

Viral Hepatitis Surveillance

United States, 2012



National Center for HIV/AIDS, Viral Hepatitis, STD & TB Prevention
Division of Viral Hepatitis



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SUMMARY

As part of CDC's National Notifiable Disease Surveillance System (NNDSS), viral hepatitis case-reports are received electronically from state health departments via CDC's National Electronic Telecommunications System for Surveillance (NETSS), a computerized public health surveillance system that provides CDC with data regarding cases of nationally notifiable diseases on a weekly basis. Although surveillance infrastructure is in place for reporting of acute infection, reports of chronic hepatitis B and C, which account for the greatest burden of disease, are not submitted by all states. As noted in a report from the Institute of Medicine ([1](#)), surveillance capacity to monitor both acute and chronic viral hepatitis is limited at the state and local levels, resulting in underreporting and variable data quality.

Data in this report should be interpreted with the consideration that reported cases of acute or chronic viral hepatitis represent only those relatively few infected persons who were detected, diagnosed, met a stringent case definition, and eventually reported to CDC in 2012. Because most acute and chronic infections are not reported, this Summary is mainly useful in detecting major trends in viral hepatitis A (HAV), B (HBV) and C (HCV). In 2011 and 2012 a major effort was undertaken to improve methodologies for estimating total number of new cases of hepatitis A, B and C from the number of cases reported for each disease ([2](#)). Estimates in this report of incidence of new infections were obtained using the newly improved methodology ([2](#)). These estimates cannot be compared to previous years' estimates that were obtained using different (unpublished) procedures; however, trends seen in reported data still pertain, such as the increase in acute HCV infection among young persons that was observed in 2011.

Because chronic HBV and HCV infection are largely hidden and part of what the former United States Assistant Secretary for Health, Dr. Howard Koh has dubbed the "Silent Epidemic" ([3](#)), this report also provides data to inform our understanding of the current epidemic of chronic hepatitis B and C.

With progressive infant vaccination recommendations since 1996—and universal infant vaccination since 2006—vaccination rates and evidence of vaccine-induced immunity in young patients have been increasing continuously in the past decade ([4](#), [5](#)). Half of all hepatitis A infections now apparently are acquired outside the United States by adult travelers ([6](#)). The major public health demands regarding hepatitis A relate to newly discovered HAV-infected food handlers, as these place a large burden on local public health departments to notify, test, and vaccinate potentially infected restaurant patrons ([7](#)). There were 1,562 reported cases of acute HAV in 2012. After asymptomatic infections and under-reporting were taken into account ([2](#)), it was estimated that approximately 3,050 new infections occurred in 2012.

Acute hepatitis B has been declining in incidence since 1990 mainly due to effective vaccination strategies, but chronic HBV infection, estimated at 700,000-1.4 million of the US population ([8](#), [9](#)), remains a major public health challenge. As the surveillance data in this report and other data indicate, about one-half of all chronic HBV infections are among persons born in Asia and Asian-Americans who were born to HBV-infected mothers in the United States. Identifying these chronically infected persons and linking them to care remains a challenge ([10](#), [11](#)). There

were 2,895 cases of acute hepatitis B reported in 2012. After adjusting for asymptomatic infections and under-reporting (2), the estimated number of new HBV infections was 18,760.

After receiving reports of approximately 800-1,000 cases of acute hepatitis C each year from 2006-2010, there was a significant increase of 45% in reported cases of acute HCV infection from 2010-2011, and a 75% increase from 2010-2012. Cases of acute HCV infection rose from 850 in 2010 to 1,229 in 2011 and to 1,778 in 2012. After adjusting for asymptomatic infections and under-reporting (2), 21,870 new infections of HCV occurred in 2012. This increase is thought to reflect a trend in new cases among adolescents and young adults, particularly in Eastern and Midwestern states. Based on epidemiologic studies, these cases of HCV infection are predominately among young persons who are white, live in non-urban areas, have a history of injection drug use, and previously used opioid agonists such as oxycodone (12, 13). Some of the increase in reported acute HCV infection reflects improved ascertainment by selected states and local health departments funded by CDC to investigate such cases more actively, for example Florida, Massachusetts, New York, Wisconsin, and Philadelphia. However, in other locations where the number of cases has increased very markedly, such as Tennessee, West Virginia, and Kentucky, with over 20% of all new cases in the three states combined, the increases have occurred without any federal support for investigation or follow up (14)(Table 4.1).

Chronic HCV infection affects approximately 3.2 million US residents, after adjustment for homeless and incarcerated persons not captured in random household surveys (15). However, prevalent chronic infections appear to be declining due, in part, to increasing mortality among HCV-infected persons—primarily adults aged 45 to 65 years—mortality that since 2007 has exceeded deaths from HIV/AIDS in the United States (16, 17). A major public health challenge is to increase the proportion of persons tested and the proportion of those who test positive who are referred for care and treatment (10, 11).

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 an acute illness characterized by nausea, malaise, abdominal pain and jaundice, although many of these acute infections are asymptomatic or cause only mild disease. 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.

Hepatitis A

Transmitted through the fecal-oral route, HAV is acquired primarily through close personal contact and foodborne outbreaks ([18](#)). Since 1995, effective vaccines to prevent HAV infection have been available in the United States, increasing the 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), non-injection and injection-drug users (IDUs), and children living in communities with high rates of disease ([19](#)). In 1996, ACIP also recommended routine vaccination for children living in 11 states with average hepatitis A rates of ≥ 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 ([20](#)). ACIP expanded these recommendations in 2006 to include routine vaccination of newborns in all 50 states ([4](#)).

Hepatitis B

HBV is transmitted by percutaneous or mucosal exposure to the blood or body fluids of an infected person, from an infected mother to her newborn during childbirth, through close 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 of acquiring HBV infection. These persons are recommended to receive hepatitis B vaccination if younger than 60 years of age and to be considered for vaccination if aged 60 years or older ([21](#)).

The risk for chronic HBV infection decreases with increasing age at infection. Of infants who acquire HBV infection from their mothers at birth, as many as 90% become chronically infected, whereas 30%–50% of children infected at age 1–5 years become chronically infected. This percentage is smaller among adults, in whom approximately 5% of all acute HBV infections progress to chronic infection ([22](#)).

Effective vaccines to prevent hepatitis B virus 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 ([23](#), [24](#)). This strategy encompassed 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 the provision of immunoprophylaxis to infants born either to infected women or to women of unknown infection status;
- Routine vaccination of previously unvaccinated children and adolescents; and
- Vaccination of adults at increased risk for infection (including health-care workers, dialysis patients, 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, men who have sex with men [MSM], and injection drug users).

In addition to hepatitis B vaccination, efforts have been made to improve care and treatment for persons who are living with hepatitis B. In the United States, 700,000-1.4 million persons are estimated to be infected with the virus ([8](#), [25](#)), many of whom are unaware of their infection status ([10](#)). To improve health outcomes for these persons, CDC issued recommendations in 2008 to guide HBV testing and public health management of persons with chronic HBV infection ([26](#)). 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.

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 ([27](#), [28](#)), among persons who receive tattoos in unregulated settings ([28](#)), and among infants born to HCV-infected mothers ([29](#)). With an estimated 3.2 million chronically infected persons nationwide, HCV infection is the most common blood-borne chronic infection in the United States ([15](#)).

Currently a single positive anti-HCV result cannot distinguish between acute and chronic HCV infection, and making this distinction requires a health department to follow-up with a provider to determine if there were symptoms for reporting purposes. Laboratory criteria in the 2012 case definition for past or present HCV infection require one or more of the following: anti-HCV positive (repeatedly reactive) by EIA, verified by at least one more specific assay, or HCV RIBA positive, or HCV nucleic acid test (NAT) positive, or anti-HCV screening-test positive with an assay-specific signal-to-cutoff ratio predictive of a true case. This assessment requires, on average, review of at least 4 records by hepatitis surveillance staff in health departments ([30](#)) No clinical symptoms are required; however, the case must be known to not be an acute case. Approximately 75%-85% of newly infected persons develop chronic infection.

Because of the high burden of chronic HCV infection in the United States and because no vaccine is available for preventing infection, national recommendations ([31](#)) emphasize other

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primary prevention activities, including screening and testing blood donors, inactivating HCV in plasma-derived products, testing persons at risk for HCV infection and providing them with risk-reduction counseling, and consistently implementing and practicing infection control in health-care settings. In 2010, the FDA approved point-of-care tests for HCV infection, which meant that patients could receive HCV test results within the same visit and faster referral to care (32). In 2012, CDC augmented existing risk-based recommendations for HCV testing by recommending one-time screening for HCV infection among all those born during 1945-1965 (33). It is estimated that persons born during these years have a 3% prevalence of HCV antibodies, which is five times higher than the prevalence seen in adults born in other years. 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 (33). The goal of the new birth-cohort approach to HCV testing is to identify unrecognized infections among the segment of the population with the largest risk of HCV-associated morbidity and mortality, thereby increasing opportunities for persons infected with HCV to benefit from appropriate care and treatment. Implementation of the birth cohort screening recommendation and point of care testing for HCV infection will facilitate testing, notification of results, post-test counseling and referral to care.

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 the major advancements that have been made in HCV treatments. For patients infected with HCV, treatment has previously consisted of pegylated interferon combined with oral doses of ribavirin, a regimen that has improved health outcomes for many infected persons. Approximately 40% of HCV-infected patients receiving this therapy clear their infection. New direct acting agents against HCV (telaprevir, boceprevir) were licensed by the FDA in 2011 and are now standard-of-care. These agents, when given in combination with current therapy, can increase virologic cure rates to 80% while decreasing duration of therapy (34). Several drugs are now administered orally (a major advancement in how treatments are administered for this infection), leading to viral suppression in 90% of patients taking one of these new oral medications (35, 36).

Notes on “Case Classification”

For analysis at the national level, cases of viral hepatitis are considered “confirmed” if they meet both the clinical case definition and laboratory criteria for diagnosis; however, these criteria are evaluated at the state or local level and are not validated by CDC. For hepatitis A, cases also are considered confirmed if they meet the clinical case definition and involve a person who is epidemiologically linked to someone with laboratory-confirmed hepatitis A (e.g., through household or sexual contact with an infected person or eating HAV-contaminated food or food prepared by an infected foodhandler during the 15–50 days before symptom onset).

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. The basis for most case reports is passive surveillance through the *National Notifiable Disease Surveillance System (NNDSS)*. State and local health departments report acute hepatitis A, B and C (incident cases) through this system. However, a number of states do not report cases of chronic hepatitis B and C through the

NNDSS. Collecting, verifying and reporting the many chronic cases of hepatitis B and C in the United States (estimated at over 4 million) is beyond the capability of many health departments. Reports of chronic hepatitis B and C are included in this Surveillance Summary from NNDSS from states that gave permission for CDC to publish those counts. Severity and burden of viral hepatitis A, B and C disease are measured by information obtained from death certificates through the National Vital Statistics System (NVSS) (37).

Surveillance activities also include the examination of other data sets which are not included in this report, such as the *National Ambulatory Medical Care Survey (NAMCS)* and the *National Hospital Ambulatory Medical Care Survey (NHAMCS)*. Additional special studies, including the *National Health and Nutrition Examination Survey (NHANES)*, which collects data from a nationally representative sample of about 5,000 non-institutionalized US residents each year, also are important in understanding the prevalence of chronic HCV infection (14; MM Denniston, manuscript submitted). Severity and burden of viral hepatitis A, B and C disease are measured by information obtained from death certificates through the National Vital Statistics System (NVSS) (37).

National Notifiable Disease Surveillance System (NNDSS)

Background

Each week, state and territorial health departments report cases of acute, symptomatic viral hepatitis to CDC's NNDSS. Since 1990, states have been electronically submitting individual case reports (absent of personal identifiers) to CDC. States' participation in reporting nationally notifiable diseases, including viral hepatitis, is voluntary.

National surveillance for viral hepatitis (including acute hepatitis A, hepatitis B, and hepatitis C; chronic hepatitis B; and chronic [past or present] hepatitis C) is based on case definitions developed and approved by the Council of State and Territorial Epidemiologists (CSTE) and CDC. In 2012, reported cases of acute and chronic viral hepatitis were required to meet the following CSTE-defined clinical and laboratory criteria (available at: <http://wwwn.cdc.gov/nndss/script/ConditionList.aspx?Type=0&Yr=2012>).

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, and 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) (36), information from death certificates is compiled by CDC's National Center for Health Statistics (NCHS) to produce national multiple-cause-of-death (MCO) data (38); causes of death are coded in accordance with the International Classification of Diseases, Tenth Revision (ICD-10) (39). MCO data are used to determine the national burden of mortality associated with viral hepatitis infections and to describe the demographic characteristics of decedents.

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A major study of these records from 1999 through 2007 showed that the annual number of deaths among HCV-infected persons exceeded deaths among HIV-infected persons beginning in 2007 ([16](#)).

Methods

We analyzed national multiple-cause mortality data collected during 2007–2011 (the most recent data-years available) obtained from NCHS. The following case definitions were used to identify a death associated with hepatitis A, B, or C.

Any death record with a report of:


- 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) listed as the underlying or one of the multiple (e.g., contributing) causes of death in the record axis.

Demographic information on age, race, 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 categories for 2006–2009 consisted of white (Hispanic and non-Hispanic), black (Hispanic and non-Hispanic), and non-black, non-white (which included all other racial and ethnic groups). For 2010, race/ethnicity categories consisted of white non-Hispanic, black non-Hispanic, Hispanic, Asian/Pacific Islander (API) and American Indian/Alaska Native (AI/AN) to be consistent with those used by Division of Viral Hepatitis (DVH). To calculate national mortality rates, the number of deaths was divided by the total US Census population for each demographic subgroup. Rates on race, sex, and overall total were standardized to the age distribution of the US population in 2000 ([40](#)). Data were analyzed using SAS software, version 9.2 (SAS Institute; Cary, NC).

Interpretation of Mortality 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 US Census data (the denominator for calculating rates), potentially causing overestimated rates for these populations.
- 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.
- The race category designated as “non-white/non-black” includes all other race groups (e.g., APIs, AI/ANs, and persons who are Hispanic). This lack of specificity limits race-specific interpretation of mortality data prior to 2010.

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Investigations of Acute Cases

In 2012, CDC participated in 2 state-based investigations of outbreaks of viral hepatitis infection, one involving HBV and one involving HCV infection. Additional information may be found at the following link that summarizes known outbreaks 2008-2013.

<http://www.cdc.gov/hepatitis/Statistics/HealthcareOutbreakTable.htm>

Adjustments to Reported Cases

CDC has reanalyzed the estimators (multipliers) traditionally used to convert reported cases to estimated (true) incidence of acute hepatitis A, B, and C in the United States. Briefly, this review and analysis has been of more recent data that allow better estimation of the numbers and percentages of acute viral hepatitis cases who have symptoms, seek medical care, and get reported to local, state and federal health authorities (1). A probabilistic model factored probabilities of symptoms (I), referral to care and treatment (II), and rates of reporting to local and state health department (III). This analysis indicated that reported cases represent an estimated one of 1.95 acute hepatitis A; one of 6.48 hepatitis B; and one of 12.30 hepatitis C cases¹. Accordingly, these estimators are used in this Surveillance Summary. These estimates cannot be used to deduce trends by comparison with estimations obtained in previous years as earlier estimates were obtained from different (and unpublished) calculations; trends are best evaluated in reported cases, as in the increase in acute HCV in 2012 among nationally reported cases.

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HEPATITIS A

Acute Hepatitis A.

There were 1,562 reported cases of acute hepatitis A virus (HAV) infection in 2012, representing an estimated 3,050 cases.

Case Definition

Clinical Description

Acute hepatitis is defined as acute illness with 1) discrete onset of symptoms (e.g., nausea, anorexia, fever, malaise, and abdominal pain) and 2) jaundice, dark urine, or elevated serum alanine aminotransferase (ALT) >200 IU/L.

Laboratory Criteria for Acute Hepatitis A

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

Acute Hepatitis A

Historically, acute hepatitis A rates vary cyclically, with nationwide increases every 10-15 years. The last peak was in 1995; since that time, rates of hepatitis A have generally declined. In 2012, a total of 1,562 cases of acute hepatitis A were reported nationwide to CDC (Table 2.1). The overall incidence rate for 2012 was 0.5 cases per 100,000 population. No data were available for 2012 from the District of Columbia.

Table 2.1 Reported cases of acute hepatitis A, by state — United States, 2008–2012

State	2008		2009		2010		2011		2012	
	Rate	(No.)	Rate	(No.)	Rate	(No.)	Rate	(No.)	Rate	(No.)
Alabama	0.3	(12)	0.3	(12)	0.2	(8)	0.2	(8)	0.4	(19)
Alaska	0.7	(5)	0.3	(2)	0.7	(5)	0.6	(4)	0.1	(1)
Arizona	1.8	(118)	1.0	(68)	1.0	(61)	1.2	(77)	1.4	(93)
Arkansas	0.3	(10)	0.4	(12)	0.1	(2)	0.1	(3)	0.3	(8)
California	1.2	(446)	0.7	(273)	0.6	(242)	0.5	(186)	0.5	(209)
Colorado	0.7	(36)	1.0	(52)	0.7	(36)	0.4	(21)	0.5	(28)
Connecticut	0.7	(26)	0.5	(18)	0.8	(29)	0.5	(18)	0.6	(23)
Delaware	0.8	(7)	0.5	(4)	0.8	(7)	0.2	(2)	1.0	(9)
District of Columbia	U	U	0.2	(1)	0.2	(1)	U	U	U	U
Florida	0.8	(146)	0.9	(171)	0.7	(139)	0.5	(87)	0.5	(87)
Georgia	0.6	(57)	0.5	(54)	0.4	(40)	0.3	(27)	0.5	(46)
Hawaii	1.6	(20)	0.8	(11)	0.6	(8)	0.6	(8)	0.4	(5)
Idaho	1.1	(17)	0.3	(5)	0.5	(8)	0.4	(6)	0.7	(11)
Illinois	0.9	(112)	1.0	(126)	0.4	(48)	0.6	(73)	0.5	(67)
Indiana	0.3	(20)	0.3	(17)	0.2	(12)	0.4	(24)	0.2	(11)
Iowa	3.6	(109)	1.3	(38)	0.4	(11)	0.3	(8)	0.2	(7)
Kansas	0.5	(15)	0.4	(12)	0.5	(14)	0.1	(4)	0.5	(15)
Kentucky	0.7	(30)	0.3	(12)	0.6	(26)	0.2	(10)	0.6	(25)
Louisiana	0.3	(12)	0.1	(6)	0.2	(11)	0.1	(5)	0.2	(7)
Maine	1.4	(18)	0.1	(1)	0.5	(7)	0.5	(6)	0.7	(9)
Maryland	0.8	(44)	0.8	(47)	0.4	(23)	0.4	(26)	0.5	(28)
Massachusetts	0.9	(58)	1.1	(71)	0.7	(48)	0.6	(39)	0.6	(40)
Michigan	1.2	(119)	0.7	(72)	0.7	(73)	0.7	(70)	1.0	(100)
Minnesota	0.9	(49)	0.6	(29)	0.7	(37)	0.5	(27)	0.5	(29)
Mississippi	0.2	(7)	0.3	(9)	0.1	(2)	0.2	(7)	0.4	(11)
Missouri	0.6	(35)	0.4	(21)	0.4	(21)	0.2	(13)	0.3	(20)
Montana	0.1	(1)	0.6	(6)	0.4	(4)	0.3	(3)	0.6	(6)
Nebraska	2.3	(41)	1.2	(21)	0.8	(14)	0.3	(5)	0.9	(16)
Nevada	0.5	(13)	0.6	(15)	0.5	(14)	0.2	(5)	0.4	(10)
New Hampshire	0.9	(12)	0.5	(7)	0.2	(2)	0	(0)	0.5	(6)
New Jersey	1.0	(86)	0.8	(71)	0.9	(76)	0.9	(79)	0.7	(60)
New Mexico	0.9	(18)	0.4	(8)	0.2	(5)	0.3	(7)	0.5	(10)
New York	0.9	(179)	0.7	(136)	0.8	(147)	0.6	(113)	0.6	(111)
North Carolina	0.7	(63)	0.4	(41)	0.5	(48)	0.3	(31)	0.3	(34)
North Dakota	0.3	(2)	0.3	(2)	0.6	(4)	0	(0)	0.3	(2)
Ohio	0.4	(51)	0.3	(36)	0.4	(47)	0.3	(39)	0.3	(36)
Oklahoma	0.4	(13)	0.2	(7)	0.2	(6)	0.3	(11)	0.3	(12)
Oregon	0.7	(25)	0.5	(19)	0.4	(17)	0.3	(11)	0.2	(9)
Pennsylvania	0.5	(68)	0.5	(68)	0.4	(53)	0.5	(60)	0.5	(62)
Rhode Island	1.1	(12)	0.9	(9)	0.9	(9)	0.8	(8)	0.3	(3)
South Carolina	0.4	(19)	1.4	(63)	0.6	(26)	0.2	(11)	0.1	(6)
South Dakota	0.5	(4)	0.4	(3)	0.1	(1)	0.2	(2)	0	0
Tennessee	0.5	(32)	0.2	(13)	0.2	(12)	0.4	(23)	0.4	(23)
Texas	1.1	(259)	0.7	(184)	0.6	(139)	0.5	(138)	0.5	(134)
Utah	0.5	(13)	0.3	(7)	0.4	(12)	0.3	(8)	0.1	(4)
Vermont	0.3	(2)	0.3	(2)	0	0	1.0	(6)	0.3	(2)
Virginia	0.7	(51)	0.5	(42)	0.6	(52)	0.4	(30)	0.6	(49)
Washington	0.8	(51)	0.6	(42)	0.3	(21)	0.5	(31)	0.4	(29)
West Virginia	0.3	(6)	0.3	(6)	0.8	(15)	0.4	(8)	0.4	(8)
Wisconsin	0.6	(33)	0.6	(33)	0.4	(23)	0.1	(8)	0.4	(21)
Wyoming	0.6	(3)	0.4	(2)	0.7	(4)	0.4	(2)	0.2	(1)
Total	0.9	(2,585)	0.6	(1,987)	0.5	(1,670)	0.4	(1,398)	0.5	(1,562)

*Rate per 100,000 population. †U=No data available for reporting.

Division of Viral Hepatitis, CDC

- The number of acute hepatitis A cases reported in the United States declined by approximately 53%, from 2,979 in 2007 to 1,562 in 2012.
- The 1,562 acute hepatitis A cases represented an increase of 11% from 2011 to 2012.
- Of the 50 states that reported hepatitis A cases in 2012, 25 states had rates below the national rate.
- In 2012, the case rate ranged from no cases in South Dakota to 1.4 cases per 100,000 population in Arizona.

Table 2.2 Clinical characteristics of reported cases of acute hepatitis A* — United States, 2012

Clinical characteristic	Availability of valid data [†] for clinical characteristic		Cases with clinical characteristic [§]	
	No.	%	No.	%
Jaundice	1,018	65.2	652	64
Hospitalized for hepatitis A	1,022	65.4	468	45.8
Died from hepatitis A	938	60.1	6	0.6

*A total of 1,562 hepatitis A cases were reported during 2012.

[†]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 1,562 case reports of hepatitis A received during 2012, 65.2% included information about whether the patient had jaundice, 65.4% had information regarding hospitalization caused by hepatitis A, and 60.1% included information on hepatitis A-associated death.
- In 2012, of all case reports with information regarding clinical characteristics:
 - 64.0% indicated the patient had jaundice.
 - 45.8% indicated the patient was hospitalized as a result of hepatitis A.
 - 0.6% indicated the patient died from hepatitis A.

Table 2.3 Number and rate* of deaths with hepatitis A listed as a cause of death†, by demographic characteristic and year — United States, 2007–2011

Demographic characteristic		2007		2008		2009		2010		2011	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Age Group (years)	0–34	6	0.00	0	0.00	1	0.00	3	0.00	0	0.00
	35–44	3	0.01	1	0.00	1	0.00	7	0.02	1	0.00
	45–54	21	0.05	23	0.05	14	0.03	25	0.06	11	0.02
	55–64	20	0.06	24	0.07	22	0.06	34	0.09	16	0.04
	65–74	14	0.07	12	0.06	12	0.06	10	0.05	12	0.05
	≥75	21	0.11	23	0.12	32	0.17	16	0.09	29	0.15
Race§	White	70	0.03	63	0.02	68	0.02				
	Black	14	0.04	13	0.04	13	0.04				
	Non-White, Non-Black	1	0.01	7	0.04	1	0.00				
Race/ Ethnicity¶	White, NH (Non-Hispanic)							65	0.03	44	0.02
	Black, NH							15	0.04	10	0.03
	Hispanic							12	0.03	6	0.02
	Asian/ Pacific Islander							2	0.02	8	0.06
	American Indian/ Alaska Native							1	0.05	1	0.04
Sex	Male	61	0.04	51	0.03	50	0.03	73	0.05	37	0.02
	Female	24	0.01	32	0.02	32	0.02	22	0.01	32	0.02
Overall		85	0.03	83	0.02	82	0.02	95	0.03	69	0.02

* Rates for race, sex, and overall total are age-adjusted per 100,000 US standard population.

†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).

§Included white, non-Hispanic and white Hispanic.

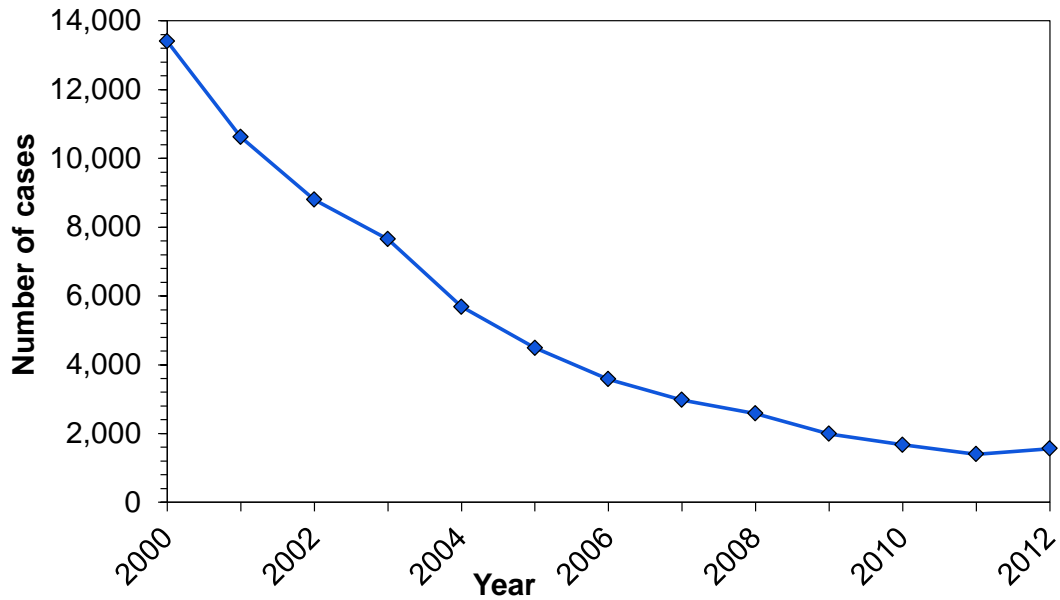
¶Included black, non-Hispanic and black Hispanic.

**Included all other racial/ethnic groups.

Source: CDC. National Vital Statistics System.

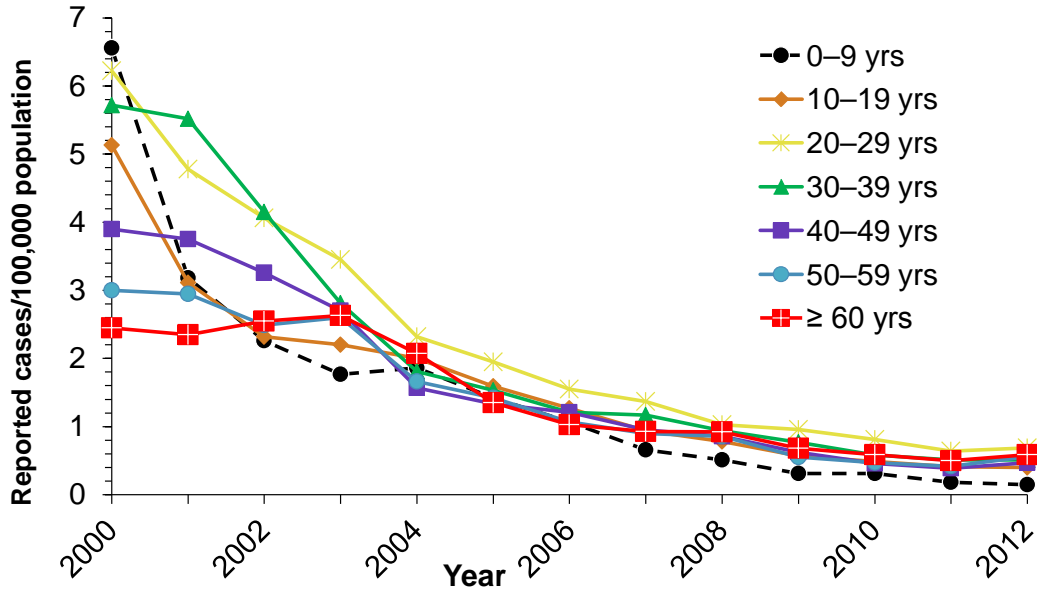
- In 2011, the mortality rate of hepatitis A was 0.02 deaths per 100,000 population (n=69). From 2007 through 2011, mortality rates were higher among persons aged ≥45 years compared with persons younger than 45 years of age.
- In 2011, the highest mortality rates for race/ethnicity and sex were observed among Asian/and Pacific Islanders (0.06 deaths per 100,000 population for each group).
- Males and Females had the same rate of 0.02 deaths per 100,000 population.

Figure 2.1. Reported number of acute hepatitis A cases — United States, 2000–2012



- The number of reported cases of acute hepatitis A declined by 88%, from 13,397 in 2000 to 1,562 in 2012.
- Acute hepatitis A cases increased by 11% from 2011 to 2012.

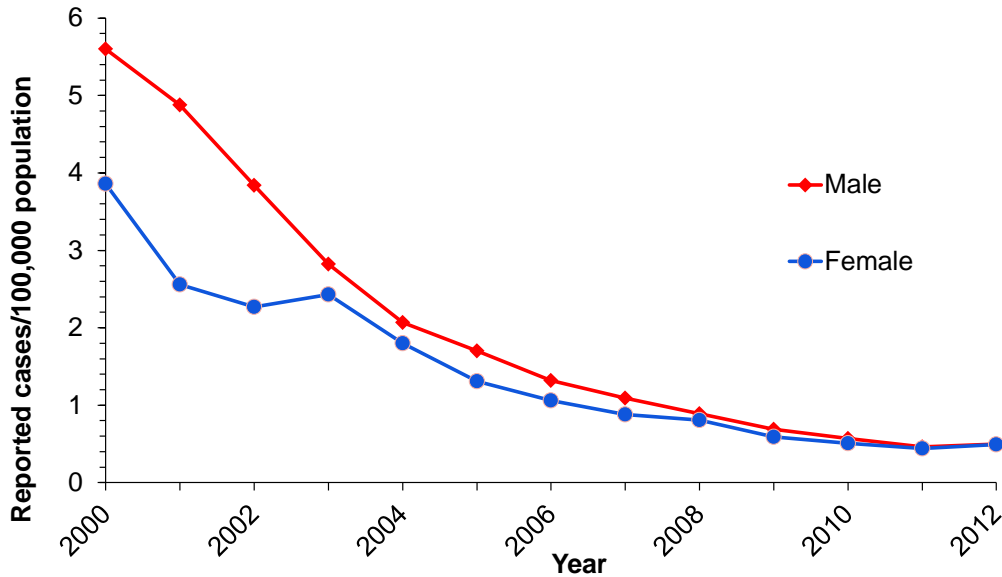
Figure 2.2. Incidence of acute hepatitis A, by age group — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- Rates of acute hepatitis A declined for all age groups from 2000-2012.
- Rates were similar and low among persons in all age groups in 2012 (<1.0 case per 100,000 population; range: 0.15–0.69).
- In 2012, rates were highest for persons aged 20–29 years (0.69 cases per 100,000 population); the lowest rates were among children aged ≤ 9 years (0.15 cases per 100,000 population).

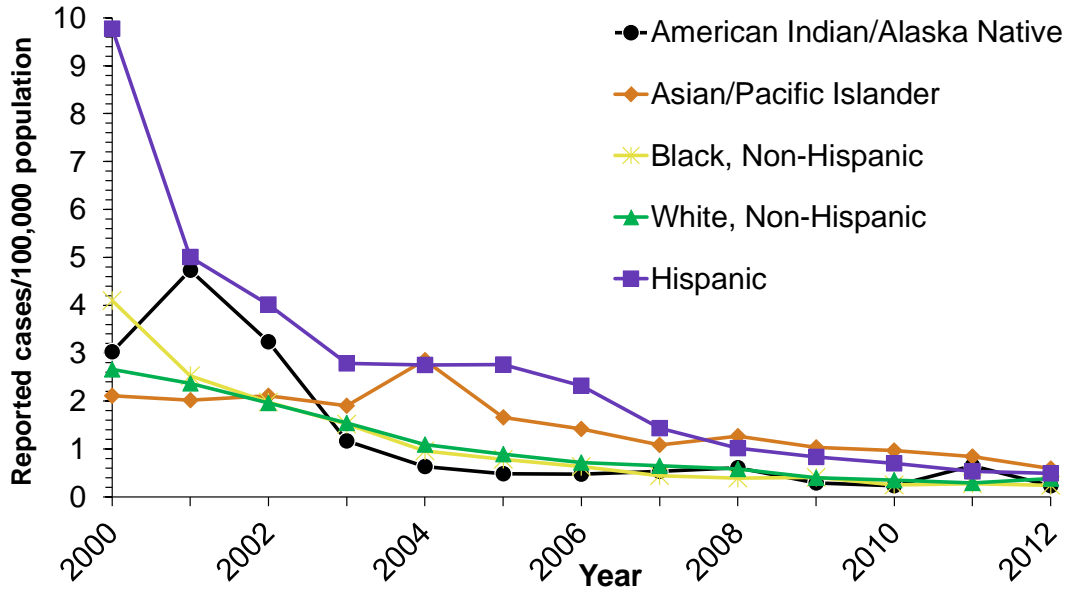
Figure 2.3. Incidence of acute hepatitis A, by sex — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNSS)

- Since 2003, the rate of acute hepatitis A among males decreased and by 2012 was similar to that in females.
- In 2012, the incidence rate was 0.5 cases per 100,000 population each for males and females.

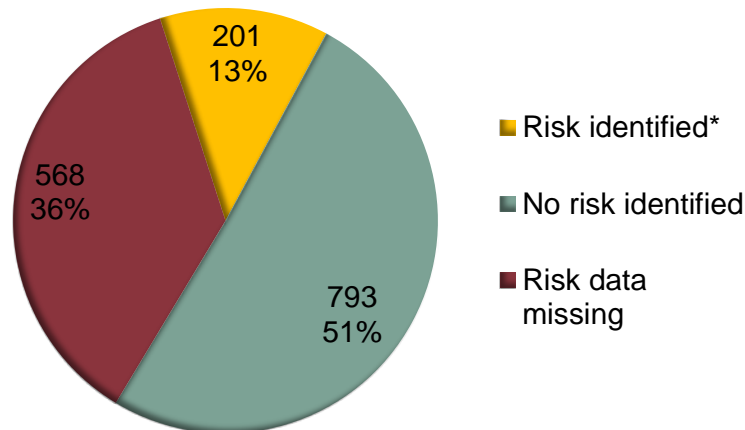
Figure 2.4. Incidence of acute hepatitis A, by race/ethnicity — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- From 2000-2007, rates of hepatitis A among Hispanics were generally higher than those of other racial/ethnic populations.
- In 2012, the rate of hepatitis A among Hispanics was 0.49 cases per 100,000 population, the lowest rate recorded for this group since 2000.
- Although rates of acute hepatitis A among Asian/Pacific Islanders have continued to decline, from 2008-2012, this group had a higher rate of hepatitis A compared with other racial/ethnic groups; in 2012, the rate among Asian/Pacific Islanders was 0.59 per 100,000 population.

Figure 2.5. Availability of information on risk behaviors/exposures associated with acute hepatitis A — United States, 2012

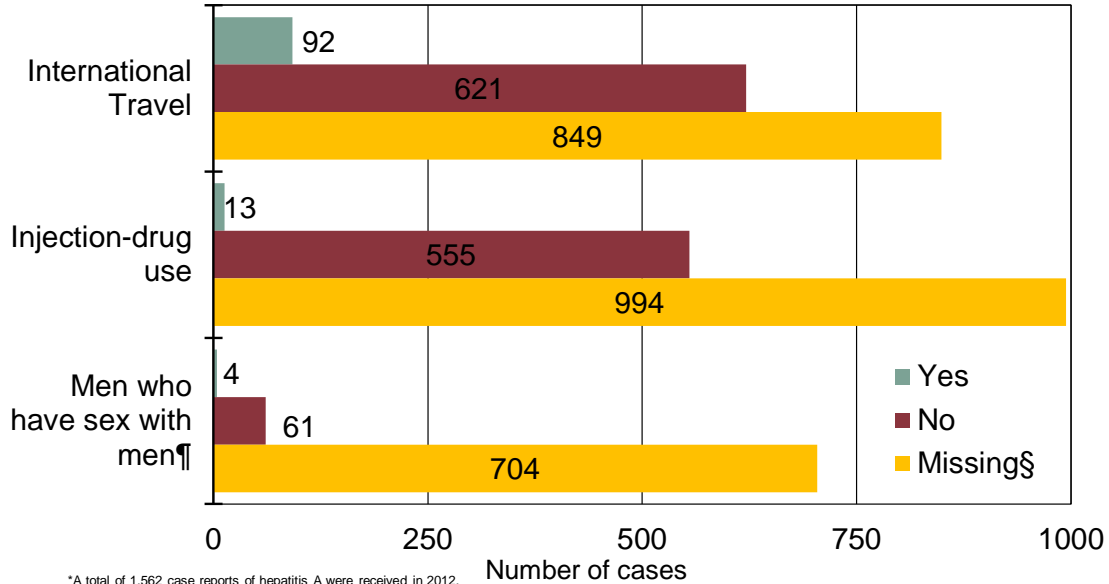


* Includes case reports indicating the presence of at least one of the following risks 2–6 weeks prior to onset of acute, symptomatic hepatitis A: 1) having traveled to hepatitis A-endemic regions of Mexico, South/Central America, Africa, Asia/South Pacific, or the Middle East; 2) having sexual/household 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.

Source: National Notifiable Diseases Surveillance System (NNDSS)

- Of the 1,562 case reports of acute hepatitis A received by CDC during 2012, a total of 568 (36%) cases did not include a response (i.e., a “yes” or “no” response to any of the questions about risk behaviors and exposures) to enable assessment of risk behaviors or exposures.
- Of the 994 case reports that had a response:
 - 80% (n=793) indicated no risk behaviors/exposures for acute hepatitis A.
 - 20% (n=201) indicated at least one risk behavior/exposure for acute hepatitis A during the 2–6 weeks prior to onset of illness.
 - Of the 201 who indicated a risk, 92 (46%) indicated recent international travel.

Figure 2.6a. Acute hepatitis A reports*, by risk behavior† — United States, 2012

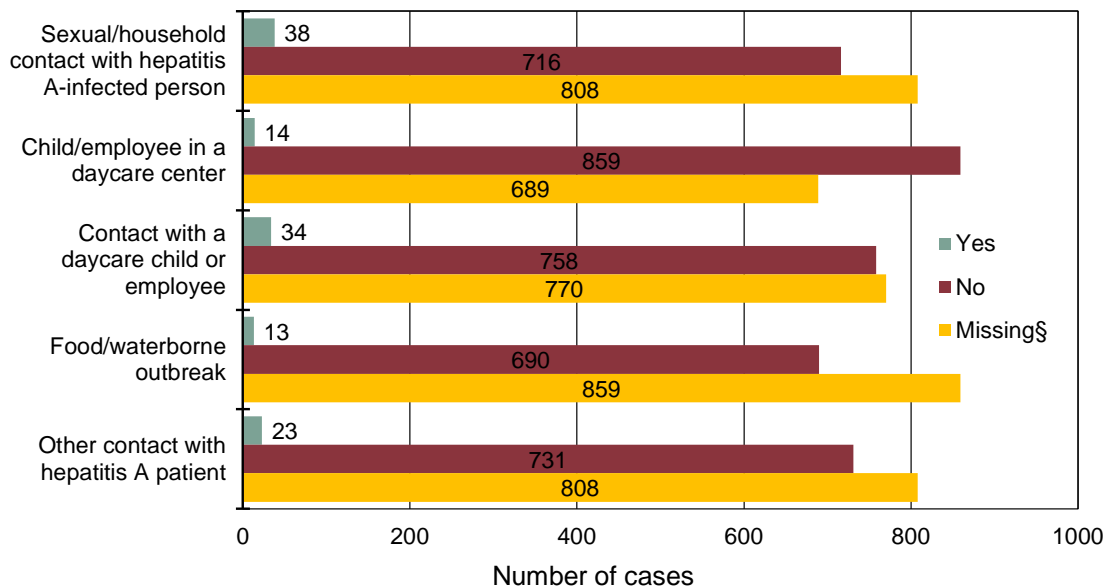


*A total of 1,562 case reports of hepatitis A were received in 2012.
 † More than one risk behavior may be indicated on each case report.
 § No risk data reported.
 ¶ A total of 769 hepatitis A cases were reported among males in 2012.
 Source: National Notifiable Diseases Surveillance System (NNSS)

Figure 2.6a presents patient engagement in selected risk behaviors and exposures during the incubation period, 2–6 weeks prior to onset of symptoms:

- Of the 713 case reports that had information about travel, 12.9% (n= 92) involved persons who had traveled outside the United States or Canada.
- Of the 568 case reports that included information about injection-drug use, 2.3% (n=13) indicated use of these drugs.
- Of the 65 case reports from males that included information about sexual preference/practices, 6.2% (n=4) indicated sex with another man.

Figure 2.6b. Acute hepatitis A reports*, by risk exposure† — United States, 2012



*A total of 1,562 case reports with hepatitis A were received in 2012.
 † More than one risk exposure may be indicated on each case report.
 § No risk data reported.
 Source: National Notifiable Diseases Surveillance System (NNDSS)

Figure 2.6b presents patient engagement in selected risk behaviors and exposures during the incubation period, 2–6 weeks prior to onset of symptoms:

- Of the 754 case reports that contained information about contact, 5.0% (n=38) involved persons who had sexual or household contact with a person confirmed or suspected of having hepatitis A.
- Of the 873 case reports that included information about employment or attendance at a nursery, day-care center, or preschool, 1.6% (n=14) involved persons who worked at or attended a nursery, day-care center, or preschool.
- Of the 792 case reports that included information about household contact with an employee of or a child attending a nursery, day-care center, or preschool, 4.3% (n=34) indicated such contact.
- Of the 703 case reports that had information about linkage to an outbreak, 1.8% (n=13) indicated exposure that may have been linked to a common-source foodborne or waterborne outbreak.
- Of the 754 case reports that included information about additional contact (i.e., other than household or sexual contact) with someone confirmed or suspected of having hepatitis A, 3.1% (n=23) of persons reported such contact.

HEPATITIS B

Acute Hepatitis B

There were 2,895 reported cases of acute hepatitis B in 2012, representing an estimated 18,760 acute cases.

Case Definition

Clinical Description

An acute illness with 1) discrete onset of symptoms (e.g., nausea, anorexia, fever, malaise, and abdominal pain) and 2) jaundice or elevated serum alanine aminotransferase (ALT) >200 IU/L.

Laboratory Criteria for Acute Hepatitis B

- IgM antibody to hepatitis B core antigen (anti-HBc) positive OR hepatitis B surface antigen (HBsAg) positive

AND

- IgM anti-HAV negative (if performed).

Acute Hepatitis B

In 2012, a total of 2,895 cases of acute hepatitis B were reported nationwide to CDC (Table 3.1). The overall incidence rate for 2012 was 0.9 cases per 100,000 population. No data were available from the District of Columbia and Rhode Island for 2012.

Table 3.1. Reported cases of acute hepatitis B, by state — United States, 2008-2012

State	2008		2009		2010		2011		2012	
	Rate*	(No.)	Rate	(No.)	Rate	(No.)	Rate	(No.)	Rate	(No.)
Alabama	2.3	(109)	1.9	(89)	1.4	(68)	2.5	(119)	1.6	(79)
Alaska	1.5	(10)	0.6	(4)	0.7	(5)	0.4	(3)	0.1	(1)
Arizona	1.2	(80)	0.6	(42)	0.4	(26)	0.2	(14)	0.2	(14)
Arkansas	2.3	(67)	2.2	(65)	2.3	(66)	1.9	(57)	2.5	(74)
California	0.8	(303)	0.7	(258)	0.7	(252)	0.4	(157)	0.4	(136)
Colorado	0.7	(33)	0.5	(27)	0.9	(46)	0.4	(23)	0.5	(24)
Connecticut	0.9	(30)	0.5	(16)	0.6	(22)	0.5	(19)	0.4	(15)
Delaware	U†	U	U	U	U	U	U	U	1.2	(11)
District of Columbia	U	U	1.7	(10)	0.5	(3)	U	U	U	U
Florida	1.9	(344)	1.6	(299)	1.6	(297)	1.1	(213)	1.3	(247)
Georgia	1.9	(187)	1.5	(144)	1.7	(165)	1.4	(142)	1.1	(109)
Hawaii	0.5	(7)	0.5	(6)	0.4	(6)	0.4	(6)	0.4	(5)
Idaho	0.8	(12)	0.7	(11)	0.4	(6)	0.1	(2)	0.3	(5)
Illinois	1.4	(184)	0.9	(118)	1.1	(135)	0.7	(85)	0.7	(86)
Indiana	1.0	(67)	1.2	(74)	1.2	(75)	1.1	(70)	1.4	(90)
Iowa	0.8	(24)	1.2	(37)	0.5	(15)	0.5	(15)	0.4	(13)
Kansas	0.3	(9)	0.2	(6)	0.4	(11)	0.5	(15)	0.3	(9)
Kentucky	2.4	(101)	2.1	(90)	3.1	(136)	3.5	(151)	4.1	(180)
Louisiana	2.1	(94)	1.6	(73)	1.2	(55)	1.4	(62)	1.0	(44)
Maine	1.1	(15)	1.1	(15)	1.0	(13)	0.6	(8)	0.7	(9)
Maryland	1.5	(85)	1.3	(72)	1.2	(67)	1.1	(62)	0.9	(52)
Massachusetts	0.3	(21)	0.3	(17)	0.2	(13)	1.0	(67)	1.1	(75)
Michigan	1.5	(149)	1.3	(132)	1.2	(122)	0.9	(91)	0.8	(81)
Minnesota	0.5	(25)	0.7	(38)	0.4	(23)	0.4	(20)	0.3	(17)
Mississippi	1.7	(50)	1.1	(33)	1.1	(33)	1.9	(57)	2.6	(78)
Missouri	0.6	(38)	0.8	(47)	1.1	(67)	1.0	(60)	0.8	(48)
Montana	0.2	(2)	0.1	(1)	0	(0)	0	(0)	0.2	(2)
Nebraska	0.5	(9)	1.2	(22)	0.7	(12)	0.7	(12)	0.5	(10)
Nevada	1.6	(43)	1.3	(34)	1.5	(41)	1.1	(29)	1.0	(28)
New Hampshire	0.6	(8)	0.5	(6)	0.4	(5)	0.2	(3)	0.3	(4)
New Jersey	1.4	(118)	1.1	(93)	0.9	(77)	0.8	(73)	0.8	(70)
New Mexico	0.6	(12)	0.4	(8)	0.2	(5)	0.5	(10)	0.1	(3)
New York	0.9	(173)	0.7	(129)	0.7	(139)	0.7	(134)	0.6	(113)
North Carolina	0.9	(81)	1.1	(104)	1.2	(113)	1.1	(109)	0.7	(73)
North Dakota	0.3	(2)	0	(0)	0	(0)	0	(0)	0	(0)
Ohio	1.0	(118)	0.8	(88)	0.8	(95)	0.8	(90)	1.5	(178)
Oklahoma	3.5	(129)	3.3	(122)	3.1	(115)	2.6	(100)	2.1	(79)
Oregon	1.1	(41)	1.2	(44)	1.1	(42)	0.8	(32)	0.6	(25)
Pennsylvania	1.2	(157)	0.8	(106)	0.6	(72)	0.7	(84)	0.5	(63)
Rhode Island	U	U	U	U	U	U	U	U	U	U
South Carolina	1.6	(71)	1.2	(56)	1.3	(59)	0.8	(39)	0.8	(37)
South Dakota	0	(0)	0.5	(4)	0.2	(2)	0.2	(2)	0.2	(2)
Tennessee	2.4	(149)	2.2	(136)	2.4	(150)	3.0	(192)	3.7	(240)
Texas	2.3	(562)	1.7	(420)	1.6	(394)	0.8	(204)	0.7	(170)
Utah	0.5	(14)	0.2	(5)	0.3	(8)	0.4	(10)	0.5	(13)
Vermont	0.5	(3)	0	(0)	0.3	(2)	0	(0)	0.3	(2)
Virginia	1.7	(130)	1.4	(110)	1.2	(97)	1.0	(84)	1.0	(84)
Washington	0.9	(56)	0.7	(48)	0.7	(50)	0.5	(35)	0.5	(34)
West Virginia	4.6	(83)	4.6	(84)	4.7	(88)	6.1	(113)	7.6	(141)
Wisconsin	0.3	(18)	0.4	(24)	0.9	(54)	0.3	(17)	0.4	(22)
Wyoming	1.1	(6)	0.7	(4)	0.5	(3)	0	(0)	0	(0)
Total	1.3	(4,029)	1.1	(3,371)	1.1	(3,350)	0.9	(2,890)	0.9	(2,895)

*Rate per 100,000 population.

†U=No data available for reporting.

Surveillance for Viral Hepatitis — United States, 2012

- The number of acute cases of hepatitis B decreased by 28% overall during 2008–2012, from 4,029 cases to 2,895 cases; increases in Arkansas, Indiana, Kentucky, Massachusetts, Mississippi, Missouri, Ohio, Tennessee and West Virginia occurred during this time period.
- Of the 49 states that reported acute hepatitis B cases in 2012, 30 states had rates below the national rate of 0.9 per 100,000 population.
- Rates of acute hepatitis B in 2012 ranged from no cases reported in North Dakota and Wyoming to 7.6 cases per 100,000 population in West Virginia.

Table 3.2. Clinical characteristics of reported cases of acute hepatitis B* — United States, 2012

Clinical characteristic	Availability of valid data† for clinical characteristic		Cases with clinical characteristic§	
	No.	%	No.	%
Jaundice	2,072	71.6	1,565	75.5
Hospitalized for hepatitis B	1,997	69.0	1,198	60.0
Died from hepatitis B	1,846	63.8	20	1.1

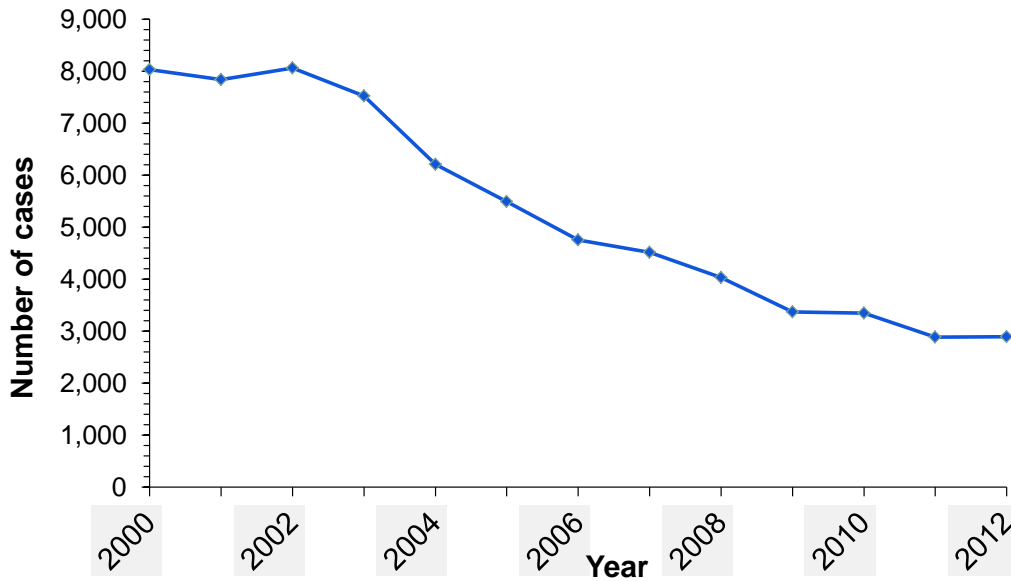
*A total of 2,895 hepatitis B cases were reported during 2012.

†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 underestimated

- Of the 2,895 case reports of acute hepatitis B received in 2012, 69.0% included information regarding whether the patient had jaundice, 71.6% had information regarding hospitalization caused by hepatitis B, and 63.8% included information on hepatitis B-associated deaths.
- In 2012, of all case reports with information about clinical characteristics:
 - 75.5% indicated the patient had jaundice.
 - 60.0% indicated the patient was hospitalized as a result of hepatitis B.
 - 1.1% indicated the patient died from hepatitis B.

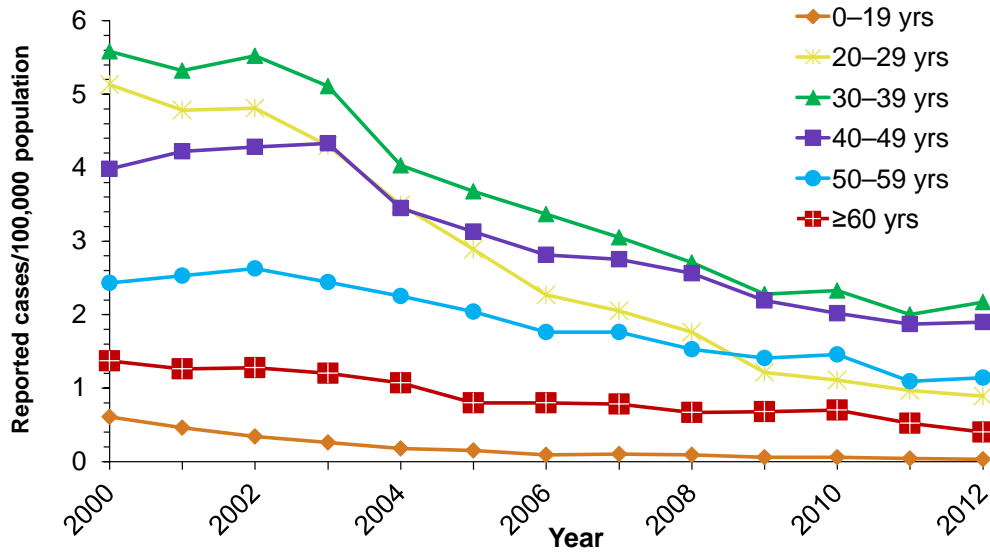
Figure 3.1. Reported number of acute hepatitis B cases — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- The number of reported cases of acute hepatitis B decreased 64%, from 8,036 in 2000 to 2,895 in 2012.

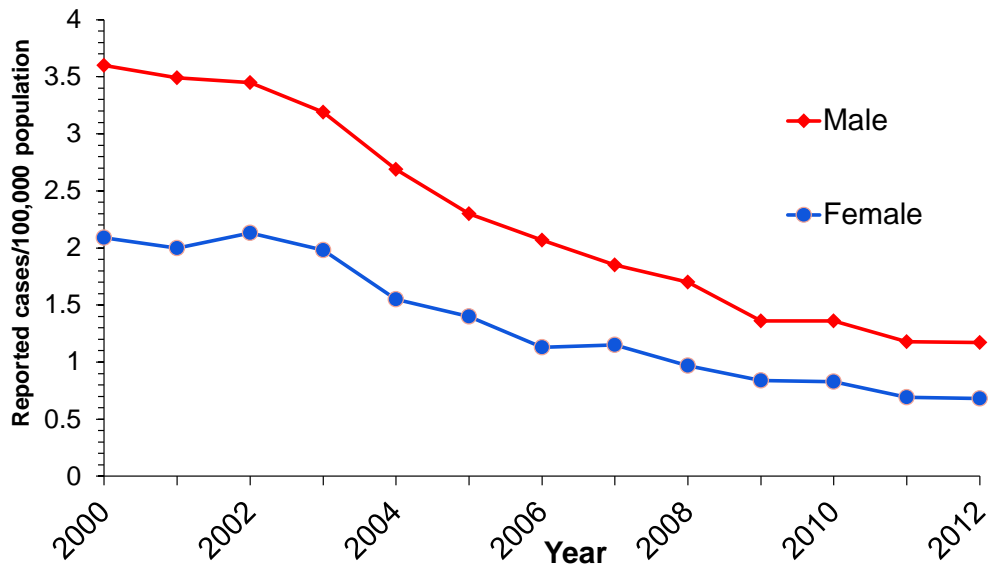
Figure 3.2. Incidence of acute hepatitis B, by age group — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- Declines in reported cases of hepatitis B were observed in all age groups.
- In 2012, the highest rates were among persons aged 30–39 years (2.17 cases/100,000 population), and the lowest were among adolescents and children aged ≤ 19 years (0.03 cases/100,000 population).

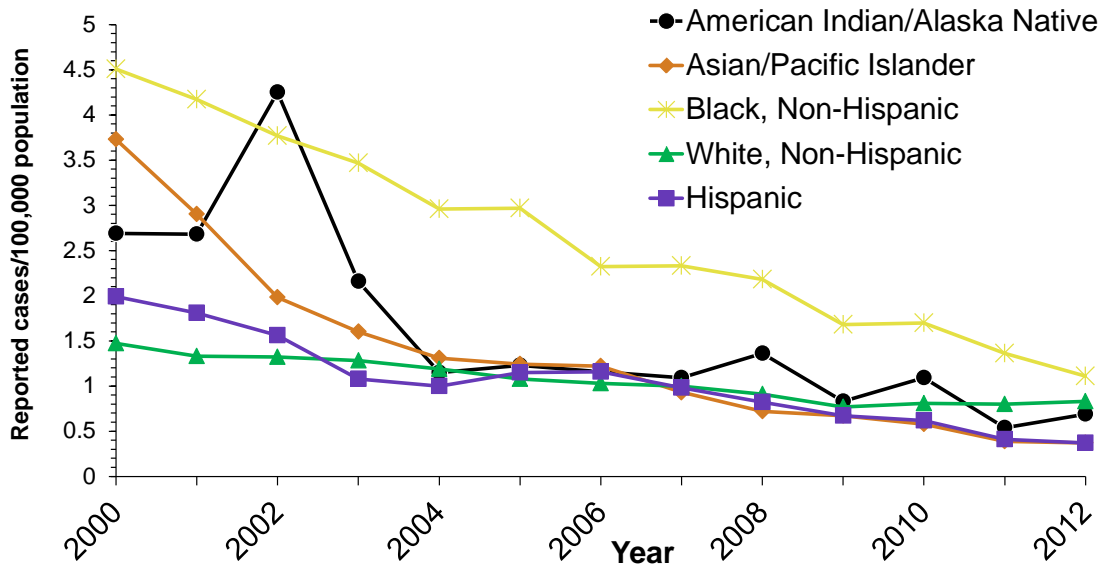
Figure 3.3. Incidence of acute hepatitis B, by sex — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- While the incidence rate of acute hepatitis B remained higher for males than for females, the gap has narrowed from 2002-2012.
- Incidence rates of acute hepatitis B decreased for both males and females from 2000 through 2012.
- In 2012, the rate for males was approximately 1.7 times higher than that for females (1.17 cases and 0.68 cases per 100,000 population, respectively).

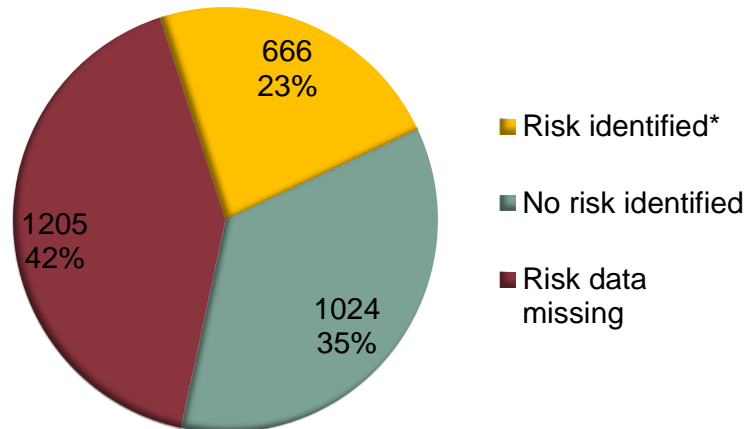
Figure 3.4. Incidence of acute hepatitis B, by race/ethnicity — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- The absolute number and rate of hepatitis B cases has declined generally for all race/ethnicity categories from 2000-2012.
- With the exception of white, non-Hispanics, declines were observed among all racial/ethnic groups ranging from 75%-90% during 2000-2012.
- White, non-Hispanic cases had the lowest rates in 2000, but have declined only 44% over the 12-year period compared with other racial/ethnic groups. In 2012, the hepatitis B rate among white, non-Hispanics was 0.8 cases per 100,000 population.
- In 2012, the rate of acute hepatitis B was lowest for Asian/Pacific Islanders and Hispanics (0.4 cases per 100,000 population for each group) and highest for black, non-Hispanics (1.1 cases per 100,000 population).

Figure 3.5. Availability of information on risk behaviors/exposures associated with acute hepatitis B — United States, 2012

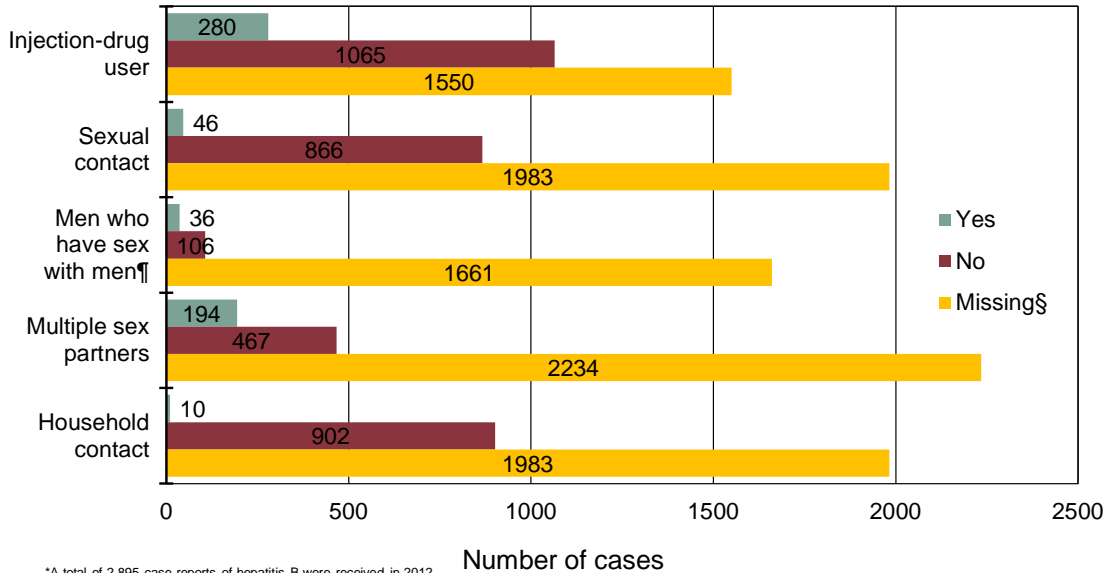


* Includes case reports indicating the presence of at least one of the following risks 6 weeks to 6 months prior to onset of acute, symptomatic hepatitis B: 1) using injection drugs; 2) having sexual contact with suspected/confirmed hepatitis B patient; 3) being a man who has sex with men; 4) having 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.

Source: National Notifiable Diseases Surveillance System (NNDSS)

- Of the 2,895 case reports of acute hepatitis B received by CDC during 2012, a total of 1,205 (42%) did not include a response (i.e., a “yes” or “no” response to any of the questions about risk behaviors and exposures) to enable assessment of risk behaviors or exposures.
- Of the 1,690 case reports that had risk behavior/exposure information:
 - 60.6% (n=1,024) indicated no risk behaviors/exposures for hepatitis B.
 - 39.4% (n=666) indicated at least one risk behavior/exposure for hepatitis B during the 6 weeks to 6 months prior to illness onset.

Figure 3.6a. Acute hepatitis B reports*, by risk behavior† — United States, 2012

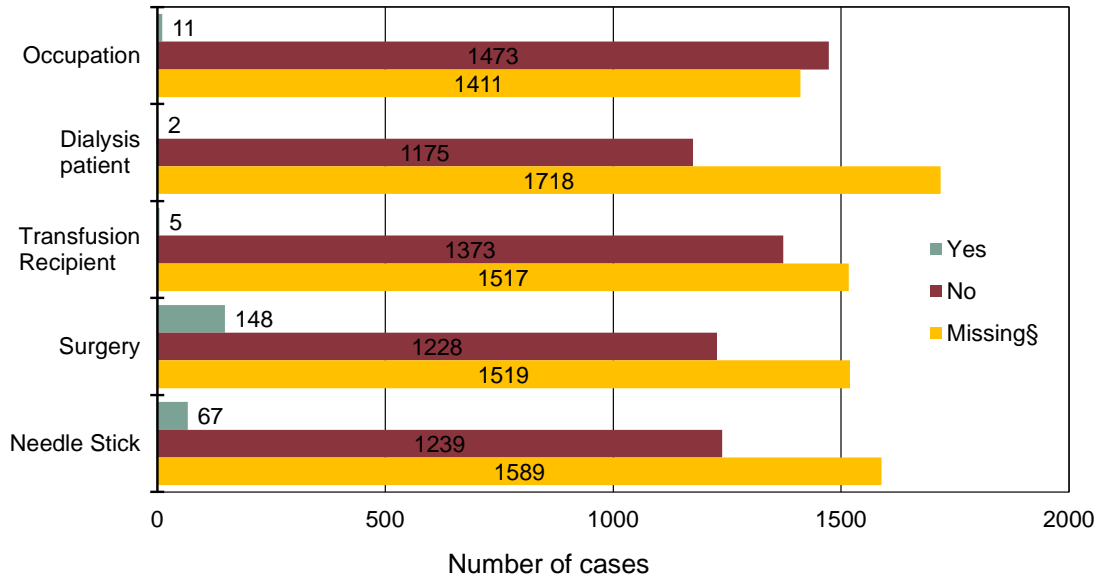


*A total of 2,895 case reports of hepatitis B were received in 2012.
 † More than one risk behavior may be indicated on each case report.
 ‡ No risk data reported.
 § A total of 1,803 hepatitis B cases were reported among males in 2012.
 Source: National Notifiable Diseases Surveillance System (NNDSS)

Figure 3.6a presents patient engagement in selected risk behaviors and exposures during the incubation period, 6 weeks to 6 months prior to onset of symptoms.

- Of the 1,345 case reports that had information about injection-drug use, 20.8% (n=280) noted use of these drugs.
- Of the 666 who could specify a risk, 280 (42%) indicated injection drug use, and 194 (29%) indicated multiple recent sex partners.
- Of the 912 case reports that had information about sexual contact, 5.0% (n=46) indicated sexual contact with a person with confirmed or suspected hepatitis B infection.
- Of the 142 case reports from males that included information about sexual preference/practices, 25.4% (n=36) indicated sex with another man.
- Of the 661 case reports that had information about number of sex partners, 29.3% (n=194) were among persons with ≥ 2 sex partners.
- Of the 912 case reports that had information about household contact, 1.1% (n=10) indicated household contact with someone with confirmed or suspected hepatitis B infection.

Figure 3.6b. Acute hepatitis B reports*, by risk exposure† — United States, 2012



*A total of 2,895 case reports of hepatitis B were received in 2012.
 †More than one risk exposure may be indicated on each case report.
 §Risk data not reported.
 Source: National Notifiable Diseases Surveillance System (NNDSS)

Figure 3.6b presents patient engagement in selected risk behaviors and exposures during the incubation period, 6 weeks to 6 months prior to onset of symptoms.

- Of the 1,484 case reports that contained information about occupational exposures, 0.7% (n=11) indicated employment in a medical, dental, or other field involving contact with human blood.
- Of the 1,177 case reports that included information about receipt of dialysis or kidney transplant, 0.2% (n=2) reported receipt of dialysis or a kidney transplant.
- Of the 1,378 case reports that had information about receipt of blood transfusion, 0.4% (n=5) noted receipt of a blood transfusion.
- Of the 1,376 case reports that had information about surgery they had received, 10.8% (n=148) reported having had surgery.
- Of the 1,306 case reports that had information about needle sticks, 5.1% (n=67) reported an accidental needle stick/puncture.

Chronic Hepatitis B

Case Definition

Clinical Description

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

Laboratory Criteria

- IgM anti-HBc negative

AND

- a positive result on one of the following tests: HBsAg, hepatitis B e antigen (HBeAg) or HBV DNA

OR

- Two positive tests for HBsAg, HBV DNA, or HBeAg when tests are performed at least 6 months apart (any combination of these tests performed 6 months apart is acceptable).

Table 3.3. Number of laboratory-confirmed, chronic hepatitis B* case reports — National Notifiable Diseases Surveillance System (NNDSS), 2012

Jurisdiction [^]	No. chronic hepatitis B case reports submitted
Arizona	892
Colorado	458
Connecticut §	562
Delaware	149
Illinois	1,714
Kansas	112
Louisiana	603
Maine	105
Massachusetts	1,750
Michigan	1,416
Montana	25
New York §	1,611
New York City	12,002
North Carolina	888
Pennsylvania §	1,952
South Carolina	463
South Dakota	51
Vermont	28
West Virginia	163
Wyoming §	6
Total	24,950

* For case-definition, see

<http://wwwn.cdc.gov/nndss/script/ConditionList.aspx?Type=0&Yr=2012>

† Reports may not reflect unique cases.

§ Includes probable and confirmed case reports.

[^] Jurisdictions that gave permission to report their chronic HBV cases

- In 2012, a total of 44 states submitted 40,599 reports of chronic hepatitis B to CDC.
- Twenty jurisdictions agreed to publication of their NNDSS data for this report, representing 61.5% (n=24,950) of all reports of chronic hepatitis B received by CDC.
- In 2012, the greatest number of reports was received from New York (n=12,002), representing 48.1% of published reports.
- The range in the number of reports of chronic hepatitis B which contained only confirmed reports was 6 received from Wyoming to 12,002 received from New York.

Table 3.4. Number and rate* of deaths with hepatitis B listed as a cause of death, by demographic characteristic and year – United States, 2007-2011

Demographic Characteristic		2007		2008		2009		2010		2011	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Age Group (years)	0–34	62	0.04	44	0.03	39	0.03	48	0.03	41	0.03
	35–44	184	0.43	154	0.36	143	0.34	142	0.35	143	0.35
	45–54	532	1.21	533	1.20	469	1.05	448	1.00	421	0.94
	55–64	546	1.67	523	1.55	547	1.57	610	1.67	645	1.69
	65–74	266	1.37	271	1.35	254	1.22	296	1.36	285	1.27
	≥75	225	1.21	263	1.40	245	1.30	248	1.34	269	1.42
Race§	White	1,081	0.40	1,093	0.40	978	0.35				
	Black	359	1.03	327	0.92	320	0.87				
	Non-White, Non-Black	375	2.16	368	2.05	399	2.15				
Race/Ethnicity¶**	White, NH (non-Hispanic)							856	0.34	832	0.32
	Black, NH							356	0.94	373	0.98
	Hispanic							136	0.43	161	0.48
	Asian/Pacific Islander							421	2.95	422	2.72
	American Indian/Alaska Native							17	0.73	9	0.38
Sex	Male	1,345	0.88	1,315	0.85	1,267	0.80	1,316	0.81	1,321	0.80
	Female	470	0.28	473	0.27	430	0.24	476	0.27	483	0.26
Overall		1,815	0.56	1,788	0.54	1,697	0.51	1,792	0.52	1,804	0.52

* Rates for race, sex, and overall total are age-adjusted per 100,000 US standard population.
 † 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, and B18.1 (hepatitis B).
 § Included white, non-Hispanic and white Hispanic.
 ¶ Included black, non-Hispanic and black Hispanic.
 ** Included all other racial/ethnic groups.

Source: CDC. National Vital Statistics System.

- In 2011, the mortality rate for hepatitis B was 0.5 deaths per 100,000 population (n=1,804).
- In 2011, the highest mortality rates by age, race/ethnicity and sex were observed among persons aged 55–64 years (1.7 deaths per 100,000 population), Asians and Pacific Islanders (2.7 deaths per 100,000 population), and males (0.8 deaths per 100,000 population) respectively.

HEPATITIS C

Acute Hepatitis C

There were 1,778 reported cases of acute HCV in 2012—a 75% increase compared with the number of cases reported in 2010. This number represents an estimated 21,870 acute cases.

Case Definition

Clinical Description

An acute illness with 1) discrete onset of symptoms (e.g., nausea, anorexia, fever, malaise, and abdominal pain) and 2) either jaundice/dark urine or serum alanine aminotransferase (ALT) >400 IU/L.

Laboratory Criteria for Acute Hepatitis C

- IgM anti-HAV negative and IgM anti-HBc negative

AND

- One or more of the following three criteria:
 - Antibody to hepatitis C virus (anti-HCV) screening-test positive, with a signal-to-cut-off ratio predictive of a true positive for the particular assay as defined by CDC (signal to cut-off ratios available at <http://www.cdc.gov/hepatitis/HCV/LabTesting.htm>)
 - OR
 - Hepatitis C Virus Recombinant Immunoblot Assay (HCV RIBA) positive
 - OR
 - Nucleic Acid Test (NAT) for HCV RNA positive (including genotype).

Acute Hepatitis C

In 2012, a total of 41 states submitted 1,778 reports of acute hepatitis C to CDC (Table 4.1). The overall incidence rate for 2012 was 0.6 cases per 100,000 population, an increase from 0.3 cases per 100,000 population during 2006-2010. Data for 2012 were unavailable from Alaska, Arizona, Delaware, the District of Columbia, Hawaii, Mississippi, New Hampshire, Rhode Island, South Dakota, and Wyoming.

Table 4.1. Reported cases of acute hepatitis C, by state — United States, 2008–2012

State	2008		2009		2010		2011		2012	
	Rate*	(No.)	Rate	(No.)	Rate	(No.)	Rate	(No.)	Rate	(No.)
Alabama	0.3	(13)	0.2	(10)	0.1	(7)	0.5	(23)	0.5	(24)
Alaska	U†	U	U	U	U	U	U	U	U	U
Arizona	U	U	U	U	U	U	U	U	U	U
Arkansas	0	(1)	0.1	(2)	0	(1)	0	(0)	0.2	(5)
California	0.1	(30)	0.1	(43)	0.1	(32)	0.1	(48)	0.2	(63)
Colorado	0.3	(14)	0.6	(28)	0.4	(20)	0.5	(28)	0.8	(42)
Connecticut	0.5	(19)	1.5	(53)	1.0	(37)	1.3	(47)	0.9	(34)
Delaware	U	U	U	U	U	U	U	U	U	U
District of Columbia	U	U	0.2	(1)	0.3	(2)	U	U	U	U
Florida	0.2	(32)	0.3	(53)	0.3	(56)	0.3	(64)	0.6	(107)
Georgia	0.2	(16)	0.3	(31)	0.3	(32)	0.5	(53)	0.8	(82)
Hawaii	U	U	U	U	U	U	U	U	U	U
Idaho	0.2	(3)	0.5	(7)	0.7	(11)	0.8	(12)	0.7	(11)
Illinois	0.1	(10)	0	(6)	0	(1)	0	(6)	0.2	(26)
Indiana	0.2	(13)	0.3	(22)	0.4	(27)	1.3	(84)	1.7	(110)
Iowa	0	(0)	0.4	(11)	0	0	0	(0)	0.1	(3)
Kansas	0	(1)	0	(1)	0.1	(2)	0.3	(8)	0.6	(16)
Kentucky	1.6	(68)	1.5	(64)	2.5	(109)	3.2	(142)	4.1	(178)
Louisiana	0.2	(9)	0.2	(9)	0.1	(4)	0.2	(7)	0.2	(11)
Maine	0.2	(3)	0.2	(2)	0.2	(2)	0.9	(12)	0.6	(8)
Maryland	0.4	(22)	0.4	(23)	0.4	(24)	0.6	(35)	0.7	(39)
Massachusetts	0.2	(13)	0.2	(10)	0.2	(13)	0.3	(23)	0.6	(37)
Michigan	1.3	(129)	0.4	(35)	0.5	(45)	0.3	(32)	0.8	(76)
Minnesota	0.4	(22)	0.3	(15)	0.3	(16)	0.3	(17)	0.6	(32)
Mississippi	U	U	U	U	U	U	U	U	U	U
Missouri	0	(2)	0	(0)	0.1	(6)	0.1	(8)	0.1	(4)
Montana	0.6	(6)	0.1	(1)	0.4	(4)	0.9	(9)	0.9	(9)
Nebraska	0.1	(2)	0.2	(3)	0.1	(2)	0.1	(2)	0.2	(3)
Nevada	0.8	(22)	0.2	(5)	0.3	(7)	0.4	(10)	0.4	(12)
New Hampshire	U	U	U	U	U	U	U	U	U	U
New Jersey	0.7	(61)	0.1	(7)	0.3	(28)	0.6	(53)	0.8	(71)
New Mexico	0.3	(5)	0.3	(6)	0.7	(14)	0.7	(14)	1.0	(21)
New York	0.2	(43)	0.3	(53)	0.3	(50)	0.3	(52)	0.5	(93)
North Carolina	0.5	(46)	0.3	(24)	0.4	(39)	0.6	(60)	0.6	(63)
North Dakota	0	(0)	0.3	(2)	0	(0)	0	(0)	0	(0)
Ohio	0.3	(40)	0.2	(26)	0.1	(10)	0.1	(6)	0.1	(7)
Oklahoma	0.5	(20)	0.7	(27)	1.1	(41)	1.4	(53)	2.1	(80)
Oregon	0.6	(23)	0.5	(19)	0.5	(19)	0.5	(20)	0.9	(37)
Pennsylvania	0.2	(27)	0.3	(39)	0.2	(26)	0.3	(35)	0.5	(66)
Rhode Island	U	U	U	U	U	U	U	U	U	U
South Carolina	0.1	(4)	0	(1)	0	(1)	0	(1)	0.0	(1)
South Dakota	U	U	U	U	U	U	U	U	U	U
Tennessee	0.4	(28)	0.5	(33)	0.7	(46)	1.3	(83)	2.0	(129)
Texas	0.2	(59)	0.1	(36)	0.1	(35)	0.1	(37)	0.2	(44)
Utah	0.4	(12)	0.2	(6)	0.4	(10)	0.4	(10)	0.6	(17)
Vermont	0.2	(1)	0.2	(1)	0.3	(2)	1.0	(6)	1.0	(6)
Virginia	0.1	(8)	0.1	(10)	0.2	(13)	0.3	(25)	0.9	(76)
Washington	0.4	(25)	0.3	(22)	0.4	(25)	0.6	(41)	0.8	(54)
West Virginia	1.2	(22)	1.7	(31)	1.1	(21)	2.5	(46)	3.0	(55)
Wisconsin	0.1	(3)	0.1	(3)	0.2	(10)	0.3	(15)	0.5	(26)
Wyoming	0	(0)	0	(0)	0	(0)	0.4	(2)	U	U
Total	0.3	(877)	0.3	(781)	0.3	(850)	0.4	(1,229)	0.6	(1,778)

*Rate per 100,000 population. †U=No data available for reporting.

- The number of acute cases of hepatitis C reported in the United States increased 45%, from 1,229 in 2011 to 1,778 in 2012.
- The national rate of acute cases of hepatitis C remained stable, at 0.3 cases per 100,000 population from 2008 through 2010, but increased to 0.4 cases per 100,000 population in 2011, and to 0.6 cases per 100,000 population in 2012.
- Of the 41 states that submitted reports of acute hepatitis C in 2012, 15 states had rates below the national rate of 0.6 cases per 100,000 population.
- Rates of acute hepatitis C ranged from no cases reported in North Carolina to 4.1 cases per 100,000 population in Kentucky.
- In 35 states, the number of reported acute hepatitis C cases increased from 2008 to 2012.
- Three Appalachian states — Kentucky, Tennessee, and West Virginia — accounted for over 20.4% of acute cases reported in 2012.

Table 4.2 Clinical characteristics of reported cases of acute, hepatitis C* — United States, 2012

Clinical characteristic	Availability of valid data† for clinical characteristic		Cases with clinical characteristics§	
	No.	%	No.	%
Jaundice	1,278	71.9	870	68.1
Hospitalized for hepatitis C	1,216	68.4	675	55.5
Died from hepatitis C	1,123	63.2	6	0.5

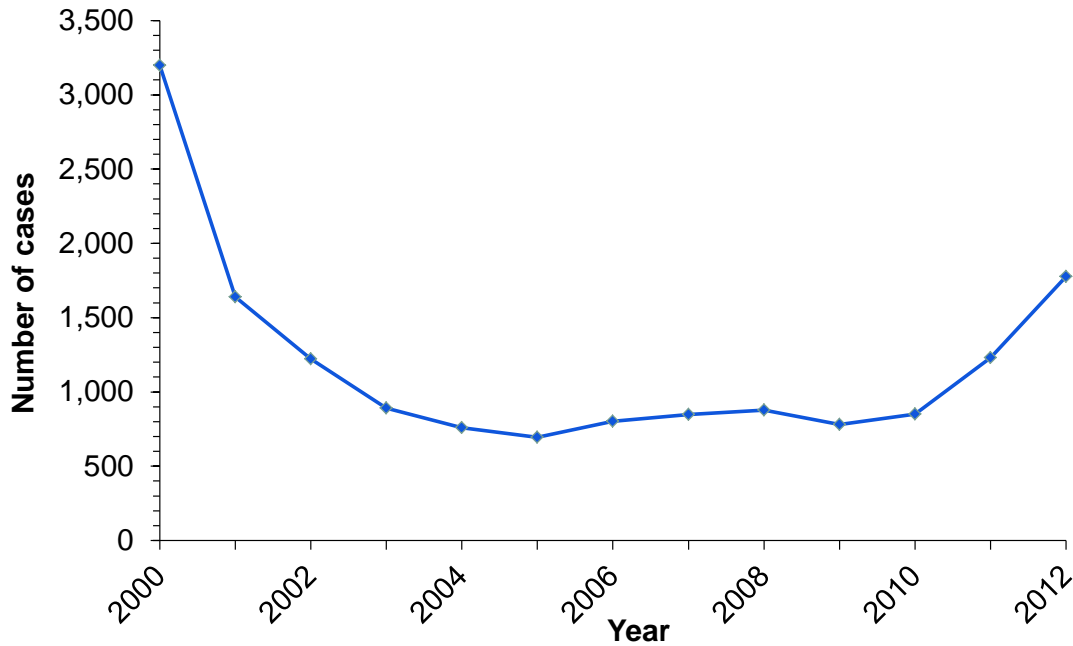
*A total of 1,778 hepatitis C cases were reported during 2012.

†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 1,778 case reports of acute hepatitis C received in 2012, 70.9% included information regarding whether the patient had jaundice, 68.4% had information regarding hospitalization caused by hepatitis C, and 63.2% included information on hepatitis C-associated deaths. (Note: more severe cases are likely to be ascertained and reported.)
- In 2012, of all case reports with information regarding clinical characteristics:
 - 68.1% indicated the patient had jaundice.
 - 55.5% indicated the patient was hospitalized as a result of hepatitis C.
 - 0.5% indicated the patient died from hepatitis C.

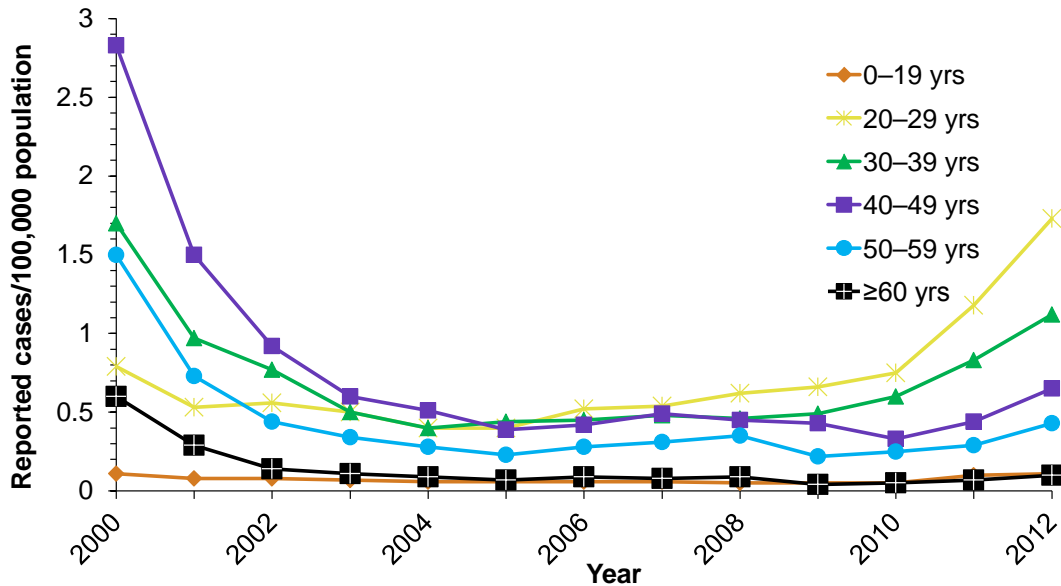
Figure 4.1. Reported number of acute hepatitis C cases — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- The number of reported cases of acute hepatitis C declined rapidly until 2003 and remained steady until 2010. However, from 2010 to 2011 there was a 45% increase in the number of reported hepatitis C (from 850 to 1,229 cases) and another 45% increase from 2011 to 2012 (from 1,229 to 1,778 cases), representing a 75% increase from 2010-2012.

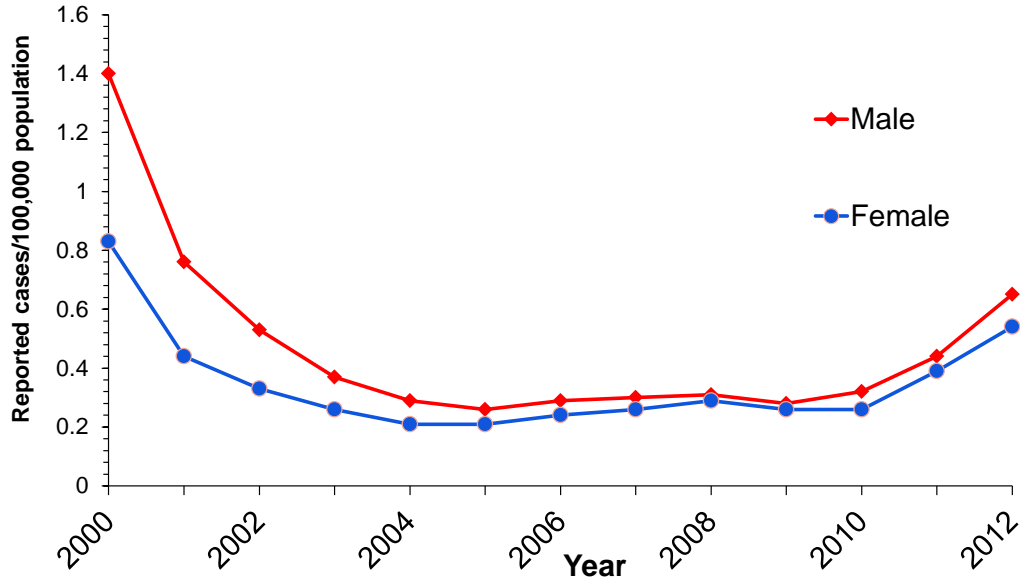
Figure 4.2. Incidence of acute hepatitis C, by age group — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- Prior to 2002, incidence rates for acute hepatitis C decreased for all age groups (with the exception of the 0–19 year age group); rates remained fairly constant for all age groups from 2002 through 2010.
- In 2012, the rate of acute hepatitis C increased in every age group when compared with 2010 and 2011, with the largest increases among persons aged 0-19 years (from 0.05 to 0.11 cases per 100,000 population) and 20–29 years (from 0.75 to 1.73 cases per 100,000 population). When comparing the 2012 hepatitis C rates of all age groups, persons aged 20–29 years had the highest rate (1.73 cases per 100,000 population) and persons aged ≥60 years had the lowest rate (0.10 cases per 100,000 population).

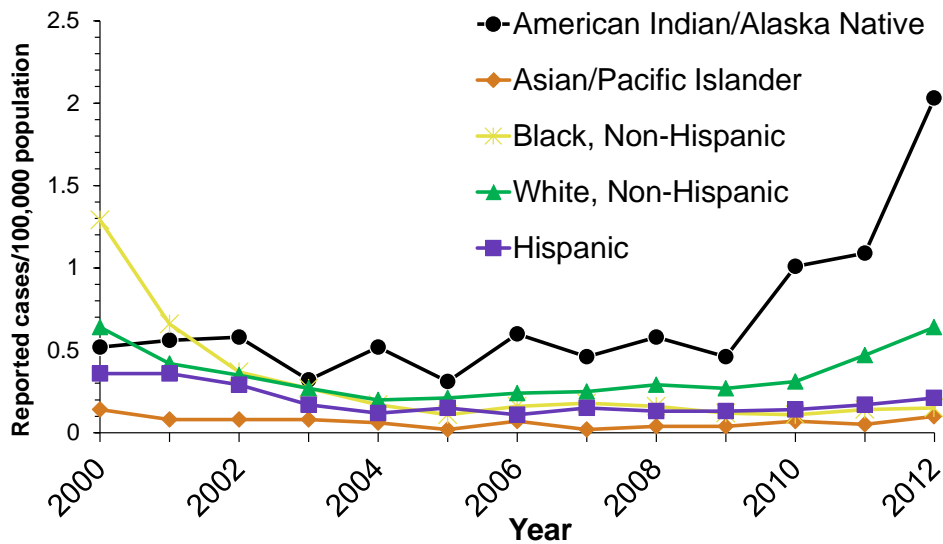
Figure 4.3. Incidence of acute hepatitis C, by sex — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- Incidence rates of acute hepatitis C decreased dramatically for both males and females from 2000-2003 and remained fairly constant from 2004-2010.
- Since 2010, rates for both males and females have increased and in 2012, rates among males and females were 0.7 and 0.5 cases per 100,000 population, respectively.

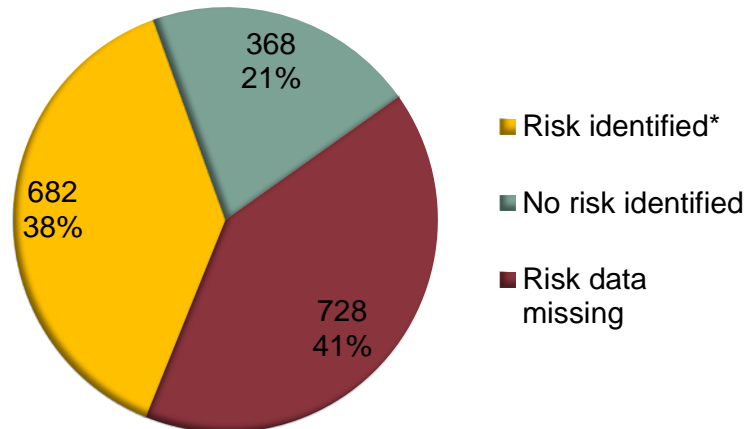
Figure 4.4. Incidence of acute hepatitis C, by race/ethnicity — United States, 2000–2012



Source: National Notifiable Diseases Surveillance System (NNDSS)

- Rates for acute hepatitis C decreased for all racial/ethnic populations through 2003.
- From 2011-2012, acute hepatitis C rates increased 86.2% among American Indians/Alaska natives, 36.2% among white, non-Hispanics, and 23.5% among Hispanics.
- The 2012 acute hepatitis C rates for Asian/Pacific Islanders, black, non-Hispanics, Hispanics, white, non-Hispanic, and American Indian/Alaska Natives were 0.1, 0.2, 0.2, 0.6 and 2.0, respectively.

Figure 4.5. Availability of information on risk exposures/behaviors associated with acute hepatitis C — United States, 2012



*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 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.

Source: National Notifiable Diseases Surveillance System (NNDSS)

- Of the 1,778 case reports of acute hepatitis C received by CDC during 2012, 728 (40.9%) did not include a response (i.e., a “yes” or “no” response to any of the questions about risk behaviors and exposures) to enable assessment of risk behaviors or exposures.
- Of 1,050 case reports that had risk factor/exposure information:
 - 368 (35%) indicated no risk behaviors/exposures for hepatitis C virus infection.
 - 682 (65%) indicated at least one risk behavior/exposure in the 2 weeks to 6 months prior to illness onset.
- Of the 682 who reported risk information:
 - 513 (75%) indicated injection drug use risk (Figure 4.6a).
 - 86 (13%) indicated recent surgery.

Figure 4.6a. Acute hepatitis C reports, by risk behavior[†] — United States, 2012

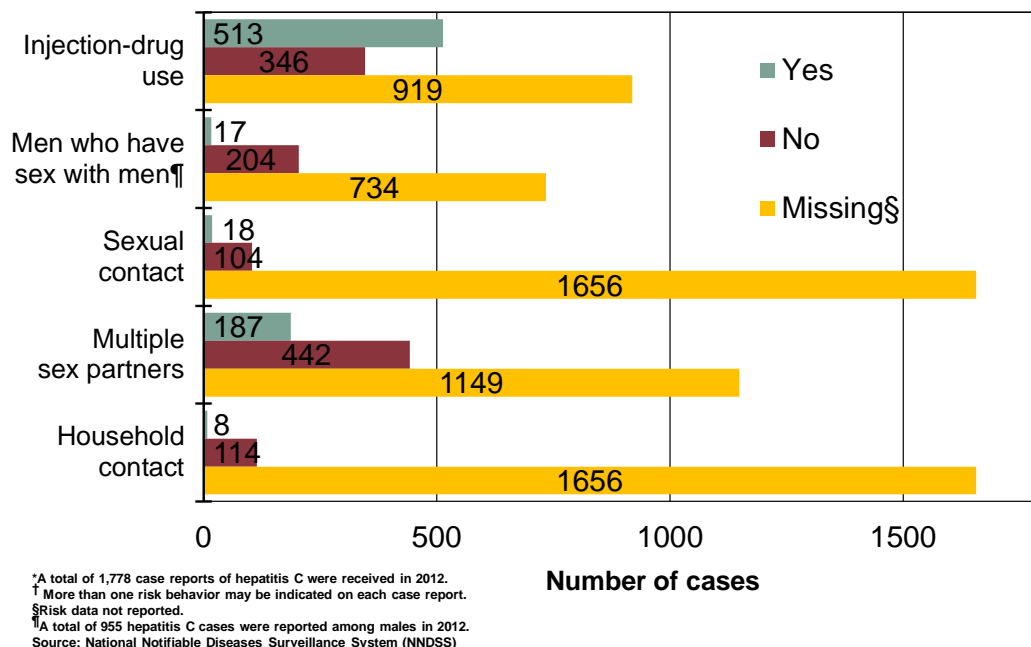
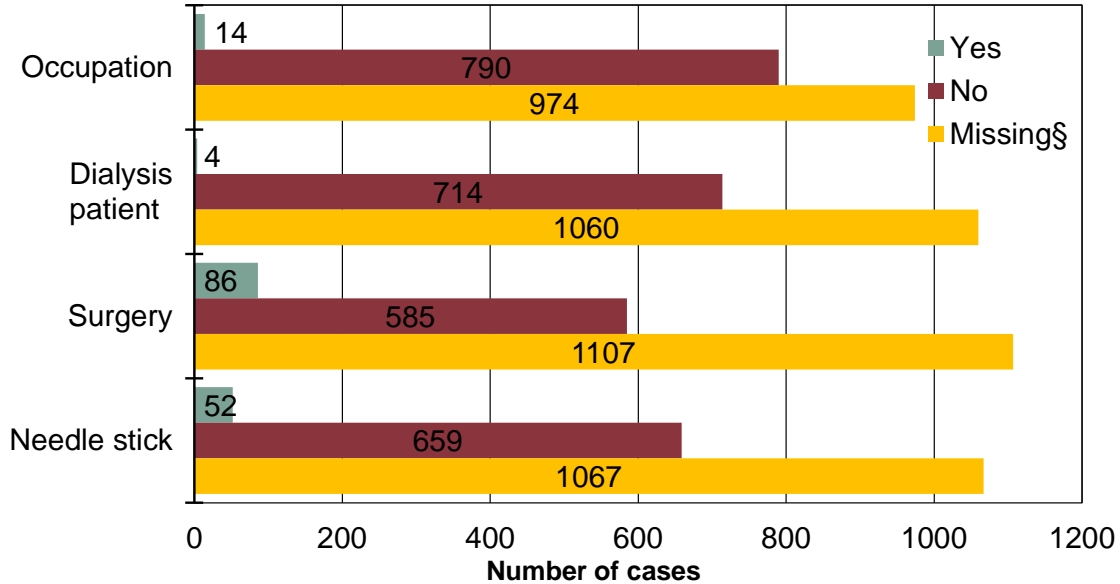


Figure 4.6a presents patient engagement in selected risk behaviors and exposures during the incubation period, 2 weeks to 6 months prior to onset of symptoms.

- IDU is the most prevalent risk behavior identified.
- Of the 859 case reports who answered “yes” or “no” to recent injection drug use, 513 (60%) said “yes” to the question. Of the 221 case reports from males that included information about sexual preferences/practices, 7.7% (n=17) indicated sex with another man.
- Of the 122 case reports that had information about sexual contact, 14.8% (n=18) involved persons reporting sexual contact with a person with confirmed or suspected HCV infection.
- Of the 629 case reports that had information about number of sex partners, 29.7% (n=187) involved persons with ≥ 2 sex partners.
- Of the 122 case reports that had information about household contact, 6.6% (n=8) indicated household contact with someone with confirmed or suspected HCV infection.

Figure 4.6b. Acute hepatitis C reports, by risk exposure† — United States, 2012



*A total of 1,778 case reports of hepatitis C were received in 2012.
 †More than one risk exposure may be indicated on each case report.
 §Risk data not reported.
 Source: National Notifiable Diseases Surveillance System (NNDSS)

Figure 4.6b presents patient engagement in selected exposures during the incubation period, 2 weeks to 6 months prior to onset of symptoms.

- Of the 804 case reports that contained information about occupational exposures, 1.7% (n=14) involved persons employed in a medical, dental, or other field involving contact with human blood.
- Of the 718 case reports that had information about receipt of dialysis or a kidney transplant, 0.6% (n=4) indicated patient receipt of dialysis or a kidney transplant.
- Of the 671 case reports that had information about surgery, 12.8% (n=86) were among persons who had undergone surgery.
- Of the 711 case reports that included information about needle sticks, 7.3% (n=52) indicated accidental needle stick/puncture.

Hepatitis C, Past or Present

The current case definition for hepatitis C cases, other than acute cases, requires as little as a single positive anti-HCV test and that the case does not meet the case definition for acute infection. Because no single current anti-HCV test can distinguish current active infections (present) from resolved infections (past), these cases are reported in a single category, hepatitis C, past or present.

Case Definition

Clinical Criteria

No symptoms are required. Most HCV-infected persons are asymptomatic; however, many have mild-to-severe chronic liver disease.

Laboratory Criteria

One or more of the following three criteria (except in persons less than 18 months of age, for whom only criteria 3 would meet the case classification criteria):

- Antibodies to hepatitis C virus (anti-HCV) screening-test-positive with a signal to cut-off 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) positive, OR
- Nucleic acid test (NAT) for HCV RNA positive (including qualitative, quantitative or genotype testing).

Case Classification

Probable

A case that does not meet the case definition for acute hepatitis C, is anti-HCV positive (repeat reactive) by EIA, and has alanine aminotransferase (ALT or SGPT) values above the upper limit of normal, but the anti-HCV EIA result has not been verified by an additional more specific assay or the signal to cut-off ratio is unknown.

Confirmed

A case that is laboratory confirmed and does not meet the case definition for acute hepatitis C.

Table 4.3 Number of laboratory confirmed, hepatitis C (past or present)* case reports† — National Notifiable Diseases Surveillance System (NNDSS), 2012

Jurisdiction	No. chronic hepatitis C case reports submitted
Colorado	2,947
Connecticut	2,934
Illinois	7,673
Kansas	1,805
Louisiana	1,933
Maine	1,213
Massachusetts	7,686
Michigan	8,005
Montana	1,251
New York	6,791
New York City	7,598
Pennsylvania	9,747
South Carolina	3,672
South Dakota	390
Vermont	671
Wyoming	521
Total	64,837

* For case-definition, see

<http://www.cdc.gov/nndss/script/ConditionList.aspx?Type=0&Yr=2012>.

†Reports may not reflect unique cases.

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- In 2012, a total of 145,762 reports of chronic hepatitis C (past or present) infection were submitted to CDC by 44 states.
- Sixteen jurisdictions agreed to publication of their NNDSS data for this report, representing 44.1% (n=64,370) of all reports of chronic hepatitis C received by CDC in 2012.
- Of the 16 states, the greatest number of reports was received from Pennsylvania (n=9,747); the least number of reports was received from Wyoming (n=521).

Table 4.4. Number and rate* of deaths with hepatitis C listed as a cause of death†, by demographic characteristic and year — United States, 2007–2011

Demographic characteristic		2007		2008		2009		2010		2011	
		No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Age Group (years)§	0–34	131	0.09	124	0.09	116	0.08	117	0.08	128	0.09
	35–44	999	2.32	878	2.07	828	1.99	712	1.73	696	1.71
	45–54	5,937	13.53	5,758	12.98	5,469	12.26	5,171	11.49	5,073	11.34
	55–64	5,145	15.72	5,967	17.71	6,683	19.21	7,431	20.37	8,330	21.89
	65–74	1,621	8.37	1,709	8.49	1,824	8.77	1,901	8.75	2,136	9.50
	≥75	1,273	6.85	1,332	7.11	1,333	7.10	1,293	6.97	1,357	7.18
Race¶	White	11,798	4.31	12,261	4.37	12,682	4.43				
	Black	2,686	7.59	2,829	7.82	2,908	7.80				
	Non-White, Non-Black	622	3.59	678	3.78	663	3.61				
Race/Ethnicity **††	White, NH (Non-Hispanic)							10575	4.03	11196	4.19
	Black, NH							2981	7.72	3167	7.89
	Hispanic							2318	6.83	2555	7.15
	Asian/Pacific Islander							440	3.30	455	3.14
	American Indian/Alaska Native							248	9.90	275	10.61
Sex	Male	10,561	6.64	11,116	6.82	11,517	6.91	11,781	6.81	12,651	7.11
	Female	4,545	2.65	4,652	2.65	4,736	2.65	4,846	2.63	5,070	2.70
Overall		15,106	4.58	15,768	4.66	16,253	4.70	16,627	4.65	17,721	4.82

* Rates for race, sex, and overall total are age-adjusted per 100,000 US standard population.

†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).

§Included white, non-Hispanic and white Hispanic.

¶Included black, non-Hispanic and black Hispanic.

**Included all other racial/ethnic groups.

Source: CDC. National Vital Statistics System.

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- Of the three types of viral hepatitis (hepatitis A, B, and C), hepatitis C accounted for the most deaths and had the highest death rate.
- From 2007 through 2011, the mortality rate of hepatitis C increased from 4.6 deaths per 100,000 population in 2007 to 4.8 deaths per 100,000 population in 2011.
- In 2007, the highest mortality rates were observed among persons aged 45–54 years and 55–64 years and the rates were similar (13.5 and 15.7 deaths per 100,000 population, respectively).
- From 2007 through 2011, mortality rates of persons with hepatitis C increased 39% among persons aged 55–64 years to a rate of 21.9 deaths per 100,000 population in 2011.
- In 2011, the highest mortality rates of persons with hepatitis C by race/ethnicity and sex were observed among American Indians and Alaska Natives (10.6 deaths per 100,000 population) and males (7.1 deaths per 100,000 population) respectively.

DISCUSSION

National surveillance data for acute viral hepatitis provide essential information for identifying patterns and trends in viral hepatitis; providing data for national and local estimates of the health burden of hepatitis A, B, and C; targeting groups for whom public health intervention is needed; and evaluating 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 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 (*1*). 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 indicate declining rates of acute hepatitis A, acute hepatitis B, and acute hepatitis C during 1995–2010. More recent data show the rate of decline has decreased, and incidence has become relatively stable for acute hepatitis A and B, whereas a marked increase in the number of cases of acute hepatitis C was in 2011 and 2012. Still, most new infections with HAV, HBV, and HCV remain undetected and unreported. In 2012, after adjusting for asymptomatic cases and underreporting, the estimated number of cases of HAV, HBV, and HCV infections was approximately 3,050, 18,760, and 21,870, respectively. As noted in “Adjustments to Reported Cases” (page 16), these estimates cannot be compared directly with estimates from previous years which were based on different methods of calculation.

Despite decreases in acute viral hepatitis, chronic hepatitis infection continues to affect millions of Americans. In the United States, an estimated 700,000–1.4 million persons are living with chronic hepatitis B infection (*2, 3*), and an estimated 2.7–3.9 million persons are chronically infected with hepatitis C (*4*). In 2012, over 40,000 reports of chronic hepatitis B and over

145,000 reports of chronic hepatitis C were submitted to CDC through NNDSS. Of these, 24,950 reports of chronic hepatitis B infection and 64,370 reports of chronic hepatitis C infections were available for descriptive analyses. Mortality data from 2011, the latest year for which these data were available, reveal the serious health consequences associated with viral hepatitis: chronic liver disease, including cirrhosis, was the 12th leading cause of death in the United States in 2011 (5). Viral hepatitis-associated death rates in 2011 were highest among persons infected with HCV (4.82 deaths per 100,000 population), followed by HBV (0.52 deaths per 100,000 population), and HAV (0.02 deaths per 100,000 population) (6).



CDC and state health departments rely on surveillance data to track the incidence of acute infection, guide development and evaluation of programs and policies designed to prevent infection and 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 already 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/2005Guidelines-Surv-CaseMngmt.pdf> 