawaii	N
Idaho	51
Illinois	440
Indiana	68
Iowa	39
Kansas	130
Kentucky	16
Louisiana	201
Maine	51
Maryland	566
Massachusetts	284
Michigan	350
Minnesota	186
Mississippi	N
Missouri	521
Montana	31
Nebraska	93
Nevada	N
New Hampshire	N
New Jersey	273
New Mexico	41

Table 3.3 (cont'd). Number of newly reported case* reports† of confirmed chronic hepatitis B submitted by states and jurisdictions, 2015

State/Jurisdiction	No. chronic hepatitis B case reports submitted †
New York	2,315
North Carolina	507
North Dakota	53
Ohio	890
Oklahoma	84
Oregon	138
Pennsylvania	857
Rhode Island	U
South Carolina	156
South Dakota	23
Tennessee	253
Texas	N
Utah	64
Vermont	39
Virginia	556
Washington	119
West Virginia	225
Wisconsin	N
Wyoming	42
Total	**14,416**

Source: CDC, National Notifiable Diseases Surveillance System.
*For case definition, see https://wwwn.cdc.gov/nndss/conditions/hepatitis-b-chronic/case-definition/2012/
† Reports may not reflect unique cases.
§ Cases reported by California through NNDSS were all from San Francisco County. The number of cases in this table and Table 3.4 differ because NNDSS and CDC's Secure Access Management System (SAMS) have different data close-out dates by which all annual data must be submitted.
N= Not Reportable, chronic hepatitis B infection is not reportable in the listed state.
U=No data available for reporting.

- In 2015, 40 states provided 14,416 case reports of chronic hepatitis B.
- Ten states (California, Florida, Georgia, Maryland, Missouri, New York, North Carolina, Ohio, Pennsylvania, and Virginia) accounted for 72.9% of the chronic hepatitis B cases reported through NNDSS in 2015.
- New York submitted the largest number of case reports (n= 2,315 or 16.1%) of chronic hepatitis B in 2015.

Table 3.4. Reported cases of chronic hepatitis B, by demographic characteristics and laboratory tests — Enhanced Viral Hepatitis Surveillance Sites, 2015

Category	FL*	MA	MI	NYS†	Phil	SF	WA	Total
	No.	No.	No.	No.	No.	No.	No.	No.
	%§	%	%	%	%	%	%	%
Sex								
	641	222	167	334	47	501	67	1979
Female	44.5%	47.0%	46.4%	43.1%	39.5%	47.0%	44.1%	45.1%
	798	250	193	440	71	566	83	2,401
Male	55.4%	53.0%	53.6%	56.8%	59.7%	53.0%	54.6%	54.7%
	2	0	0	1	1	0	2	6
Unknown /missing	0.1%	0.0%	0.0%	0.1%	0.8%	0.0%	1.3%	0.1%
Race/Ethnicity								
American Indian/ Alaska Native, NH¶	0	8	6	1	1	0	0	16
	0.0%	1.7%	1.7%	0.1%	0.8%	0.0%	0.0%	0.4%
Asian/Pacific Islander, NH	81	159	90	265	45	562	22	1,224
	5.6%	33.7%	25.0%	34.2%	37.8%	52.7%	14.5%	27.9%
	187	87	46	92	23	13	12	460
Black, NH	13.0%	18.4%	12.8%	11.9%	19.3%	1.2%	7.9%	10.5%
	290	48	108	86	12	26	13	583
White, NH	20.1%	10.2%	30.0%	11.1%	10.1%	2.4%	8.6%	13.3%
	90	15	5	40	5	20	4	179
Hispanic	6.2%	3.2%	1.4%	5.2%	4.2%	1.9%	2.6%	4.1%
	47	28	22	33	4	10	5	149
Other, NH	3.3%	5.9%	6.1%	4.3%	3.4%	0.9%	4.2%	3.4%
	746	135	83	258	29	436	96	1783
Unknown /missing	51.8%	28.6%	23.1%	33.3%	24.4%	40.9%	63.2%	40.7%
Age group, years								
	9	6	8	4	1	7	3	38
0-14	0.6%	1.3%	2.2%	0.5%	0.8%	0.7%	2.0%	0.9%
	67	33	26	63	9	43	15	256
15-24	4.6%	7.0%	7.2%	8.1%	7.6%	4.0%	9.9%	5.8%
	428	209	116	292	41	339	52	1,477
25-39	29.7%	44.3%	32.2%	37.7%	34.5%	31.8%	34.2%	33.7%
	479	126	114	235	43	378	47	1,422
40-54	33.2%	26.7%	31.7%	30.3%	36.1%	35.4%	30.9%	32.4%
	458	98	96	181	25	303	35	1,196
55+	31.8%	20.8%	26.7%	23.4%	21.0%	28.4%	23.0%	27.3%
	0	0	0	0	0	0	0	0
Unknown /missing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 3.4 (cont'd). Reported cases of chronic hepatitis B, by demographic characteristics and laboratory tests — Enhanced Viral Hepatitis Surveillance Sites, 2015

Category	FL*	MA	MI	NYS†	Phil	SF	WA	Total
	No.	No.	No.	No.	No.	No.	No.	No.
	%§	%	%	%	%	%	%	%
Place of birth								
United States	0	25	85	5	51	14	0	180
	0.0%	5.3%	23.6%	0.6%	42.9%	1.3%	0.0%	4.1%
Outside United States	0	180	128	24	62	136	0	530
	0.0%	38.1%	35.6%	3.1%	52.1%	12.7%	0.0%	12.1%
Unknown /missing	1,441	267	147	746	6	917	152	3,676
	100.0%	56.6%	40.8%	96.3%	5.0%	85.9%	100.0%	83.8%
Hepatitis B laboratory testing**								
HBV surface antigen +	1,301	398	270	690	97	943	90	3,789
	90.3%	84.3%	75.0%	89.0%	81.5%	88.4%	59.2%	86.4%
[IgM anti-HBc] -	986	84	63	236	0	0	0	1,369
	68.4%	17.8%	17.5%	30.5%	0.0%	0.0%	0.0%	31.2%
HBV "e" antigen +	193	85	12	136	35	106	20	587
	13.4%	18.0%	3.3%	17.5%	29.4%	9.9%	13.2%	13.4%
HBV NAT +	652	382	13	338	99	941	24	2,449
	45.2%	80.9%	3.6%	43.6%	83.2%	88.2%	15.8%	55.8%
Total no. cases	**1,441**	**472**	**360**	**775**	**119**	**1,067**	**152**	**4,386**
2015 Estimated population total††	20,271,272	6,794,422	9,922,576	11,245,386	1,567,442	864,816	7,170,351	57,836,265
Rate per 100,000 population	7.1	6.9	3.6	6.9	7.6	123.4	2.1	7.6

Source: CDC, Enhanced Viral Hepatitis Surveillance Sites.
Abbreviations: FL, Florida, MA, Massachusetts; MI, Michigan; NYS, New York State; Phil, Philadelphia; SF, San Francisco; WA, Washington State; HBV: Hepatitis B Virus; IgM anti-HBc (Anti-Hepatitis B core IgM); NAT: HBV nucleic acid testing.
Percentages may not sum to 100% due to rounding.
* Florida DOH only reported cases from the following 10 counties: Alachua, Broward, Hillsborough, Miami-Dade, Orange, Palm Beach, Pinellas, Polk, Sarasota, and Seminole.
†New York City was not included in the case count for New York State, therefore cases and population estimates from New York excluded those who resided in New York City.
§The denominator used to calculate proportions was the total number of cases reported for each site.
¶NH: Non-Hispanic
**Cases can be reported with more than one laboratory test result.
††Population estimates for the United States: https://www.census.gov/quickfacts/table/PST045216/00

- In 2015, a total of 4,386 chronic hepatitis B cases were reported by seven funded enhanced surveillance sites.
- Among the 4,386 chronic hepatitis B cases,
    - 54.7% were among males and
    - 66.1% were among persons aged 25–54 years.
- By site, the proportion of cases among males ranged from 53.0% in Massachusetts and San Francisco to 59.7% in Philadelphia; the proportion of Asian/Pacific Islanders with hepatitis B infection ranged from 5.6% in Florida to 52.7% in San Francisco.
- Among the 710 cases for which place of birth was known, those born outside of the United States accounted for the greatest number of chronic hepatitis B cases (n=530, 74.6%). By site, among the cases for which place of birth was known, the proportion of reported chronic hepatitis B cases born outside of the United States ranged from 54.9% in Philadelphia to 90.7% in San Francisco. In 2015, information on place of birth was not collected by Florida or Washington State.

Table 3.5. Number and rate* of hepatitis B-related deaths†, by demographic characteristics and year — United States, 2011–2015

Demographic characteristic		2011		2012		2013		2014		2015	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Age Group (years)§	0–34	41	0.03	38	0.03	40	0.03	35	0.02	31	0.02
	35–44	143	0.35	123	0.30	146	0.36	126	0.31	120	0.30
	45–54	421	0.94	428	0.97	389	0.89	384	0.88	332	0.77
	55–64	645	1.69	639	1.66	704	1.79	684	1.71	611	1.49
	65–74	285	1.27	314	1.31	343	1.36	358	1.36	384	1.39
	≥75	269	1.42	229	1.20	251	1.29	256	1.29	236	1.17
Race/ethnicity¶	White, NH (non-Hispanic)	832	0.32	818	0.31	868	0.33	853	0.32	809	0.30
	Black, NH	373	0.98	322	0.81	384	0.98	330	0.80	320	0.78
	Hispanic	161	0.48	139	0.39	149	0.39	155	0.38	134	0.32
	Asian/Pacific Islander	422	2.72	469	2.93	451	2.64	478	2.71	420	2.24
	American Indian/Alaskan Native	9	0.38	18	0.74	14	0.55	11	0.43	16	0.58
Sex	Male	1,321	0.80	1,272	0.75	1,375	0.79	1,307	0.74	1,277	0.72
	Female	483	0.26	499	0.27	498	0.26	536	0.27	438	0.22
Overall		**1,804**	**0.52**	**1,771**	**0.50**	**1,873**	**0.52**	**1,843**	**0.50**	**1,715**	**0.45**

Source: CDC, National Vital Statistics System.
*Rates for race, sex, and overall total are age-adjusted per 100,000 U.S. standard population in 2000.
†Cause of death is defined as the underlying cause of death or one of the multiple causes of death and is based on the International Classification of Diseases, 10th Revision (ICD-10) codes B16, B17.0, B18.0, B18.1 (hepatitis B).
§ One death in 2015 is not represented under the age group category due to missing data.
¶ Seven deaths in 2011, five deaths in 2012, seven deaths in 2013, 16 deaths in 2014, and 16 deaths in 2015 are not represented under the race/ethnicity category due to missing data.

- In 2015, the overall hepatitis B-related mortality rate was 0.45 deaths/100,000 population and was listed as an underlying cause of 1,715 deaths, representing a slight decline from the previous year.
- From 2011 through 2014, the hepatitis B-related mortality rate remained relatively stable at 0.50-0.52 deaths/100,000 population. In 2015, the rate slightly declined to 0.45 deaths/100,000 population.
- In 2015, Asians/Pacific Islanders had the highest hepatitis B-related mortality rate of 2.24 deaths/100,000 population compared with other racial/ethnic populations. Persons aged 55–64 years and 65–74 years had the highest age-specific mortality rates at 1.49 deaths/100,000 population and 1.39 deaths/100,000 population, respectively.
- In 2015, the hepatitis B-related mortality rate for males was more than three times the mortality rate for females (0.72 deaths/100,000 population vs. 0.22 deaths/100,000 population). From 2011 through 2015, the hepatitis B-related mortality rate remained relatively stable for males and females

Perinatal Hepatitis B

Infants born to hepatitis B surface antigen (HBsAg)-positive women who become infected with hepatitis B at or near delivery are considered to have perinatal HBV infection; 90% of infants infected at birth go on to develop chronic hepatitis B. In 2015, a total of 37 cases of perinatal hepatitis B were reported to CDC from 18 states (Table 3.6).
A 2009 modeling study estimates that 952 chronic hepatitis B cases occur each year among persons infected with HBV at birth, for a baseline annual rate of 3.84% (51).

1995 CSTE/CDC Case Definition (NNDSS)

Clinical Description

Perinatal hepatitis B in the newborn may range from asymptomatic to fulminant hepatitis.

Laboratory Criteria

- Hepatitis B surface antigen (HBsAg) positive

Case Classification

Confirmed
HBsAg positivity in any infant aged >1-24 months who was born in the United States or in U.S. territories to an HBsAg-positive mother.

Table 3.6. Number of newly reported case* reports† of perinatal hepatitis B§ submitted by states and jurisdictions, 2015

State/Jurisdiction	No. Perinatal hepatitis B case reports† submitted
Alabama	1
California	11
Colorado	1
Connecticut	1
Georgia	2
Hawaii	1
Massachusetts	1
Minnesota	3
Nebraska	1
Nevada	1
New York	4
North Carolina	1
Oregon	2
Texas	1
Virginia	1
Washington	1
West Virginia	2
Wisconsin	2
Total	**37**

Source: CDC, National Notifiable Diseases Surveillance System.
*For case-definition, see https://wwwn.cdc.gov/nndss/conditions/hepatitis-b-perinatal-virus-infection/case-definition/1995/
†Reports may not reflect unique cases.
§ Perinatal hepatitis B is not a reportable disease in ALL jurisdictions.

- In 2015, a total of 18 states provided 37 case reports of perinatal hepatitis B.
- California had the highest number of newly reported case reports of perinatal hepatitis B (n=11) in 2015.

HEPATITIS C

Acute Hepatitis C

In 2015, a total of 2,436 cases of acute hepatitis C were reported to CDC from 41 states (Table 4.1). The overall incidence rate for 2015 was 0.8 cases per 100,000 population, an increase from 2011–2012. Actual acute cases are estimated to be 13.9 times the number of reported cases in any year. After adjusting for under-ascertainment and under-reporting, an estimated 33,900 acute hepatitis C cases (95% CI=26,800–115,000) occurred in 2015. (Data for 2015 were unavailable for Alaska, Arizona, Connecticut, the District of Columbia, Hawaii, Iowa, Mississippi, New Hampshire, Rhode Island, and Wyoming.)

2012 CSTE/CDC Case Definition (NNDSS)

Clinical Description

An acute illness with a discrete onset of any sign or symptom* consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain) and either a) jaundice or b) elevated serum alanine aminotransferase (ALT) levels >400 IU/L.

Laboratory Criteria

Positive on one or more of the following three tests:

- Antibodies to hepatitis C virus (anti-HCV) screening test with a signal-to-cutoff ratio predictive of a true positive as determined for the particular assay as defined by CDC. (URL for the signal to cut-off ratios: http://www.cdc.gov/hepatitis/HCV/LabTesting.htm)
  OR
- Hepatitis C virus recombinant immunoblot assay (HCV RIBA)
  OR
- Nucleic acid test (NAT) for HCV RNA (including qualitative, quantitative or genotype testing)

AND meets the following two criteria (if additional testing is performed):

- Absence of IgM antibody to hepatitis A virus (IgM anti-HAV)
  AND
- Absence of IgM anti-HBc

*A documented negative HCV antibody laboratory test result followed within 6 months by a positive test result (as described in the laboratory criteria for diagnosis) does not require an acute clinical presentation to meet the surveillance case definition

Table 4.1. Reported cases of acute hepatitis C, nationally and by state and jurisdiction — United States, 2011-2015

State	2011		2012		2013		2014		2015	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
Alabama	23	0.5	24	0.5	30	0.6	35	0.7	70	1.4
Alaska	U	U	U	U	U	U	U	U	U	U
Arizona	U	U	U	U	U	U	U	U	U	U
Arkansas	0	0.0	5	0.2	30	1.0	13	0.4	2	0.1
California	48	0.1	63	0.2	72	0.2	73	0.2	59	0.2
Colorado	28	0.5	42	0.8	21	0.4	33	0.6	40	0.7
Connecticut	47	1.3	34	0.9	U	U	U	U	U	U
Delaware	3	0.3	U	U	U	U	U	U	4	0.4
District of Columbia	U	U	U	U	U	U	U	U	U	U
Florida	64	0.3	107	0.6	134	0.7	93	0.5	126	0.6
Georgia	53	0.5	82	0.8	48	0.5	57	0.6	84	0.8
Hawaii	U	U	U	U	U	U	U	U	U	U
Idaho	12	0.8	11	0.7	14	0.9	6	0.4	4	0.2
Illinois	6	0.0	26	0.2	37	0.3	27	0.2	31	0.2
Indiana	84	1.3	110	1.7	175	2.7	122	1.8	138	2.1
Iowa	0	0.0	3	0.1	U	U	U	U	U	U
Kansas	8	0.3	16	0.6	17	0.6	28	1.0	22	0.8
Kentucky	142	3.2	178	4.1	226	5.1	176	4.0	119	2.7
Louisiana	7	0.2	11	0.2	19	0.4	22	0.5	24	0.5
Maine	12	0.9	8	0.6	8	0.6	31	2.3	30	2.3
Maryland	35	0.6	39	0.7	53	0.9	42	0.7	38	0.6
Massachusetts	23	0.3	37	0.6	174	2.6	228	3.4	249	3.7
Michigan	32	0.3	76	0.8	74	0.7	78	0.8	83	0.8
Minnesota	17	0.3	32	0.6	47	0.9	40	0.7	37	0.7
Mississippi	U	U	U	U	U	U	U	U	U	U
Missouri	8	0.1	4	0.1	6	0.1	6	0.1	8	0.1
Montana	9	0.9	9	0.9	16	1.6	13	1.3	15	1.5
Nebraska	2	0.1	3	0.2	2	0.1	2	0.1	8	0.4
Nevada	10	0.4	12	0.4	9	0.3	6	0.2	12	0.4
New Hampshire	U	U	U	U	U	U	U	U	U	U
New Jersey	53	0.6	71	0.8	106	1.2	113	1.3	130	1.5
New Mexico	14	0.7	21	1.0	12	0.6	16	0.8	40	1.9
New York	52	0.3	93	0.5	131	0.7	126	0.6	121	0.6

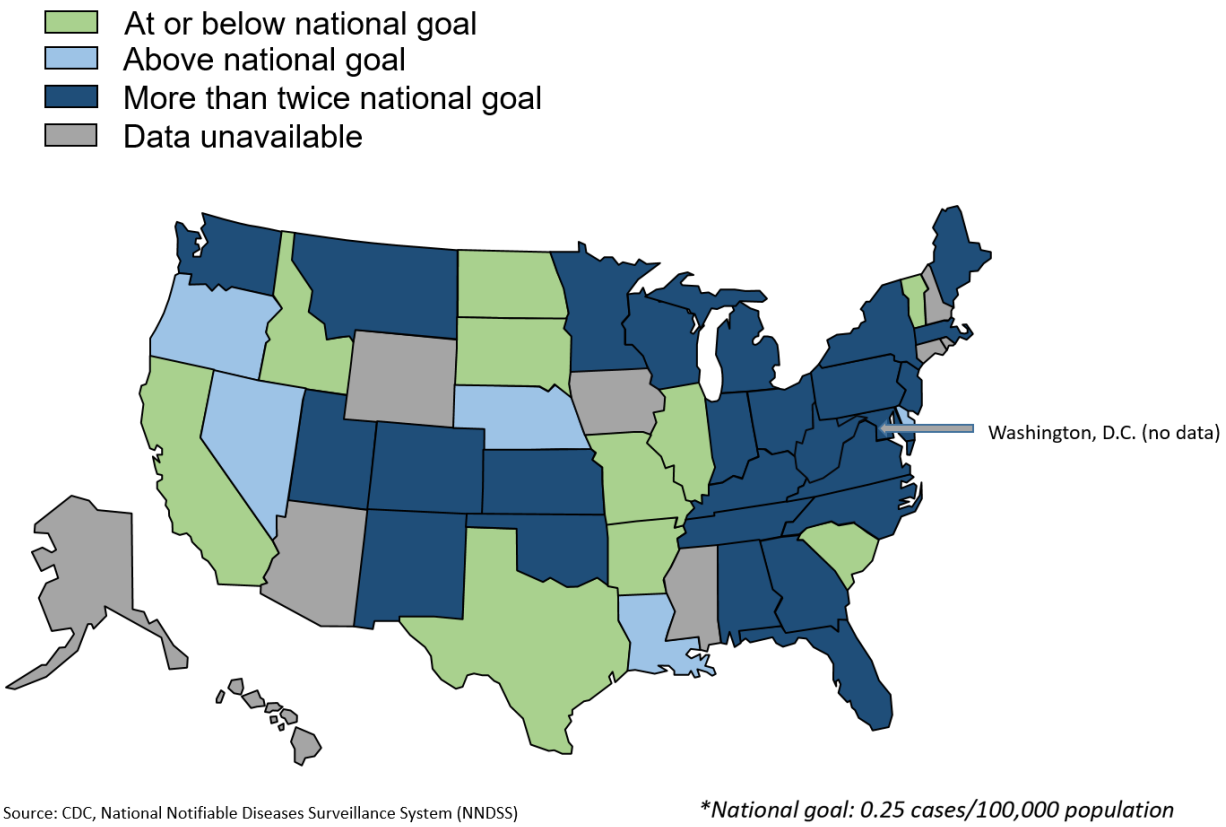
Table 4.1 (cont'd). Reported cases of acute hepatitis C, nationally and by state and jurisdiction — United States, 2011-2015

State	2011		2012		2013		2014		2015	
	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
North Carolina	60	0.6	63	0.6	79	0.8	111	1.1	144	1.4
North Dakota	0	0.0	0	0.0	4	0.6	0	0.0	0	0.0
Ohio	6	0.1	7	0.1	116	1.0	105	0.9	122	1.1
Oklahoma	53	1.4	80	2.1	40	1.0	45	1.2	35	0.9
Oregon	20	0.5	37	0.9	14	0.4	15	0.4	13	0.3
Pennsylvania	35	0.3	66	0.5	81	0.6	69	0.5	129	1.0
Rhode Island	U	U	U	U	U	U	U	U	U	U
South Carolina	1	0.0	1	0.0	0	0.0	4	0.1	5	0.1
South Dakota	U	U	U	U	U	U	U	U	U	U
Tennessee	83	1.3	129	2.0	98	1.5	123	1.9	173	2.6
Texas	37	0.1	44	0.2	28	0.1	47	0.2	48	0.2
Utah	10	0.4	17	0.6	11	0.4	38	1.3	30	1.0
Vermont	6	1.0	6	1.0	3	0.5	4	0.6	1	0.2
Virginia	25	0.3	76	0.9	41	0.5	54	0.6	52	0.6
Washington	41	0.6	54	0.8	63	0.9	82	1.2	63	0.9
West Virginia	46	2.5	55	3.0	58	3.1	62	3.4	63	3.4
Wisconsin	15	0.3	26	0.5	40	0.7	49	0.9	64	1.1
Wyoming	2	0.4	U	U	U	U	U	U	U	U
Total	**1232**	**0.4**	**1778**	**0.6**	**2138**	**0.7**	**2194**	**0.7**	**2436**	**0.8**

Source: CDC, National Notifiable Diseases Surveillance System.
*Rate per 100,000 population.
U=No data available for reporting.

- The number of acute hepatitis C cases reported in the United States increased 44.3% from 2011 through 2012 (1,232 cases to 1,778 cases), increased 20.2% (to 2,138 cases) from 2012 through 2013, and increased 2.6% (to 2,194 cases) from 2013 through 2014. Compared with 2014, cases of acute HCV increased 11.0% (to 2,436 cases) in 2015.
- From 2014 through 2015, the national rate of acute cases of hepatitis C increased from 0.7 to 0.8 cases per 100,000 population.
- By state, in 2015 rates of acute hepatitis C ranged from no cases reported in North Dakota to 3.7 cases per 100,000 population in Massachusetts.
- Of the 40 reporting states, 10 states (Florida, Indiana, Kentucky, Massachusetts, New Jersey, New York, North Carolina, Ohio, Pennsylvania, and Tennessee) accounted for 59.6% of the acute hepatitis C cases reported in 2015.

Map 4.1. 2015 State Acute Hepatitis C Incidence Compared to Healthy People 2020 National Goal*



Source: CDC, National Notifiable Diseases Surveillance System.

- Of the 40 reporting states, the following 10 (25%) met the *Healthy People 2020* (https://www.healthypeople.gov/) goal of reducing hepatitis C incidence to ≤0.25 cases/100,000 population: Arkansas, California, Idaho, Illinois, Missouri, North Dakota, South Carolina, South Dakota, Texas, and Vermont.
- The incidence of acute hepatitis C was above the *Healthy People 2020* goals for 31 of the 40 reporting states: Alabama, Colorado, Delaware, Florida, Georgia, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.
- Of the 31 states with rates above the *Healthy People 2020* goals, 26 states (Colorado, Florida, Georgia, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin) had rates of acute hepatitis C that were more than twice the national goal.

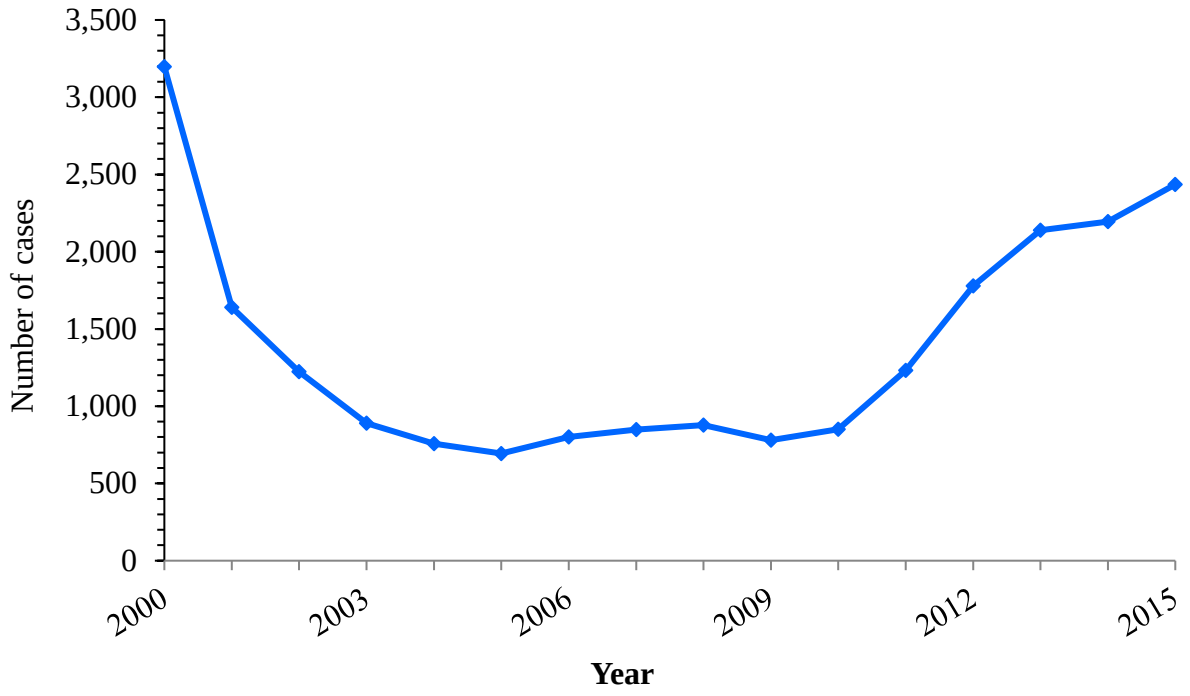
Table 4.2. Select clinical characteristics of acute hepatitis C cases* reported in the United States, 2015

Clinical characteristic	Availability of valid data† for clinical characteristic		Cases with clinical characteristic§	
	No.	%	No.	%
Jaundice	1,696	69.6	927	54.7
Hospitalized for hepatitis C	1,552	63.7	822	53.0
Died from hepatitis C	1,318	54.1	6	0.5

Source: CDC, National Notifiable Diseases Surveillance System.
*A total of 2,436 acute hepatitis C cases were reported during 2015.
†Case reports for which questions regarding clinical characteristics were answered with "yes" or "no." Reports with any other response were excluded.
§Numbers and percentages represent only those case reports for which data regarding clinical characteristics were available; numbers likely are underestimates.

- Of the 2,436 acute hepatitis C case reports received during 2015, 69.6% (n=1,696) included information about whether the case-patient had jaundice, 63.7% (n=1,552) included information regarding hospitalization caused by hepatitis C, and 54.1% (n=1,318) included information on death from hepatitis C. (Note: more severe cases are likely to be ascertained and reported.)
- Jaundice was reported for 927 (54.7%) of the 1,696 acute hepatitis C case reports that included information about jaundice.
- Hospitalization as the result of hepatitis C was reported for 822 (53.0%) of the 1,552 acute hepatitis C case reports that included information about hospitalization.
- Death from hepatitis C was reported for 6 (0.5%) of the 1,318 acute hepatitis C case-reports that included information about death.

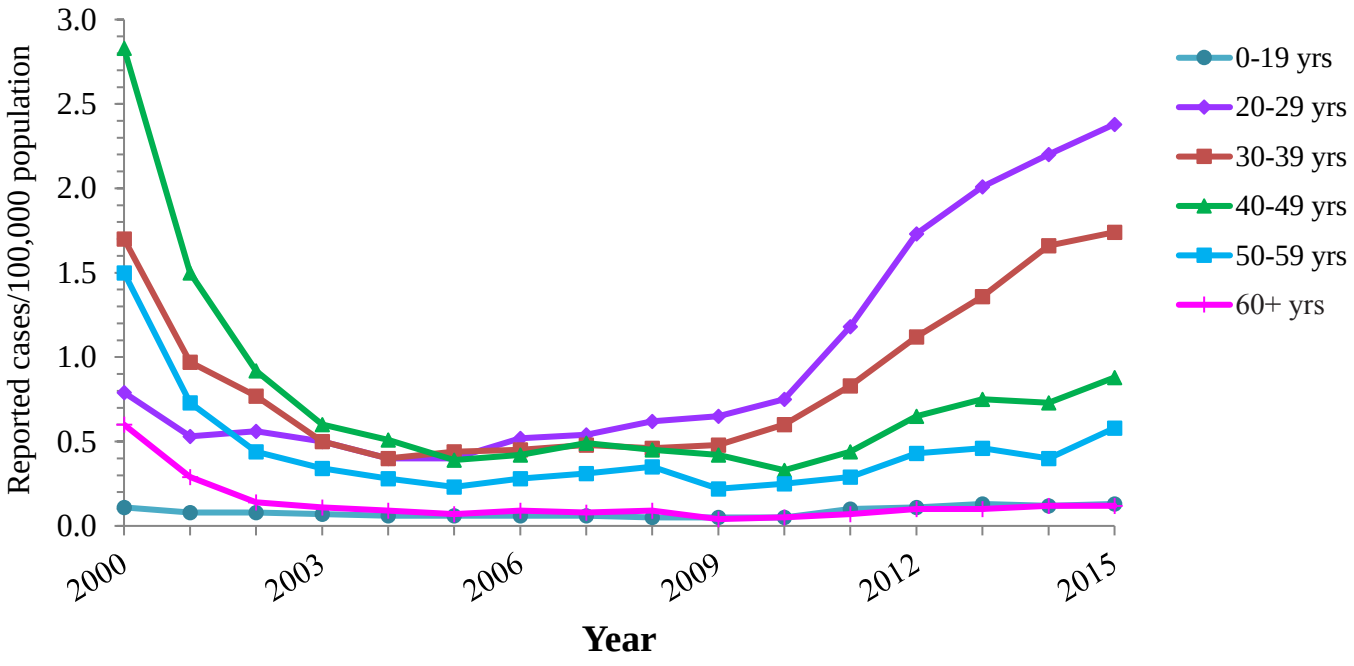
Figure 4.1. Reported number of acute hepatitis C cases — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- The number of reported acute hepatitis C cases declined 61.5%, from 3,197 in 2000 to 1,232 in 2011; increased 44.3% (to 1,778 cases) from 2011 through 2012; increased 20.3% (to 2,138 cases) from 2012 through 2013; and increased 2.6% (to 2,194 cases) from 2013 through 2014. From 2014 through 2015, the number of acute HCV cases increased 11.0% (to 2,436 cases).

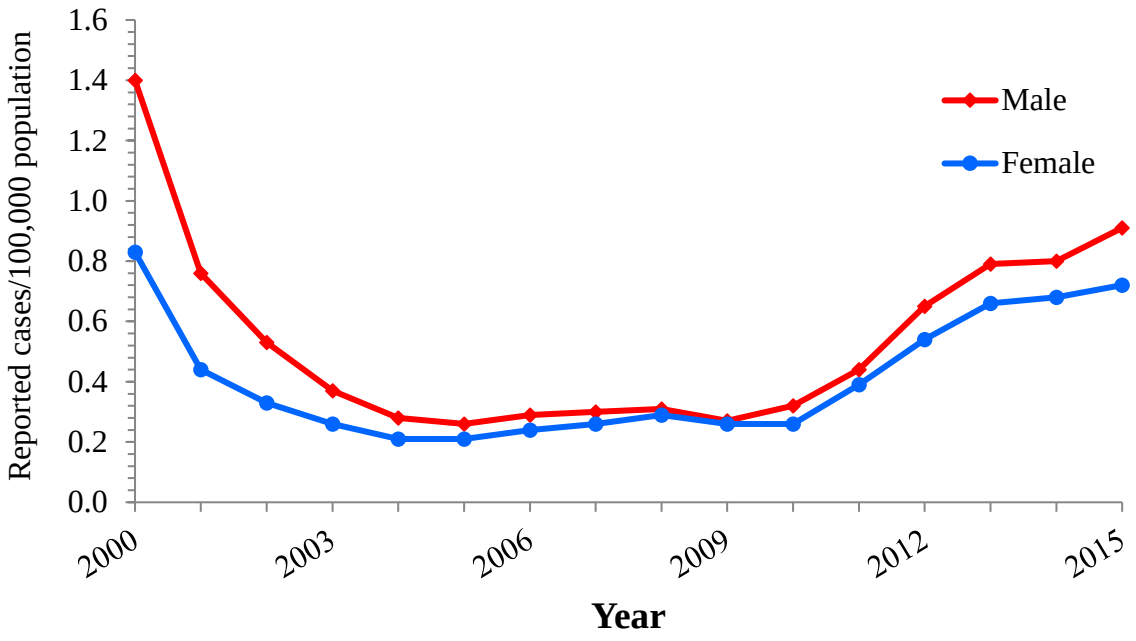
Figure 4.2. Incidence of acute hepatitis C, by age group — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2000 through 2002, incidence rates for reported acute hepatitis C decreased among all age groups except for persons aged 0–19 years; rates remained fairly constant among all age groups from 2002 through 2010.
- From 2010 through 2015, the rate of acute hepatitis C increased among persons aged 20–29, 30–39, and ≥60 years; the largest increases were among persons aged 20–29 years (from 1.2 cases per 100,000 population in 2011 to 2.3 cases per 100,000 population in 2015) and persons aged 30–39 years (from 0.8 cases per 100,000 population in 2011 to 1.7 cases per 100,000 population in 2015).
- In 2015, among all age groups, persons aged 20–29 years had the highest rate (2.4 cases per 100,000 population) and persons aged 0–19 and ≥60 years had the lowest rate (0.1 cases per 100,000 population) of acute hepatitis C.
- From 2014 through 2015, incidence rates for reported acute hepatitis C increased for all age groups, except for persons aged ≥60 years. The largest increases were among persons aged 20–29 years (from 2.2 cases per 100.000 population in 2014 to 2.4 cases per 100,000 population in 2015) and persons aged 50–59 years (from 0.4 cases per 100,000 population in 2011 to 0.6 cases per 100,000 population in 2015).

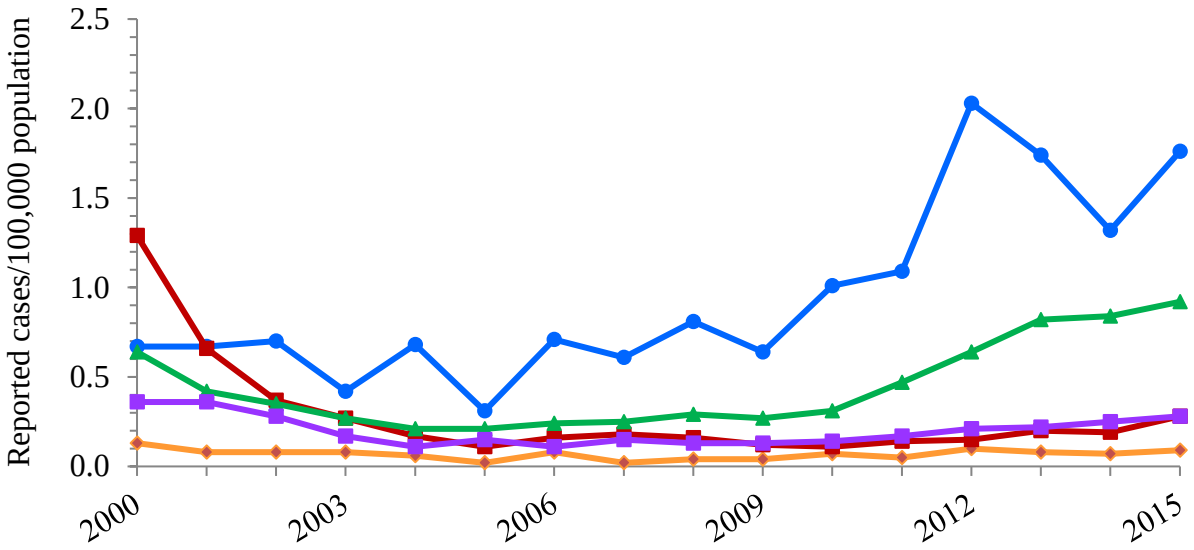
Figure 4.3. Incidence of acute hepatitis C, by sex — United States, 2000-2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2011 through 2015, rates of acute hepatitis C increased among both males and females.
- In 2015, rates among males and females were 0.9 and 0.7 cases per 100,000 population, respectively.

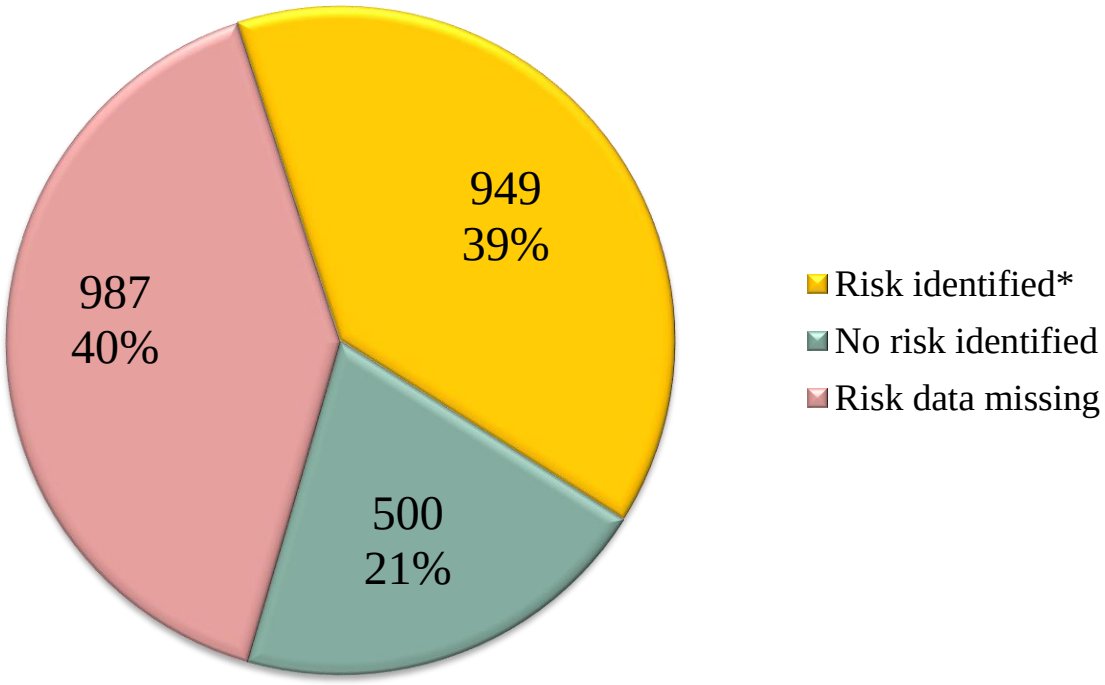
Figure 4.4. Incidence of acute hepatitis C, by race/ethnicity — United States, 2000–2015



Source: CDC, National Notifiable Diseases Surveillance System.

- From 2002 through 2010, the incidence rate of acute hepatitis C for American Indians/Alaska Natives remained high relative to other racial/ethnic groups. Incidence rates have since increased for all racial/ethnic populations.
- From 2011 through 2015, the incidence rate of acute hepatitis C increased among all racial/ethnic groups except Asians/Pacific Islanders.
- In 2015, the incidence rate per 100,000 population of acute hepatitis C was 1.8 for American Indians/Alaska Natives, 0.9 for non-Hispanic Whites, 0.3 for both Hispanics and non-Hispanic Blacks, and 0.1 for Asians/Pacific Islanders.

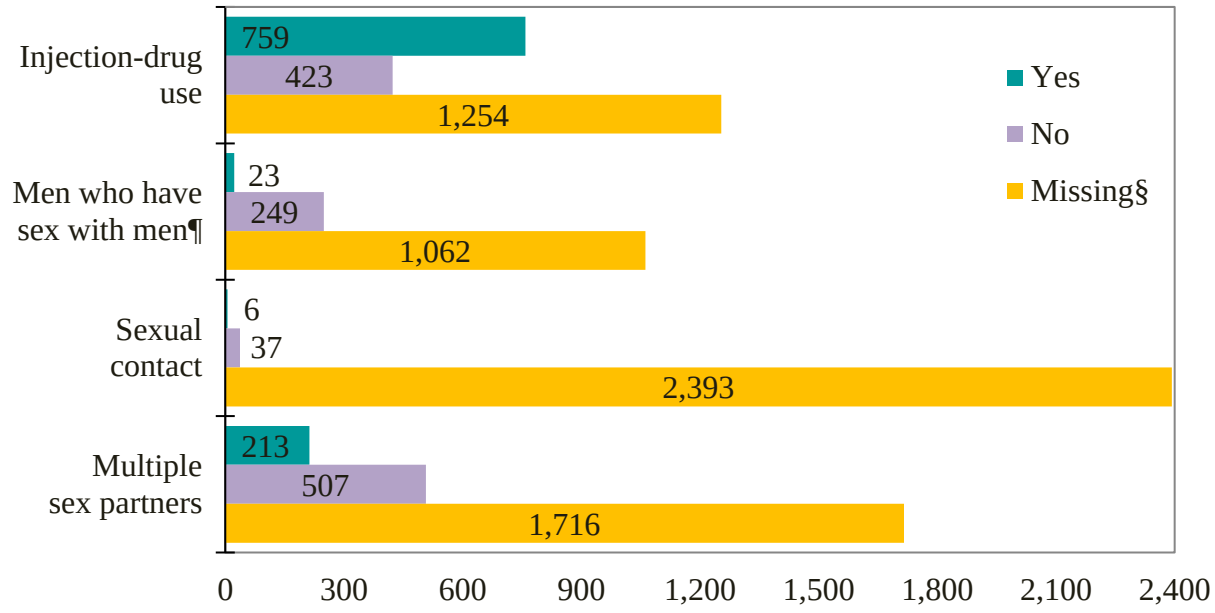
Figure 4.5. Availability of information on risk exposures/behaviors associated with acute hepatitis C — United States, 2015



Source: CDC, National Notifiable Diseases Surveillance System.
*Includes case reports indicating the presence of at least one of the following risks 2 weeks to 6 months prior to onset of acute, symptomatic hepatitis C: 1) using injection drugs; 2) having sexual contact with suspected/confirmed hepatitis C patient; 3) being a man who has sex with men; 4) having multiple sex partners concurrently; 5) having household contact with suspected/confirmed hepatitis C patient; 6) having had occupational exposure to blood; 7) being a hemodialysis patient; 8) having received a blood transfusion; 9) having sustained a percutaneous injury; and 10) having undergone surgery.

- Of the 2,436 case reports of acute hepatitis C received by CDC during 2015, a total of 987 (40%) did not include a response (i.e., a "yes" or "no" response to any of the questions about risk exposures and behaviors) to enable assessment of risk exposures or behaviors.
- Of 1,449 case reports that contained risk exposure/behavior information:
    - 500 (34.5%) indicated no risk exposure/behavior for acute hepatitis C and
    - 949 (65.5%) indicated at least one risk exposure/behavior for acute hepatitis C during the 2 weeks to 6 months prior to illness onset.

Figure 4.6a. Acute hepatitis C reports*, by risk exposure/behavior† — United States, 2015

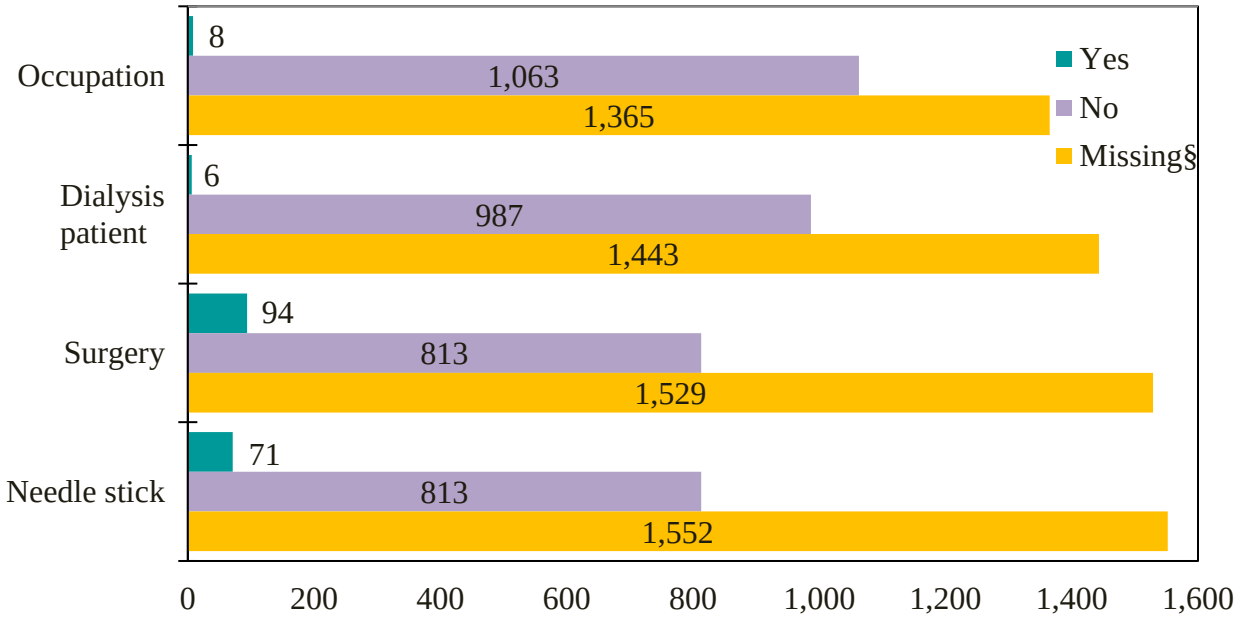


Source: CDC, National Notifiable Diseases Surveillance System.
*A total of 2,436 case reports of acute hepatitis C were received in 2015.
† More than one risk exposure/behavior may be indicated on each case report.
§No risk data reported.
¶A total of 1,334 acute hepatitis C cases were reported among males in 2015.

Figure 4.6a presents reported risk exposures/behaviors for acute hepatitis C during the incubation period, 2 weeks to 6 months prior to onset of symptoms.

- Of the 1,182 case reports that contained information about injection-drug use, 64.2% (n=759) indicated use of injection drugs.
- Of the 272 case reports from males that included information about sexual preferences/practices, 8.5% (n=23) indicated sex with another man.
- Of the 43 case reports that had information about sexual contact, 14% (n=6) indicated sexual contact with a person with confirmed or suspected hepatitis C.
- Of the 720 case reports that had information about number of sex partners, 29.6% (n=213) indicated having ≥2 sex partners.

Figure 4.6b. Acute hepatitis C reports*, by risk exposure/behavior† — United States, 2015



Source: CDC, National Notifiable Diseases Surveillance System.
*A total of 2,436 case reports of acute hepatitis C were received in 2015.
†More than one risk exposure/behavior may be indicated on each case report.
§No risk data reported.

Figure 4.6b presents reported risk exposures/behaviors for acute hepatitis C during the incubation period, 2 weeks to 6 months prior to onset of symptoms.

- Of the 1,071 case reports that included information about occupational exposures, 0.75% (n=8) indicated employment in a medical, dental, or other field involving contact with human blood.
- Of the 993 case reports that included information about receipt of dialysis or a kidney transplant, 0.6% (n=6) indicated patient receipt of dialysis or a kidney transplant.
- Of the 907 case reports that included information about surgery, 10.4% (n=94) indicated having surgery.
- Of the 884 case reports that included information about needle sticks, 8% (n=71) indicated having an accidental needle stick/puncture.

Hepatitis C, Past or Present

In 2015, a total of 181,871 case reports of past or present hepatitis C were reported to CDC from 40 states (Table 4.3). Estimates based on the population sampled by the National Health and Nutrition Examination Survey (NHANES) indicate that approximately 2.7 million U.S. residents are living with chronic HCV infection (38).

`

2012 CSTE/CDC Case Definition (NNDSS)

Clinical Description

Most persons infected with HCV are asymptomatic; however, many have chronic liver disease, which can range from mild to severe.

Laboratory Criteria

One or more of the following three criteria (except in persons <18 months of age, for whom only the third criteria would satisfy the case classification):

- Anti-HCV screening-test positive with a signal-to-cutoff ratio predictive of a true positive as determined for the particular assay as defined by CDC (URL for the signal-to-cutoff ratios: http://www.cdc.gov/hepatitis/HCV/LabTesting.htm)
  OR
- HCV RIBA positive
  OR
- NAT for HCV RNA positive (including qualitative, quantitative or genotype testing).

Table 4.3. Number of newly reported case* reports† of confirmed past or present hepatitis C submitted by states and jurisdictions, 2015

State/Jurisdiction	No. past/present hepatitis C case reports† submitted
Alabama	N
Alaska	1,604
Arizona	U
Arkansas	1
California §	1,182
Colorado	3,561
Connecticut	3,291
Delaware	31
District of Columbia	U
Florida	22,793
Georgia	7,175
Hawaii	U
Idaho	1,017
Illinois	8,696
Indiana	U
Iowa	20
Kansas	1,697
Kentucky	4
Louisiana	2,478
Maine	1,486
Maryland	7,425
Massachusetts	5,482
Michigan	6,808
Minnesota	2,015
Mississippi	N
Missouri	7,800
Montana	1,354
Nebraska	893
Nevada	N
New Hampshire	N
New Jersey	7,928
New Mexico	3,680

Table 4.3 (cont'd). Number of newly reported case* reports† of confirmed past or present hepatitis C submitted by states and jurisdictions, 2015

State/Jurisdiction	No. past/present hepatitis C case reports† submitted
New York	15,058
North Carolina	N
North Dakota	794
Ohio	19,165
Oklahoma	590
Oregon	5,472
Pennsylvania	11,988
Rhode Island	U
South Carolina	4,515
South Dakota	567
Tennessee	2,251
Texas	N
Utah	1,578
Vermont	808
Virginia	8,138
Washington	5,712
West Virginia	6,339
Wisconsin	3
Wyoming	472
Total	**181,871**

Source: CDC, National Notifiable Diseases Surveillance System
*For case definition, see https://wwwn.cdc.gov/nndss/conditions/hepatitis-c-chronic/case-definition/2012/
†Reports may not reflect unique cases.
§ Cases reported by California through NNDSS were all from San Francisco County. Differences in the number of cases in this table and table 4.4 are because NNDSS and CDC's Secure Access Management System (SAMS) have different data close-out dates by which all annual data must be submitted.
N=Not Reportable, past/present hepatitis C is not reportable in the listed state.
U= No data available for reporting.

- In 2015, a total of 40 states notified CDC of 181,871 cases of past or present hepatitis C.
- Eleven states (Florida, Georgia, Illinois, Maryland, Michigan, Missouri, New Jersey, New York, Ohio, Pennsylvania, Virginia) accounted for 67.6% of the past/present hepatitis C case reports submitted through NNDSS in 2015.
- In 2015, the largest number of reports of past/present hepatitis C was received from Florida (n=22,793 or 12.6%).

Table 4.4. Reported cases of past or present hepatitis C, by demographic characteristics and laboratory tests — Enhanced Viral Hepatitis Surveillance Sites, 2015

Category	FL*	MA	MI	NYS†	Phil	SF	WA	Total
	No.	No.	No.	No.	No.	No.	No.	No.
	%§	%	%	%	%	%	%	%
Sex								
	10,271	2,334	2,666	3,151	560	431	2,236	21,649
Female	40.2%	39.9%	37.9%	37.7%	33.5%	27.2%	37.6%	38.6%
	15,206	3,500	4,352	5,131	1,097	1,152	3,639	34,077
Male	59.5%	59.8%	61.9%	61.4%	65.7%	72.7%	61.1%	60.8%
	98	21	14	71	14	2	80	303
Unknown /missing	0.4%	0.4%	0.2%	0.8%	0.8%	0.1%	1.3%	0.5%
Race/ethnicity								
American Indian/ Alaska Native, NH¶	29	14	58	43	2	5	0	151
	0.1%	0.2%	0.8%	0.5%	0.1%	0.3%	0.0%	0.3%
Asian/Pacific Islander, NH	54	97	44	97	13	57	39	404
	0.2%	1.7%	0.6%	1.2%	0.8%	3.6%	0.7%	0.7%
	957	243	1,184	682	153	234	164	3,617
Black, NH	3.7%	4.2%	16.8%	8.2%	9.2%	14.8%	2.8%	6.5%
	7,519	2,566	3,346	4,067	185	580	1,611	19,874
White, NH	29.4%	43.8%	47.6%	48.7%	11.1%	36.6%	27.1%	35.5%
	1,135	330	112	541	89	116	135	2,458
Hispanic	4.4%	5.6%	1.6%	6.5%	5.3%	7.3%	2.3%	4.4%
	271	210	86	132	12	0	42	753
Other, NH	1.1%	3.6%	1.2%	1.6%	0.7%	0.0%	0.7%	1.3%
	15,610	2,395	2,202	2,791	1,217	593	3,964	28,772
Unknown /missing	61.0%	40.9%	31.3%	33.4%	72.8%	37.4%	66.6%	51.0%
Age group, years								
	67	25	16	15	10	1	18	152
0-14	0.3%	0.4%	0.2%	0.2%	0.6%	0.1%	0.3%	0.3%
	2,343	794	537	1,064	58	35	427	5,258
15-24	9.2%	13.6%	7.6%	12.7%	3.5%	2.2%	7.2%	9.4%
	7,071	2,197	1,795	2,720	362	295	1,473	15,913
25-39	27.6%	37.5%	25.5%	32.6%	21.7%	18.6%	24.7%	28.4%
	6,314	1,285	1,454	1,787	466	452	1,590	13,348
40-54	24.7%	21.9%	20.7%	21.4%	27.9%	28.5%	26.7%	23.7%
	9,766	1,546	3,226	2,752	773	792	2,438	21,293
55+	38.2%	26.4%	45.9%	32.9%	46.3%	50.0%	40.9%	38.0%
Unknown/missing	14	8	4	15	2	10	9	62
	0.1%	0.1%	0.1%	0.2%	0.1%	0.6%	0.2%	0.1%

Table 4.4 (cont'd). Reported cases of past or present hepatitis C, by demographic characteristics and laboratory tests — Enhanced Viral Hepatitis Surveillance Sites, 2015

Category	FL*	MA	MI	NYS†	Phil	SF	WA	Total
	No.	No.	No.	No.	No.	No.	No.	No.
	%§	%	%	%	%	%	%	%
Hepatitis C laboratory testing**								
Anti-HCV+	15,975	4,613	4,861	5,715	987	977	3,862	36,990
	62.5%	78.8%	69.1%	68.4%	59.1%	61.6%	64.9%	66.0%
HCV RNA+	15,226	4,505	2,318	5,862	1,639	1,179	2,656	33,385
	59.5%	76.9%	33.0%	70.2%	98.1%	74.4%	44.6%	59.6%
Total no. cases	25,575	5,855	7,032	8,353	1,671	1,585	5,955	56,026
2015 Estimated population total††	20,271,272	6,794,422	9,922,576	11,245,386	1,567,442	864,816	7,170,351	57,836,265
Rate per 100,000 population	126.2	86.2	70.9	74.3	106.6	183.3	83.1	96.9

Source: CDC, Enhanced Viral Hepatitis Surveillance Sites.
Abbreviations: FL, Florida; MA, Massachusetts; MI, Michigan; NYS, New York State; Phil, Philadelphia; SF, San Francisco; WA, Washington State; HCV: Hepatitis C virus; Anti-HCV: Hepatitis C Antibody: HCV RNA: Ribonucleic acid.
* Florida DOH only reported cases from the following 10 counties:
Alachua, Broward, Hillsborough, Miami-Dade, Orange, Palm Beach, Pinellas, Polk, Sarasota, and Seminole
†Cases and population estimates from New York excluded those who resided in New York City because New York City was not included in the reported case counts.
§ The denominator used to calculate proportions was the total number of cases reported for each site.
¶NH: Non-Hispanic
**Cases can be reported with more than one laboratory test result.
††Population estimates for the United States: https://www.census.gov/quickfacts/table/PST045216/00

- In 2015, a total of 56,029 cases of past or present hepatitis C were reported by the seven funded sites.
- Among the 56,026 cases of past or present hepatitis C:
    - 60.8% were among males;
    - 61.6% were among persons aged 15–54 years;
    - 35.5% were among persons identifying as white, non-Hispanic;
    - 66.0% tested anti-HCV-positive; and
    - 65.6% tested HCV RNA-positive.
- By site, the proportion of past or present hepatitis C cases among males ranged from 59.5% in Florida to 72.7% in San Francisco. Similarly, the proportion of past or present hepatitis cases among persons identifying as white, non-Hispanic ranged from 11.1% in Philadelphia to 48.7% in New York.

Table 4.5. Number and rate* of hepatitis C-related deaths†, by demographic characteristic and year — United States, 2011-2015

Demographic characteristic		2011		2012		2013		2014		2015	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Age Group (years)§	0–34	128	0.09	158	0.11	121	0.08	162	0.11	196	0.13
	35–44	696	1.71	622	1.54	573	1.42	552	1.36	597	1.47
	45–54	5,073	11.34	4,749	10.73	4,344	9.93	4,118	9.48	3,676	8.51
	55–64	8,330	21.89	9,235	23.93	9,899	25.18	9,999	24.95	9,702	23.73
	65–74	2,136	9.50	2,515	10.49	3,004	11.91	3,390	12.84	4,023	14.60
	≥75	1,357	7.18	1,369	7.15	1,425	7.31	1,433	7.22	1,434	7.10
Race/ethnicity¶	White, NH (non-Hispanic)	11,196	4.19	11,839	4.35	12,219	4.40	12,455	4.46	12,355	4.38
	Black, NH	3,167	7.89	3,232	7.81	3,520	8.35	3,540	8.12	3,606	8.14
	Hispanic	2,555	7.15	2,668	7.19	2,699	6.91	2,767	6.81	2,699	6.40
	Asian/Pacific Islander	455	3.14	472	3.15	495	3.09	438	2.56	445	2.49
	American Indian/Alaskan Native	275	10.61	313	11.81	324	12.22	317	11.20	367	12.95
Sex	Male	12,651	7.11	13,300	7.31	13,745	7.40	13,998	7.39	14,095	7.31
	Female	5,070	2.70	5,350	2.77	5,623	2.85	5,661	2.81	5,534	2.71
Overall		**17,721**	**4.82**	**18,650**	**4.96**	**19,368**	**5.03**	**19,659**	**5.01**	**19,629**	**4.91**

Source: CDC, National Vital Statistics System.
*Rates for race, sex, and overall total are age-adjusted per 100,000 U.S. standard population in 2000.
†Cause of death is defined as the underlying cause of death or one of the multiple causes of death and is based on the International Classification of Diseases, 10th Revision (ICD-10) codes B17.1, and B18.2 (hepatitis C).
§One death in 2011, two deaths in 2012, two deaths in 2013, five deaths in 2014, and one death in 2015 are not represented under the age category due to missing age data.
¶The race/ethnicity category was added starting in 2010 to incorporate bridged race categories. 73 deaths in 2011, 126 deaths in 2012, 111 deaths in 2013, 142 deaths in 2014, and 157 in 2015 are not represented under the race/ethnicity category due to missing data.

- As determined by death-certificate information, of the three types of viral hepatitis (hepatitis A, hepatitis B, and hepatitis C), hepatitis C was associated with the greatest number of deaths and the highest mortality rate in 2015, at 4.9 deaths/100,000 population.
- The overall hepatitis C-related mortality rate increased from 4.8 deaths/100,000 population in 2011 to 4.9 deaths/100,000 population in 2015. Compared with 2014, the rate of deaths in 2015 declined slightly to 5.01/100,000.
- In 2015, persons aged 55–64 years had the highest hepatitis C-related mortality rate (23.7 deaths/100,000) compared with other age groups, accounting for 49.4% of hepatitis C-related deaths in 2015.
- In 2015, American Indians/Alaska Natives had the highest hepatitis C-related mortality rate compared with other racial/ethnic populations, at 12.95 deaths/100,000 population. During 2011–2015, the hepatitis C-related mortality rate among American Indians/Alaska Natives increased by 13%.
- In 2015, the hepatitis C-related mortality rate for males was approximately 2.7 times the rate for females.

DISCUSSION

National surveillance data for acute viral hepatitis provide essential information for identifying patterns and trends in viral hepatitis. These data can help public health entities 1) estimate the health burden of hepatitis A, hepatitis B, and hepatitis C at national, state, and local levels; 2) identify those populations for whom public health intervention is needed; and 3) evaluate intervention efforts. National rates for acute hepatitis A and B have been published since 1966, and national rates for acute hepatitis C (formerly non-A, non-B) have been published since 1992. Major changes in the epidemiology of these diseases have occurred since reporting of these infections was initiated, largely resulting from implementation of prevention strategies, including the introduction of effective vaccines against hepatitis A and hepatitis B.

NNDSS, the core of viral hepatitis surveillance, was designed to enable states to notify CDC of cases of infectious diseases diagnosed with a single positive laboratory test. Cases of acute and chronic hepatitis B and C do not fit this pattern, as additional information beyond a single laboratory test is required to confirm a case (35). To better count and characterize cases of viral hepatitis and estimate the burden of disease, CDC supplements NNDSS data with data obtained from select funded sites, national surveys, and vital statistics.

Data from NNDSS reveal that from 2014 through 2015, there was an increase of 12.2% in the number of reported cases of hepatitis A, a 20.7% increase in the number of reported cases of acute hepatitis B, and an 11% increase in the number of reported cases of hepatitis C. CDC was not alerted to any outbreaks of hepatitis A in 2015, but five states reported at least 20 more cases in 2015 than were reported in 2014, representing an 18%–86% increase in reported cases and suggesting the occurrence of small outbreaks. Likewise, five states reported at least 50 more cases (range: 50–238) in 2015 than in 2014, representing a 38%–139% increase in reported cases. Given the decreases in new infections during previous reporting periods, recent increases in hepatitis A and acute hepatitis B signal the continued need to increase hepatitis A and hepatitis B vaccination coverage among at-risk populations. The 11% increase in annual number of new HCV infections in 2015 reflects the epidemics of HCV transmission associated with growing numbers of young, non-urban (rural and Appalachian) white youth who have transitioned from oral prescription opioid abuse to injection of these opioids and heroin (16). In 2015, after adjusting for under- ascertainment and under-reporting, the estimated numbers of cases of HAV, HBV, and HCV infections were 2,800, 21,900, and 33,900, respectively.

Chronic hepatitis infection continues to affect millions of Americans (8, 38). In 2015, a total of 14,416 reports of chronic hepatitis B and 181,871 reports of past or current hepatitis C were submitted to CDC through NNDSS. Mortality data from 2015 presented in this surveillance report show that certain socio-demographic groups are disproportionately dying with these infections, specifically 1) persons aged ≥55 years and American Indian/Alaska Natives (for hepatitis A); 2) persons aged ≥55 years of age (especially those 55–64 years of age) and Asians/Pacific Islanders (for hepatitis B); and 3) persons aged 55–64 years and American Indians/Alaska Native (for hepatitis C). Mortality rates in 2015 were highest among persons infected with HCV (4.91 deaths per 100,000 population), followed by HBV (0.45 deaths per 100,000 population) and HAV (0.02 deaths per 100,000 population).

CDC and state health departments rely on surveillance data to track the incidence of acute infection, guide development and evaluation of programs and policies for preventing infection, minimize the public health impact of viral hepatitis, and monitor progress towards achieving goals established for these programs and policies. Effective systems for conducting surveillance for chronic HBV and HCV infections are needed to ensure accurate reporting of all cases and to support and evaluate prevention activities. Additional investments in surveillance at the local, state, and national levels are essential to build strong prevention programs that interrupt transmission of viral hepatitis and improve the health of those who are currently infected.

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ADDITIONAL RESOURCES

Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book: Course Textbook.

- Hepatitis A: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hepa.pdf [PDF - 14 Pages]
- Hepatitis B: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hepb.pdf [PDF - 24 Pages]

Prevention of Hepatitis A through Active or Passive Immunization: Recommendations of the Advisory Committee on Immunization Practices (ACIP): http://www.cdc.gov/mmwr/pdf/rr/rr5507.pdf [PDF - 30 Pages]

A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States — Part I: Immunization of Infants, Children, and Adolescents: http://www.cdc.gov/mmwr/PDF/rr/rr5416.pdf [PDF - 39 Pages]

A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States — Part II: Immunization of Adults: http://www.cdc.gov/mmwr/PDF/rr/rr5516.pdf [PDF - 40 Pages]

Recommendations for Identification and Public Health Management of Persons with Chronic Hepatitis B Virus Infection: http://www.cdc.gov/mmwr/pdf/rr/rr5708.pdf [PDF - 28 Pages]

Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease: http://www.cdc.gov/mmwr/PDF/RR/RR4719.pdf [PDF - 54 Pages]

2005 Guidelines for Viral Hepatitis Surveillance and Case Management: http://www.cdc.gov/hepatitis/PDFs/2005Guidlines-Surv-CaseMngmt.pdf