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HEPATITIS

SURVEILLANCE

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Preface

Hepatitis Surveillance, No. 61 presents statistics and trends in viral hepatitis in the United States through 2004. This publication, which summarizes viral hepatitis case reports received from state health departments, is intended as a reference document for policy makers, program managers, health planners, researchers and others who are concerned with the public health implications of these diseases. Any comments and suggestions that would improve the usefulness of future publications are appreciated and should be sent to Chief, Surveillance Team, Division of Viral Hepatitis, Centers for Disease Control and Prevention, 1600 Clifton Road, Mailstop G37, Atlanta, GA 30333.

Acknowledgments

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This report was prepared by the following staff members of the Surveillance Team of the Epidemiology Branch of the Division of Viral Hepatitis, National Center for Infectious Diseases: Annemarie Wasley, Jeremy Miller, and Lyn Finelli

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Methods

Conditions under surveillance

National surveillance is conducted for acute hepatitis A, acute hepatitis B, and acute hepatitis C. Case definitions for these conditions are below. Nationwide reporting of perinatal HBV infection was implemented in 2001. In addition, chronic hepatitis B virus (HBV) infection and hepatitis C virus (HCV) infection, past or present were added to the list of nationally notifiable conditions in January 2003. This publication summarizes information received about cases of acute disease. Future issues will summarize the information about reported cases of perinatal and chronic infection with hepatitis viruses.

Sources of data

Cases of acute hepatitis are reported to CDC by state and territorial health departments on a weekly basis via the National Notifiable Diseases Surveillance System (NNDSS). As of January 1, 2002, all reports are received electronically by CDC via NETSS (National Electronic Telecommunications System for Surveillance).

Participation by states in the reporting of viral hepatitis cases to CDC is voluntary as it is for all nationally notifiable diseases. Currently, all states collect and report basic information (event date, source of report, demographic characteristics) about cases of acute viral hepatitis that are identified in their states. States are also asked to report additional information (laboratory test results, clinical information and exposure history) about investigated cases. Completeness of reporting of these additional data varies among and within states. Currently, approximately 40% of case reports received by CDC include any of these additional data. See Table 1 for information on state-specific reporting profiles.

Analyses

Incidence rate calculations

Crude incidence rates of new cases were calculated on an annual basis per 100,000 population using Bureau of the Census estimates of the U.S. resident population.

Frequency analysis

The percentage of cases reporting a specific risk factor is determined using the number of cases reporting any information, positive or negative, about that exposure as the denominator. Depending on the type of hepatitis, the percentage of cases with any risk factor information ranges from 30-40%. Multiple risk factors can be reported by a single case. Consequently, the percentages of cases with specific risk factors may sum to >100%.

Data Limitations

There is considerable variability by state in terms of both the sensitivity of reporting (i.e. frequency of underreporting) and the completeness of individual case reports. Information to assess the degree of underreporting is not available. Only 40% of cases are reported with extended case investigation data (e.g., clinical characteristics, exposure history) and this percentage varies by state from 0 to 100% (see Table 1). Analyses of trends in the characteristics of cases are based on records for which this information is complete; it is not known if or how cases that are reported with complete data differ from those for which data are missing or from those that are not reported.

Case definitions

Reported cases must meet the clinical criteria and be serologically confirmed.

Clinical case definition

An acute illness with a) discrete onset of symptoms and b) jaundice or elevated serum aminotransferase levels

Laboratory criteria for diagnosis:

- *Acute hepatitis A:*
 - Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive

- *Acute hepatitis B:*
 - IgM antibody to hepatitis B core antigen (anti-HBc) positive or hepatitis B surface antigen (HBsAg) positive

- IgM anti-HAV negative (if done)
- *Acute hepatitis C:*
 - Serum alanine aminotransferase levels greater than 7 times the upper limit of normal, and
 - IgM anti-HAV negative, and
 - IgM anti-HBc negative or if not done, HBsAg negative, and
 - One of the following:
 - Antibody to hepatitis C virus (anti-HCV) screening-test-positive, verified by an additional more specific assay (e.g. RIBA for anti-HCV or nucleic acid testing for HCV RNA) OR
 - Anti-HCV screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay (e.g., >3.8 for the enzyme immunoassays).

Case classification

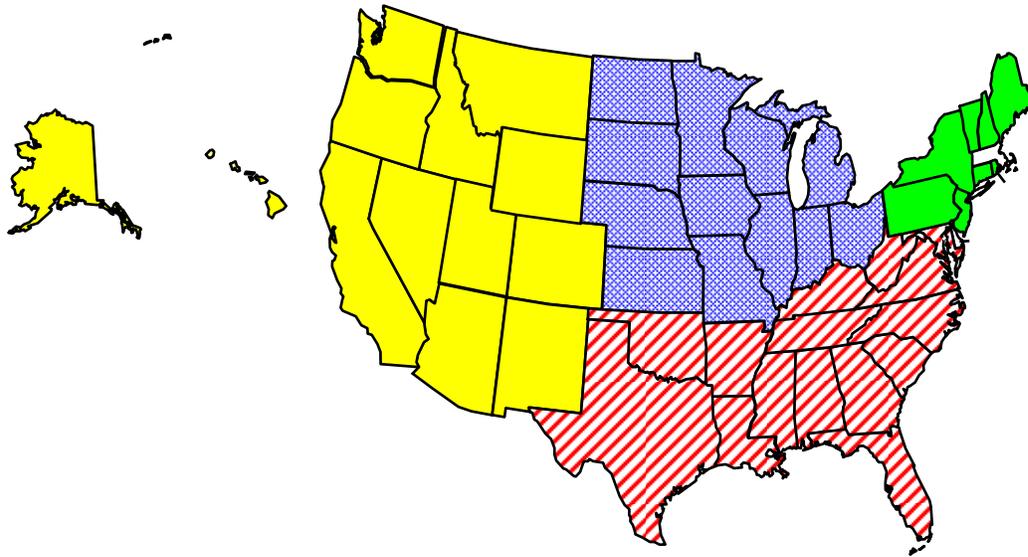
Confirmed: a case that meets the clinical case definition and is laboratory confirmed or, for hepatitis A, a case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms)

Table 1: Proportion of Cases That Included Risk Factor Data, by State, 2004

81%-100%	61% - 80%	41-60%	11-40%	0-10%
Alabama	Arkansas	Michigan	Arizona	Alaska
Colorado	Connecticut	Missouri	Illinois	California
District of Columbia	Indiana	Nebraska	Louisiana	Delaware
Florida	Kentucky	New York	Montana	Georgia
Hawaii	Massachusetts	Utah	South Carolina	Idaho
Iowa	Pennsylvania	Wyoming	Texas	Mississippi
Kansas	Tennessee		Virginia	New Hampshire
Maine	Vermont			New Jersey
Maryland	Wisconsin			New York City
Minnesota				Oregon
Nevada				
New Mexico				
North Carolina				
North Dakota				
Ohio				
Oklahoma				
Rhode Island				
South Dakota				
Washington				
West Virginia				

Note: **blue** font indicates states where completeness of reporting has increased by at least one category in the last year; **red** font indicates states where completeness of reporting decreased by at least one category.

Figure 1: Geographic Divisions of the United States



West	Midwest	South	Northeast
Alaska	Illinois	Alabama	Connecticut
Arizona	Indiana	Arkansas	Maine
California	Iowa	Delaware	Massachusetts
Colorado	Kansas	District of Columbia	New Hampshire
Hawaii	Michigan	Florida	New Jersey
Idaho	Minnesota	Georgia	New York
Montana	Missouri	Kentucky	Pennsylvania
Nevada	Nebraska	Louisiana	Rhode Island
New Mexico	North Dakota	Maryland	Vermont
Oregon	Ohio	Mississippi	
Utah	South Dakota	North Carolina	
Washington	Wisconsin	Oklahoma	
Wyoming		South Carolina	
		Tennessee	
		Texas	
		Virginia	
		West Virginia	

Figure 2: Incidence of viral hepatitis, United States, 1966-2004

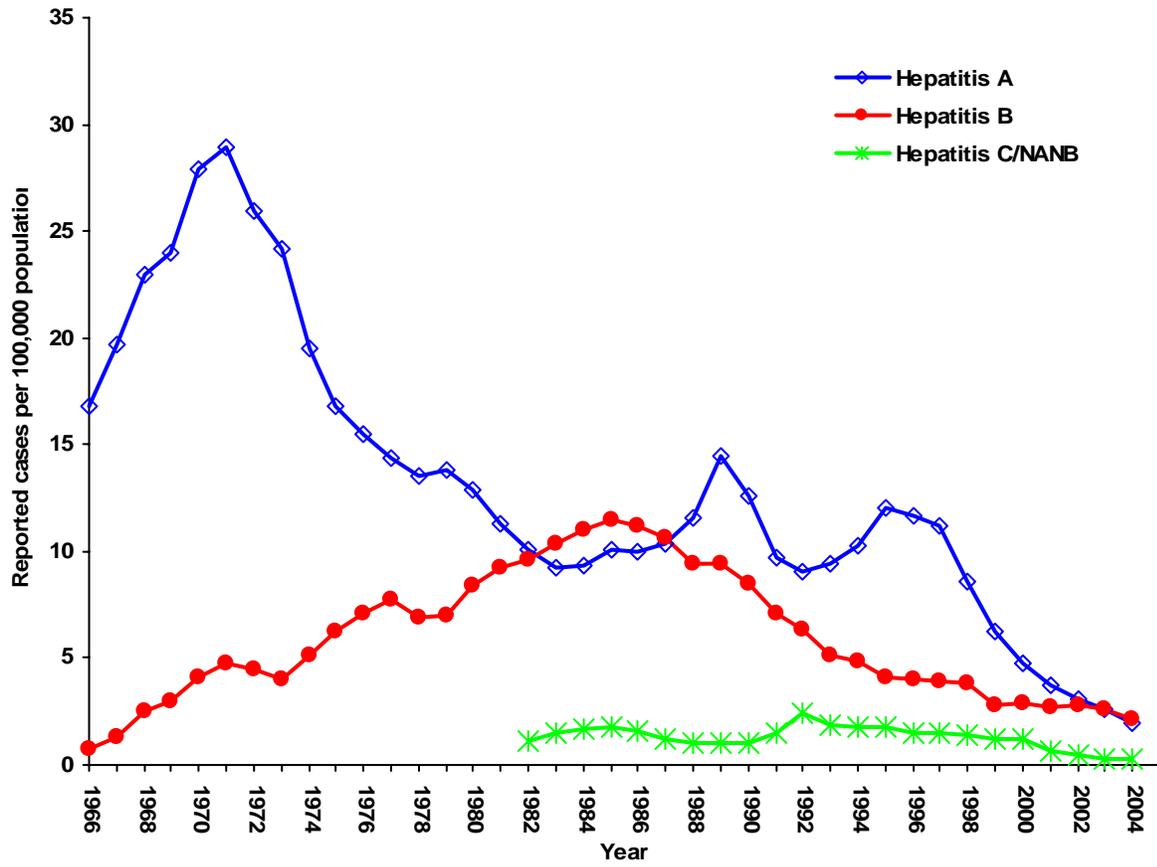


Table 2: Reported cases of acute viral hepatitis, by type and year, United States, 1966-2004

Year	<u>Hepatitis A</u>		<u>Hepatitis B</u>		<u>Hepatitis C/NANB</u>	
	No.	Rate*	No.	Rate	No.	Rate
1966	32,859	16.8	1,497	0.8	---	---
1967	38,909	19.7	2,458	1.3	---	---
1968	45,893	23.0	4,829	2.5	---	---
1969	48,416	24.0	5,909	3.0	---	---
1970	56,797	27.9	8,310	4.1	---	---
1971	59,606	28.9	9,556	4.7	---	---
1972	54,074	26.0	9,402	4.5	---	---
1973	50,749	24.2	8,451	4.0	---	---
1974	40,358	19.5	10,631	5.2	---	---
1975	35,855	16.8	13,121	6.3	---	---
1976	33,288	15.5	14,973	7.1	---	---
1977	31,153	14.4	16,831	7.8	---	---
1978	29,500	13.5	15,016	6.9	---	---
1979	30,407	13.8	15,452	7.0	---	---
1980	29,087	12.8	19,015	8.4	---	---
1981	25,802	11.3	21,152	9.2	---	---
1982	23,403	10.1	22,177	9.6	2,629 [‡]	1.1 [†]
1983	21,532	9.2	24,318	10.4	3,470 [†]	1.5 [†]
1984	22,040	9.3	26,115	11.1	3,871 [†]	1.6 [†]
1985 [§]	23,257	10.0	26,654	11.5	4,192 [†]	1.8 [†]
1986 [§]	23,430	10.0	26,107	11.2	3,634 [†]	1.6 [†]
1987	25,280	10.4	25,916	10.7	2,999 [†]	1.2 [†]
1988	28,507	11.6	23,177	9.4	2,619 [†]	1.1 [†]
1989	35,821	14.4	23,419	9.4	2,529 [†]	1.0 [†]
1990	31,441	12.6	21,102	8.5	2,553 [†]	1.0 [†]
1991	24,378	9.7	18,003	7.1	3,582 [†]	1.4 [†]
1992	23,112	9.1	16,126	6.3	6,010	2.4
1993	24,238	9.4	13,361	5.2	4,786	1.9
1994	26,796	10.3	12,517	4.8	4,470	1.8
1995	31,582	12.0	10,805	4.1	4,576	1.7
1996	31,032	11.7	10,637	4.0	3,716	1.4
1997	30,021	11.2	10,416	3.9	3,816	1.4
1998	23,229	8.6	10,258	3.8	3,518	1.3
1999	17,047	6.3	7,694	2.8	3,111	1.1
2000	13,397	4.8	8,036	2.9	3,197	1.1
2001	10,615	3.7	7,844	2.8	1,640 ^{**}	0.7 ^{**}
2002	8,795	3.1	8,064	2.8	1,223 ^{††}	0.5 ^{††}
2003	7,653	2.6	7,526	2.6	891 ^{††}	0.3 ^{††}
2004	5,683	1.9	6,212	2.1	758	0.3

Source: National Notifiable Diseases Surveillance System * Rate per 100,000 population. † Numbers and rates shown for hepatitis C/ Non-A, non-B hepatitis are unreliable. § Excludes cases from New York City; data not available for 1985 or 1986.

**Excludes cases from New Jersey and Missouri. †† Excludes cases from Missouri

Table 3: Incidence per 100,000 of acute hepatitis A, by state and year, United States

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Alabama	2.4	1.1	1.3	1.4	3.3	2.2	5.1	2.0	1.9	1.4	1.3	1.8	0.9	0.5	0.2
Alaska	34.4	16.9	22.1	129.8	34.8	8.3	8.9	5.6	2.8	2.4	2.1	2.5	1.9	1.5	0.6
Arizona	53.8	29.7	31.7	37.4	52.1	31.6	39.9	51.2	39.5	14.6	9.0	7.7	5.6	5.0	4.6
Arkansas	25.7	10.9	6.5	3.1	10.3	26.7	20.0	8.8	3.2	3.2	5.4	2.7	2.7	1.4	2.2
California	21.4	16.5	16.0	18.2	21.1	21.4	20.9	19.9	12.8	10.4	8.8	5.4	4.1	3.2	2.5
Colorado	10.7	20.2	25.5	24.6	16.0	13.6	13.4	10.3	8.7	5.4	5.2	2.0	1.6	1.4	1.1
Connecticut	4.2	3.8	2.5	3.6	3.0	2.6	4.3	4.6	3.0	3.9	5.2	7.0	2.7	2.6	2.1
Delaware	14.3	1.9	8.1	1.7	3.1	1.7	2.9	4.2	0.8	0.3	1.9	2.0	1.9	1.1	0.7
District of Columbia	6.5	13.0	2.9	1.9	4.8	4.7	7.2	6.8	12.7	11.4	7.0	14.0	14.3	7.7	1.3
Florida	5.2	6.4	4.3	5.1	5.6	4.7	5.1	5.5	4.1	5.7	4.1	5.2	6.3	2.3	1.5
Georgia	5.8	3.7	3.4	2.1	0.6	1.2	5.6	10.2	11.5	6.2	4.6	11.1	6.0	9.1	3.6
Hawaii	9.5	7.9	14.9	5.9	4.9	14.1	10.1	12.4	4.5	2.0	1.1	1.4	2.0	1.0	2.1
Idaho	9.5	9.5	12.8	27.1	33.5	30.3	20.8	12.4	19.1	3.8	3.5	4.3	2.3	1.3	1.4
Illinois	15.1	12.2	6.7	8.7	5.2	5.6	6.4	7.2	6.8	7.0	5.6	3.5	2.1	1.5	1.2
Indiana	4.6	8.9	14.1	11.3	6.3	3.3	6.3	5.6	2.9	1.8	2.2	1.7	0.8	1.2	1.0
Iowa	10.1	1.7	1.9	2.1	2.3	3.8	11.7	17.2	14.0	5.6	2.3	1.2	2.2	1.4	1.7
Kansas	10.9	3.6	5.6	3.1	4.3	6.3	15.1	10.0	4.1	2.5	4.1	6.7	2.6	1.0	0.8
Kentucky	2.5	1.9	3.7	3.7	5.8	1.1	1.4	2.0	0.8	1.7	1.6	3.6	1.1	0.9	0.7
Louisiana	5.3	3.5	5.5	2.5	3.9	4.5	6.0	6.1	4.0	4.9	2.4	1.9	2.0	1.1	1.1
Maine	0.9	1.7	2.3	1.1	2.0	2.4	2.3	5.3	1.6	2.2	1.7	0.9	0.6	1.6	1.3
Maryland	19.8	5.6	5.2	3.2	4.0	4.4	5.1	3.7	8.1	5.9	4.0	5.5	5.5	3.2	1.9
Massachusetts	6.6	4.8	4.9	3.5	1.9	2.7	3.8	4.2	2.1	2.3	2.2	5.9	2.2	3.4	10.3
Michigan	4.1	3.1	1.6	2.2	3.7	3.8	5.2	14.0	21.7	12.7	4.9	3.3	2.2	2.0	1.4
Minnesota	7.4	10.9	19.8	11.0	5.7	4.3	3.8	5.2	3.1	2.7	3.7	0.9	1.1	1.0	1.1
Mississippi	1.8	1.3	1.6	2.3	2.9	8.3	8.3	3.5	2.5	4.6	5.0	1.3	2.2	0.6	0.8
Missouri	12.1	12.7	28.9	27.5	11.7	25.1	26.3	21.3	11.7	13.0	4.6	1.6	1.5	1.0	0.6
Montana	19.9	10.2	10.6	9.2	2.9	19.9	14.8	8.1	10.9	2.0	0.8	1.8	1.4	0.9	0.8
Nebraska	6.6	15.5	16.6	12.1	7.5	4.0	9.5	6.8	1.6	3.2	2.2	2.2	1.1	0.8	0.7
Nevada	26.3	24.2	8.3	12.6	17.4	21.9	28.1	26.1	13.0	8.1	4.5	3.3	2.5	2.3	0.7
New Hampshire	0.8	2.7	2.9	1.6	1.5	1.1	1.9	3.0	1.6	1.5	1.5	1.4	0.9	1.5	2.1
New Jersey	5.6	4.2	4.0	3.7	3.9	3.9	4.9	3.9	4.2	1.9	3.4	3.3	2.2	2.4	2.2
New Mexico	71.1	44.7	21.7	24.8	66.5	48.0	20.8	20.4	8.9	3.2	3.8	2.2	1.7	1.3	1.3
New York	11.5	10.6	6.8	6.5	8.2	8.4	5.8	7.2	5.3	3.8	4.2	4.1	3.3	3.1	2.4
North Carolina	9.7	2.4	1.6	1.4	2.1	1.5	2.8	2.8	1.7	2.2	1.9	3.0	2.5	1.5	1.2
North Dakota	5.2	10.4	22.5	12.6	0.9	3.6	21.8	2.2	0.6	0.5	0.6	0.5	0.6	0.3	0.3
Ohio	2.7	3.3	4.1	3.1	10.8	15.8	7.0	3.0	3.5	5.8	2.3	2.3	2.6	1.5	0.4
Oklahoma	19.3	9.0	6.8	6.6	12.9	43.7	78.6	43.6	20.0	15.9	7.9	3.3	1.5	0.8	0.6
Oregon	29.0	15.3	18.5	17.5	40.2	86.7	27.4	11.6	13.3	7.6	5.0	3.0	1.8	1.7	1.5
Pennsylvania	15.0	3.6	2.1	1.5	1.8	2.1	4.5	4.2	3.5	3.0	3.6	2.5	2.4	8.2	1.2
Rhode Island	5.2	11.4	17.0	7.7	3.0	3.5	2.6	13.3	1.8	3.5	3.0	7.1	3.2	1.6	2.2
South Carolina	1.3	1.2	0.6	0.5	1.1	1.2	1.5	2.9	1.4	1.2	2.4	2.1	1.6	1.3	0.9
South Dakota	70.8	119.3	30.3	2.5	5.4	13.6	5.9	3.7	5.5	1.4	0.4	0.4	0.4		0.5
Tennessee	4.4	3.2	2.3	2.0	6.7	37.2	14.6	7.8	4.3	2.7	2.7	3.3	2.1	3.5	1.6
Texas	16.0	15.4	10.4	15.5	15.7	16.1	18.2	23.3	17.9	12.6	9.2	2.6	3.9	2.8	2.8
Utah	35.3	16.2	38.2	44.1	39.1	35.2	53.1	26.6	9.3	3.0	3.2	2.9	2.4	1.7	1.5
Vermont	1.1	4.2	2.5	1.6	2.4	1.4	2.0	2.5	2.9	4.0	1.6	2.6	0.6	1.0	1.3
Virginia	4.9	3.0	2.6	2.4	3.0	3.6	3.3	3.7	3.3	2.7	2.3	2.3	2.2	1.9	1.9
Washington	28.1	12.1	16.8	17.6	21.0	17.3	18.2	18.1	18.2	8.8	5.0	3.1	2.7	1.2	1.1
West Virginia	1.3	1.2	0.6	1.6	1.3	1.3	1.0	0.7	0.5	2.6	3.1	1.6	1.3	2.1	0.3
Wisconsin	9.8	15.8	18.7	10.0	4.8	3.6	3.8	3.6	3.6	1.5	2.0	1.6	3.6	0.8	2.2
Wyoming	16.1	29.5	3.0	3.6	8.6	23.0	8.5	7.3	7.7	1.9	0.8	1.4	0.6	0.4	1.0

Table 4: Incidence per 100,000 of acute hepatitis B, by state and year, United States

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Alabama	4.1	4.2	3.3	2.6	2.1	2.7	1.8	1.9	1.7	2.0	1.6	2.0	2.3	2.1	1.8
Alaska	10.5	7.2	3.6	2.5	2.2	2.2	2.6	2.5	2.1	2.9	2.1	1.6	1.9	1.2	1.7
Arizona	13.2	4.7	5.1	2.4	2.5	2.8	5.3	4.4	4.0	2.9	4.2	3.1	4.6	5.1	5.0
Arkansas	5.2	6.5	4.5	3.7	2.4	3.3	3.7	4.2	4.5	3.8	4.1	4.0	4.4	3.3	4.3
California	9.8	8.6	9.2	6.0	6.5	5.5	5.4	5.1	4.4	3.7	3.2	2.5	1.8	1.9	1.4
Colorado	5.9	4.2	3.5	2.3	2.7	3.7	3.5	3.8	2.6	2.4	2.5	2.3	1.8	1.8	1.2
Connecticut	7.8	5.9	4.9	2.3	2.9	2.6	2.5	1.7	1.2	1.2	1.4	1.4	2.0	2.8	3.1
Delaware	14.6	7.9	30.3	2.6	2.0	1.3	1.2	1.0	0.5	0.1	1.9	3.6	1.7	1.7	6.4
District of	21.4	26.5	14.6	7.5	9.4	3.8	5.9	5.7	3.6	4.8	6.1	2.3	3.9	2.3	3.4
Florida	7.4	7.2	6.9	6.2	5.4	4.7	4.6	4.4	3.5	3.9	3.8	3.1	3.3	3.7	2.9
Georgia	8.3	8.9	4.7	9.7	7.9	1.4	0.8	3.0	2.7	3.0	4.3	5.2	5.7	7.7	1.2
Hawaii	9.5	4.4	1.6	1.9	2.4	2.7	1.2	0.9	1.5	1.3	1.0	1.8	1.0	2.2	0.9
Idaho	9.1	7.0	7.9	8.1	6.8	8.8	7.4	4.5	4.0	2.3	0.8	0.8	0.5	0.6	1.0
Illinois	5.2	3.6	3.4	2.9	2.7	2.5	2.8	2.4	1.9	1.7	1.4	1.7	1.5	1.0	0.9
Indiana	6.6	4.2	4.0	4.4	3.7	4.2	2.5	1.7	2.0	1.3	1.4	1.2	1.4	1.1	1.3
Iowa	1.9	1.5	1.2	1.3	1.0	1.6	2.6	1.5	1.9	1.5	1.3	0.8	0.7	0.6	0.6
Kansas	5.6	2.4	2.6	2.6	1.2	2.0	1.2	1.2	1.1	0.6	1.0	0.5	0.9	0.7	0.7
Kentucky	12.6	5.2	2.9	2.6	2.0	1.8	2.0	1.1	1.2	1.3	2.0	1.6	1.6	2.3	2.1
Louisiana	8.9	9.1	6.1	6.3	4.7	5.6	4.8	4.8	5.0	3.9	3.5	2.8	3.0	2.6	1.5
Maine	2.4	2.6	2.2	0.9	0.9	1.0	0.6	0.5	0.4	0.2	0.4	0.5	1.1	0.5	0.9
Maryland	11.8	8.0	8.2	5.4	7.1	5.2	3.3	3.4	2.8	2.9	2.5	2.6	2.4	2.4	2.8
Massachusetts	10.7	9.1	6.4	3.6	3.3	1.9	1.8	1.3	1.3	0.7	0.2	0.6	2.6	3.3	3.1
Michigan	6.9	6.5	6.2	4.1	4.5	4.1	4.3	4.7	4.8	5.2	4.3	6.2	3.3	2.2	2.4
Minnesota	2.8	2.3	2.1	2.1	1.8	2.0	2.0	1.3	1.5	1.7	1.2	0.9	1.0	1.1	1.3
Mississippi	4.8	2.9	13.1	14.8			9.0	6.6	3.4	4.7	3.9	3.3	3.2	3.9	3.5
Missouri	12.3	10.6	10.3	11.2	10.2	8.2	6.1	6.7	4.6	4.2	2.7	2.3	2.1	4.3	2.5
Montana	9.4	8.7	4.9	3.3	2.5	2.8	2.4	1.4	0.9	2.4	0.9	0.3	1.1	1.7	1.5
Nebraska	2.1	2.5	2.8	1.2	1.9	2.4	2.4	1.6	1.4	1.3	2.6	2.0	1.8	1.8	2.5
Nevada	24.3	15.0	8.0	5.4	4.1	4.3	6.0	4.8	4.6	3.3	2.7	2.5	3.3	3.9	3.3
New Hampshire	3.7	3.0	4.5	2.4	2.5	2.0	1.8	1.5	1.8	1.4	1.5	1.3	2.0	1.9	3.3
New Jersey	7.0	6.3	6.5	5.2	5.2	4.6	3.5	3.1	2.5	1.7	2.1	3.4	4.0	2.1	2.5
New Mexico	15.5	13.3	13.2	13.3	13.2	19.1	24.4	14.9	17.9	12.4	7.9	7.4	7.9	1.9	1.1
New York	7.6	5.3	5.3	4.5	5.2	5.2	4.7	4.5	3.8	2.7	3.7	4.3	4.6	1.6	1.3
North Carolina	16.4	8.3	6.3	4.5	4.1	4.3	4.6	3.6	3.2	2.9	3.2	2.7	2.8	1.9	2.1
North Dakota	1.3	0.3	0.6	0.2	0.2	0.8	0.3	1.1	0.6	0.3	0.5	0.3	1.3	0.3	0.6
Ohio	3.6	3.7	2.1	1.7	1.5	1.0	1.1	0.8	0.7	0.8	0.9	0.8	1.0	1.4	1.0
Oklahoma	5.8	6.5	5.9	6.0	4.3	5.3	1.7	2.0	5.2	5.5	5.2	3.3	3.2	2.2	2.3
Oregon	14.7	10.6	10.3	7.3	5.1	4.1	4.0	3.7	6.1	3.5	3.6	4.8	3.6	3.4	3.1
Pennsylvania	6.2	4.2	4.1	3.0	3.4	2.4	2.4	2.9	3.0	2.4	2.2	2.7	2.8	2.4	2.4
Rhode Island	5.3	2.8	2.0	1.9	0.8	1.0	1.9	2.2	7.6	4.3	4.4	3.1	3.4	2.0	0.6
South Carolina	17.8	18.7	1.5	1.4	0.9	1.5	2.7	2.6	1.7	1.6	0.6	1.8	3.3	4.8	3.5
South Dakota	1.1	1.3	0.7		0.6	0.3	0.7	0.1	0.5	0.1	0.3	0.1	0.4	0.5	0.1
Tennessee	17.7	19.1	21.0	22.7	20.2	12.3	9.7	8.4	5.4	3.8	4.2	4.8	2.5	3.9	3.7
Texas	10.5	11.3	8.7	7.5	7.8	6.5	6.6	6.4	9.9	4.3	5.1	3.3	5.1	4.4	3.1
Utah	6.4	2.5	1.6	3.7	5.0	3.8	6.4	4.5	3.1	1.8	1.6	1.1	2.3	2.2	2.1
Vermont	9.0	3.4	3.0	1.7	2.1	1.2	2.4	1.9	1.7	0.8	1.0	0.8	1.1	0.6	1.0
Virginia	4.5	3.5	3.0	2.4	2.2	1.8	2.4	2.0	1.6	1.5	2.4	3.0	3.1	3.1	4.1
Washington	12.6	9.4	7.7	4.7	4.8	4.2	2.9	2.1	2.4	1.9	2.2	2.9	1.4	1.5	1.0
West Virginia	4.9	3.6	3.0	2.4	2.6	2.9	2.0	0.9	0.8	1.6	1.7	1.9	1.4	2.4	2.9
Wisconsin	9.1	9.7	9.6	6.3	1.9	1.6	1.7	10.9	9.8	0.6	0.8	0.9	0.9	0.9	0.7
Wyoming	5.1	7.2	4.7	7.2	5.1	6.9	9.4	5.2	2.3	2.9	0.6	0.6	3.4	6.2	1.8

Table 5: Incidence per 100,000 of acute hepatitis C, by state and year, United States

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Alabama	0.6	0.6	0.4	0.1	0.5	0.1	0.2	0.3	0.1	0.0	0.2	0.1	0.2	0.1	0.1
Alaska	1.6	2.3	1.2	2.0		0.5	0.5								
Arizona	2.0	0.5	0.9	0.3	0.7	1.4	1.7	0.6	0.4	1.0	0.4	0.2	0.1	0.1	0.0
Arkansas	0.8	0.2	0.2	0.2	0.3	0.3	0.3	0.6	1.2	1.2	0.4	0.6	0.4	0.1	0.1
California	2.1	1.3	3.4	1.8	1.8	1.6	1.5	2.7	2.6	0.6	0.3	0.3	0.2	0.1	0.1
Colorado	1.6	2.7	2.9	1.7	2.2	1.8	1.7	1.0	0.8	0.9	0.4	0.2	0.1	0.3	0.3
Connecticut	0.3	0.1													0.1
Delaware	1.3	0.7	29.6	0.1	0.3		0.1				0.3	1.4			5.4
District of	1.3	40.8	47.6	0.5	0.4					0.2	0.5				0.7
Florida	0.6	0.7	1.4	0.3	0.7	0.9	0.9	1.0	0.7	0.5	0.3	0.4	0.5	0.4	0.2
Georgia	0.2	1.5	2.0	6.5	3.1	0.4			0.1	0.1	0.0		0.7	0.1	0.2
Hawaii	1.7	1.6	14.8	0.3	0.4	10.5	18.3	15.3	4.5		0.2		0.1	0.3	0.2
Idaho	0.8	0.6			6.3	5.0	8.3	7.1	7.1	0.6	0.2	0.2	0.1	0.1	0.1
Illinois	0.7	0.9	1.0	0.9	0.7	0.7	0.8	0.7	0.3	0.4	0.2	0.1	0.2	0.2	0.1
Indiana	0.6	5.7	0.5	0.3	0.2	0.2	0.1	0.2	0.1	0.1		0.0	0.0	0.2	0.2
Iowa	0.5	0.4	0.2	0.3	0.5	0.5	1.9	1.0	0.3		0.1		0.0	0.0	
Kansas	1.6	0.8	0.6	0.7	0.7	0.7	0.6	0.5	0.2		0.3	0.3			
Kentucky	1.1	0.2	0.2	0.4	0.8	0.9	0.7	0.4	0.6	0.7	1.0	0.3	0.1	0.6	0.7
Louisiana	0.1	2.4	3.0	4.2	5.0	5.1	6.7	6.3	3.1	6.9	10.2	3.4	2.2	2.3	0.1
Maine	0.4	0.4	0.5	0.2						0.2	0.2	0.1		0.2	
Maryland	0.9	1.0	0.7	0.8	0.4	0.1	0.1	0.2	0.4	0.4	0.3	0.2	0.3	0.2	0.3
Massachusetts	0.4	0.5	0.9	1.3	2.0	1.7	1.2	0.8	0.8	0.1	0.3	0.4	0.1		0.1
Michigan	0.5	1.5	5.1	4.2	2.1	2.5	3.6	4.0	4.8	8.3	2.0	1.4	0.9	1.0	0.8
Minnesota	0.8	0.4	0.6	0.3	0.4	0.1	0.2	0.1	0.4	0.5	0.3	0.7	0.3	0.5	0.4
Mississippi	0.6	0.4	0.0	0.4			5.6	4.1	3.0	7.1	10.7	3.8	3.2	1.5	1.0
Missouri	0.8	0.7	0.5	0.5	0.6	0.4	0.4	0.2	0.3	5.8	10.8	19.8	10.8	4.5	0.1
Montana	0.9	4.1	3.4	0.4	1.5	2.1	2.3	2.7	0.9	0.6	0.6	0.1	0.1	0.4	0.2
Nebraska	0.3	0.1	5.6	0.7	0.9	1.4	0.5	0.2	0.3	0.2	0.3	0.6	0.9	0.2	0.1
Nevada	2.6	2.4	1.1	1.4	1.4	1.7	1.3	1.1	1.1	0.6	0.9	0.6	1.4	1.2	0.7
New Hampshire	0.8	0.8	2.2	0.7	1.0	1.2	0.6								
New Jersey	0.6	1.4	1.2	1.2	2.7	2.4					6.7	14.3	0.1		
New Mexico	1.8	1.6	3.4	6.6	2.7	3.2	4.5	3.5	5.6	2.0	0.9	0.7	0.2		0.4
New York	0.7	1.4	1.1	1.4	1.3	1.9	1.5	1.5	0.7	0.4	0.2	0.2	0.3	0.1	0.1
North Carolina	2.2	1.7	1.3	1.2	0.8	0.9	0.6	0.7	0.3	0.4	0.2	0.3	0.3	0.2	0.1
North Dakota	0.3	0.8	0.6	0.5	0.2	1.1		0.6		0.2	0.2				0.8
Ohio	0.9	1.5	0.9	0.3	0.2	0.1	0.3	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.1
Oklahoma	0.9	1.5	1.5	1.5	1.9	1.7	0.2	0.3	0.7	0.5	0.5	0.2	0.6	0.2	0.2
Oregon	2.1	4.5	2.9	1.8	1.5	1.2	0.3	0.1	0.6	0.7	0.8	0.4	0.4	0.4	0.3
Pennsylvania	0.7	0.4	0.3	0.3	0.4	0.5	0.5	0.7	1.0	0.6	0.4	1.2	0.5	0.9	0.5
Rhode Island		1.2	0.7	1.3	2.0	0.8	0.6	0.8	0.4	0.3	0.7		0.1	0.1	
South Carolina	0.4	1.1	0.0	0.1	0.3	0.6	0.9	1.1	0.5	0.6	0.1	0.3	0.1	0.6	0.1
South Dakota	0.6	0.1				0.1							0.1		
Tennessee	3.1	9.7	25.2	19.5	17.3	18.8	7.5	4.5	3.2	2.2	2.0	1.2	0.5	0.4	0.6
Texas	0.9	0.8	1.6	2.3	1.7	1.9	1.1	2.0	2.3	1.8	1.3	2.3	1.3	0.2	0.5
Utah	1.6	1.4	2.0	2.2	0.9	0.7	0.9	0.2	1.0	0.3	0.6	0.1	0.2		0.3
Vermont	1.4	1.2	3.0	1.0	2.8	2.4	4.4	0.7	1.0	1.2	0.8	1.1	2.4	2.1	1.3
Virginia	0.7	0.6	0.8	0.8	0.4	0.3	0.3	0.4	0.2	0.2	0.0	0.0	0.2	0.2	0.2
Washington	2.9	3.3	3.6	4.2	5.5	4.3	1.2	0.7	0.5	0.4	0.7	0.5	0.4	0.3	0.4
West Virginia	0.2	0.2	0.4	2.4	2.6	2.4	0.5	1.0	0.5	1.2	1.3	1.4	0.2	1.1	1.3
Wisconsin	0.3	2.0	2.0	0.8				0.5	2.8	0.3			0.1	0.1	
Wyoming	1.1	1.7	14.2	25.4	37.3	46.6	37.3	17.3	21.2	18.3	0.4	1.6	1.0		0.4

Acute Hepatitis A, 2004

Summary

With an average of 28,000 cases per year (range: 23,112-35,821) during 1987-1997, hepatitis A has historically been one of the most frequently notifiable diseases in the United States. However, effective vaccines to prevent hepatitis A virus (HAV) infection have been available in the U.S. since 1995 for use in individuals at least two years of age. These vaccines have provided the opportunity to substantially reduce disease incidence and potentially eliminate transmission.

Since 1996, hepatitis A vaccine has been recommended for individuals at increased risk of hepatitis A including international travelers, men who have sex with men, and injecting and non-injecting drug users¹. In 1999, routine vaccination was also recommended for children living in 11 states, ten of which are in the western region, with average hepatitis A rates during 1987-1997 that were at least 20/100,000 and was suggested for children in an additional six states where rates were less than 20/100,000 but above 10/100,000 which was approximately the national average for the time period².

Hepatitis A rates have declined steadily each year since the issuance of these recommendations, with the most dramatic decreases occurring in the age groups and regions for which routine childhood vaccination is recommended, suggesting that this strategy is reducing the transmission of HAV in the United States. The overall rate in 2004 is the lowest recorded. The declines in rates that have been observed in recent years have also been accompanied by substantial shifts in the epidemiologic profile of this disease in the United States, with an increasing proportion of cases occurring among adults, particularly those in high risk populations such as international travelers and men who have sex with men. In 2005, the minimum age for which hepatitis A vaccine is licensed was reduced by the Food and Drug Administration from 24 months of age to 12 months of age, facilitating integration of hepatitis A vaccine into the schedule of routine childhood immunizations. In October 2005, the recommendations were expanded to include routine vaccination of all children 12-23 months of age nationwide³. It is anticipated that implementation of these expanded recommendations will help sustain or perhaps even further reduce incidence rates.

- Historically, hepatitis A rates have varied cyclically with periodic nationwide increases. The national rate of hepatitis A has declined steadily since the last peak that occurred in 1995. With 5683 acute symptomatic cases reported for the year 2004, the national incidence of hepatitis A is the lowest recorded (1.9/100,000). When asymptomatic infection and underreporting are taken into account, there were an estimated 56,000 new infections in 2004. [Figure 3](#)
- In addition to temporal variation, hepatitis A rates have consistently varied geographically with higher rates in the West than elsewhere in the country. Following the 1999 issuance of recommendations for routine childhood vaccination that focused on states with consistently elevated rates of hepatitis A, incidence rates in the West have declined steadily and since 2001 have been approximately equal to those in other regions of the U.S. [Figure 4](#), [Figure 5](#).
- Incidence of hepatitis A varies by age. Since the last nationwide increase, rates have declined among all age groups but the greatest decreases have been among children. Historically, the highest rates have been among children and young adults with the lowest rates observed among persons greater than 40 years of age. However, since 1997, rates among children have declined more rapidly than among adults and in 2004 rates were similar across all age groups ranging from a low of 1.5/100,000 among children <5 years of age to 2.2/100,000 among persons 5-14 years old. [Figure 6](#) Children <5 years of age have had the lowest rates since 2001 but asymptomatic infection is common among very young children and cases in children <5 years old represent only a small proportion of infections occurring in this age group. The low and relatively stable rates among persons 40+ years of age in large part reflect the higher proportion of persons in this age group with immunity due to previous infection; data from the Third National Health and Nutrition Examination Survey (NHANES III) conducted during 1988-1994⁴ indicated that approximately one third of the U.S. population had serologic evidence of immunity to HAV, reaching a high of 75% among persons ≥ 70 years of age. Investigations of an increased number of cases reported recently among the oldest age groups (60+ years of age) indicate that many of the reports of cases in this age group, although positive for IgM anti-HAV, do not represent acute hepatitis A; these false positive results are not believed to be due to poor performance of the assay for IgM anti-HAV, which is highly specific and highly sensitive when used in persons with symptoms of acute hepatitis, but rather, is a reflection of increased and

largely inappropriate use of testing in individuals without signs or symptoms of clinical hepatitis.⁵

- Rates of hepatitis A have historically been higher among males than females and during the late 1990s through 2001, the difference in the gender-specific rates increased until there were almost 2 male cases for each female case. However, since 2001, rates have declined more in males than females and rates are similar for both genders (2.1/100,000 for males vs. 1.8/100,000 for females) except in the 35-44 year age group where an excess number of cases among males persists. [Figure 7](#) , [Figure 8](#)
- Historically, hepatitis A rates have differed by race with the highest rates among American Indian/Alaska Natives and the lowest rates among Asians, and by ethnicity with higher rates among Hispanics than non-Hispanics. However, rates among American Indians, which were greater than 60/100,000 prior to 1995, have decreased dramatically following widespread vaccination in this group, and since 2001, have been approximately the same or lower than those of other races. Rates among Hispanics have also decreased since 1997 but remain higher than those for Non-Hispanics. [Figure 9](#) The increase in rates in 2004 among Asians/Pacific Islanders reflects an outbreak in several U.S. states that occurred among refugee populations recently resettled from a single refugee camp in Thailand.
- Among cases where information about exposures during the incubation period was collected, the most frequently identified risk factor for hepatitis A in 2004 was international travel which was reported by 16% of cases overall and almost 40% of cases among children <15 years of age. Although the majority (59%) of these travel-related cases were, as in previous years, associated with travel to Central/South America including Mexico, there was an increase in the proportion of cases reporting travel to Asia/South Pacific (28%). This increase reflected a large outbreak occurring in several U.S. states among refugees recently resettled from a single camp in Thailand. As transmission of HAV within the U.S. has declined, cases in travelers to endemic countries have accounted for a steadily increasing proportion of all cases. The percentage of cases reporting sexual and household contact with another hepatitis A case, which has historically been among the most frequently identified risk factors, was smaller than in previous years (11%). The proportion (and the absolute number) of cases reporting male

homosexual behavior, which ranged from 14-23% during the years 1999-2002, declined for the second year in a row and in 2004, was reported by <3% of all cases (and approximately 5% of male cases). The proportion of cases in persons reporting illegal drug use, which ranged from 6-10% since 1997, increased to 13% in 2004. [Table 4](#), [Figure 10](#).

- The clinical characteristics of hepatitis A cases in 2004 are similar to previous years, with 72% of cases having jaundice, 33% requiring hospitalization for their illness and 0.6% resulting in death. The proportion of cases that were jaundiced was highest in persons 5-39 years of age (81%) and lower among children <5 years (44%) and persons who 60 years of age or more (46%). The proportion of cases hospitalized increased with age from 12% among children <5 years of age to 44% among persons 60 years of age or older. [Table 5](#)

Figure 3: Incidence of Hepatitis A, United States, 1982-2004

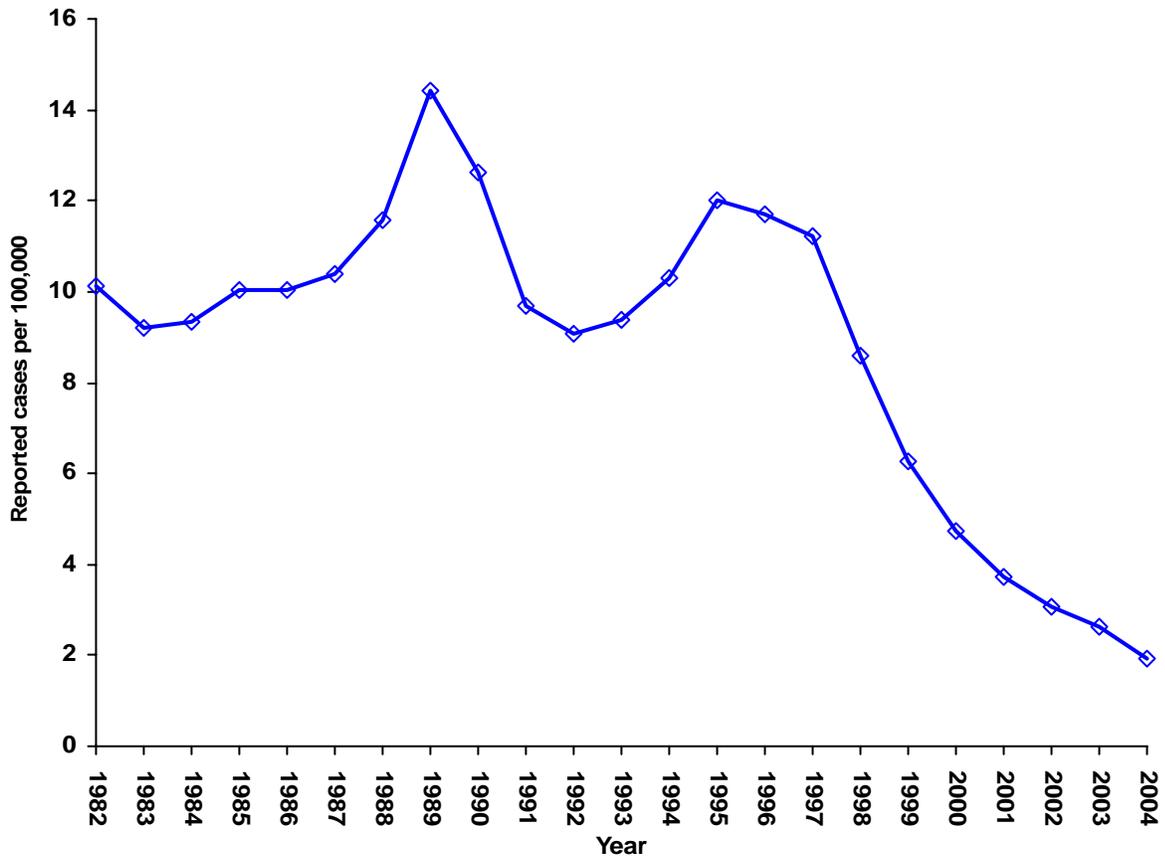
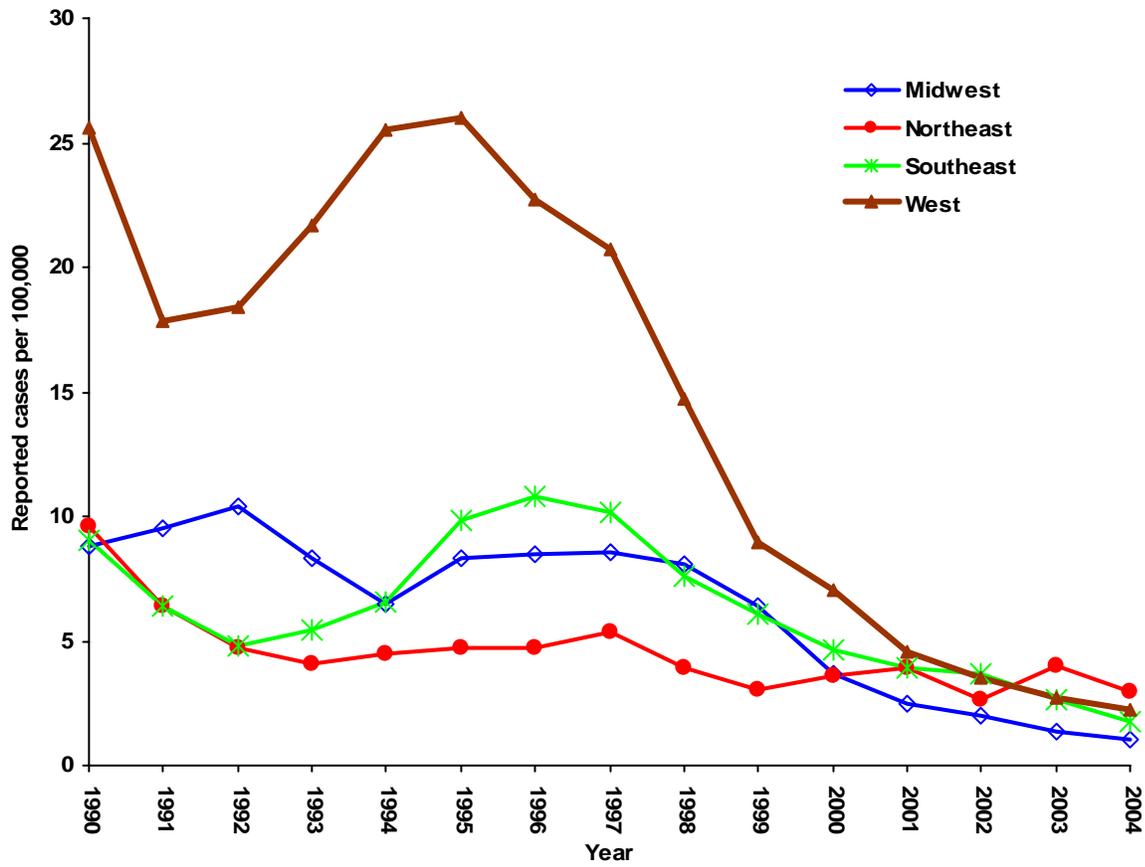
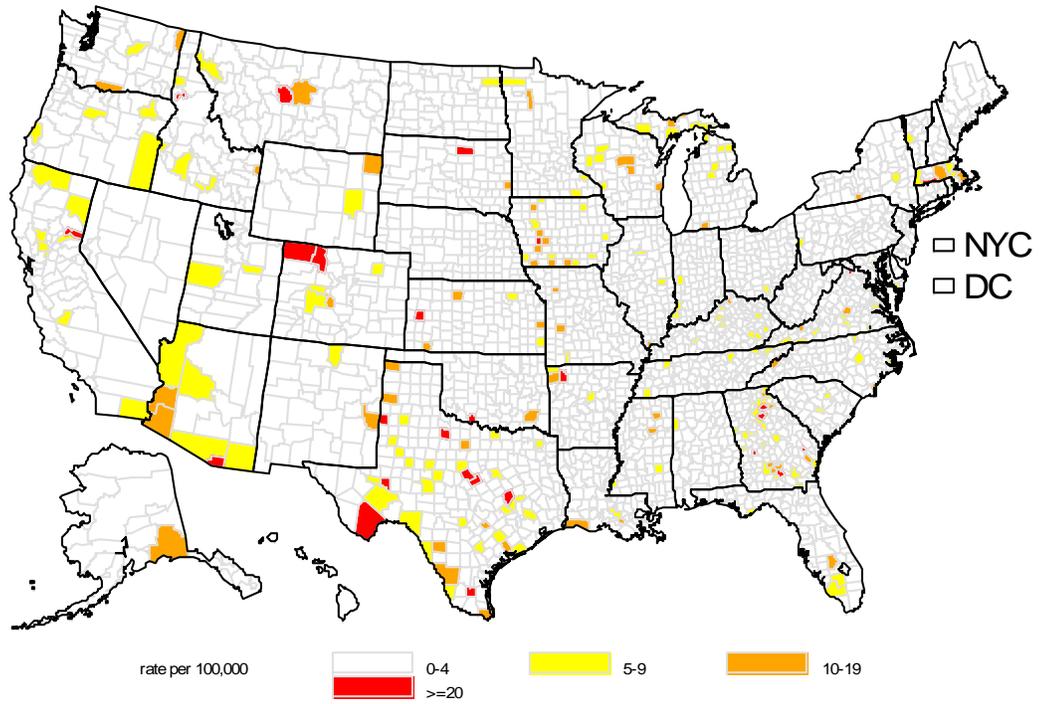


Figure 4: Incidence of Hepatitis A, by Region, United States, 1990-2004



See page 5 for regional categories

Figure 5: Incidence of Hepatitis A, by County, United States, 2004



Source: NNDSS

Figure 6: Incidence of Hepatitis A, by Age, United States, 1990-2004

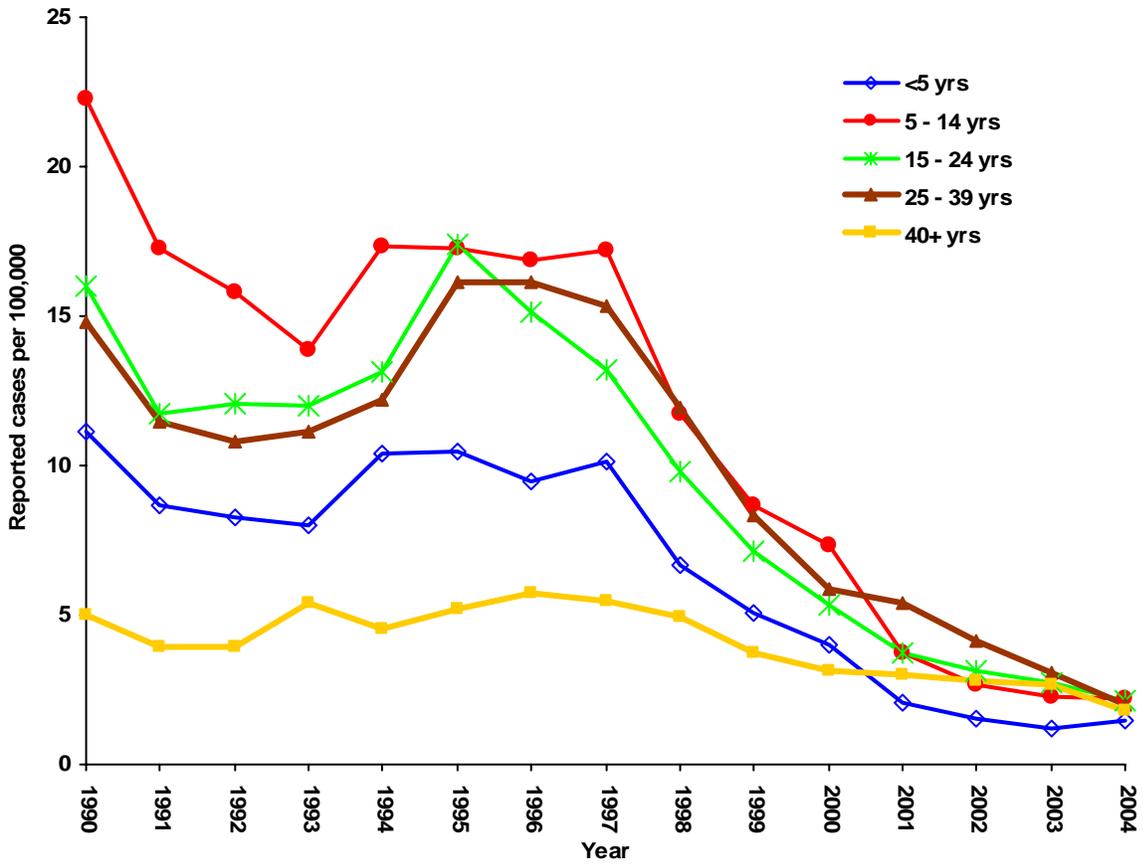
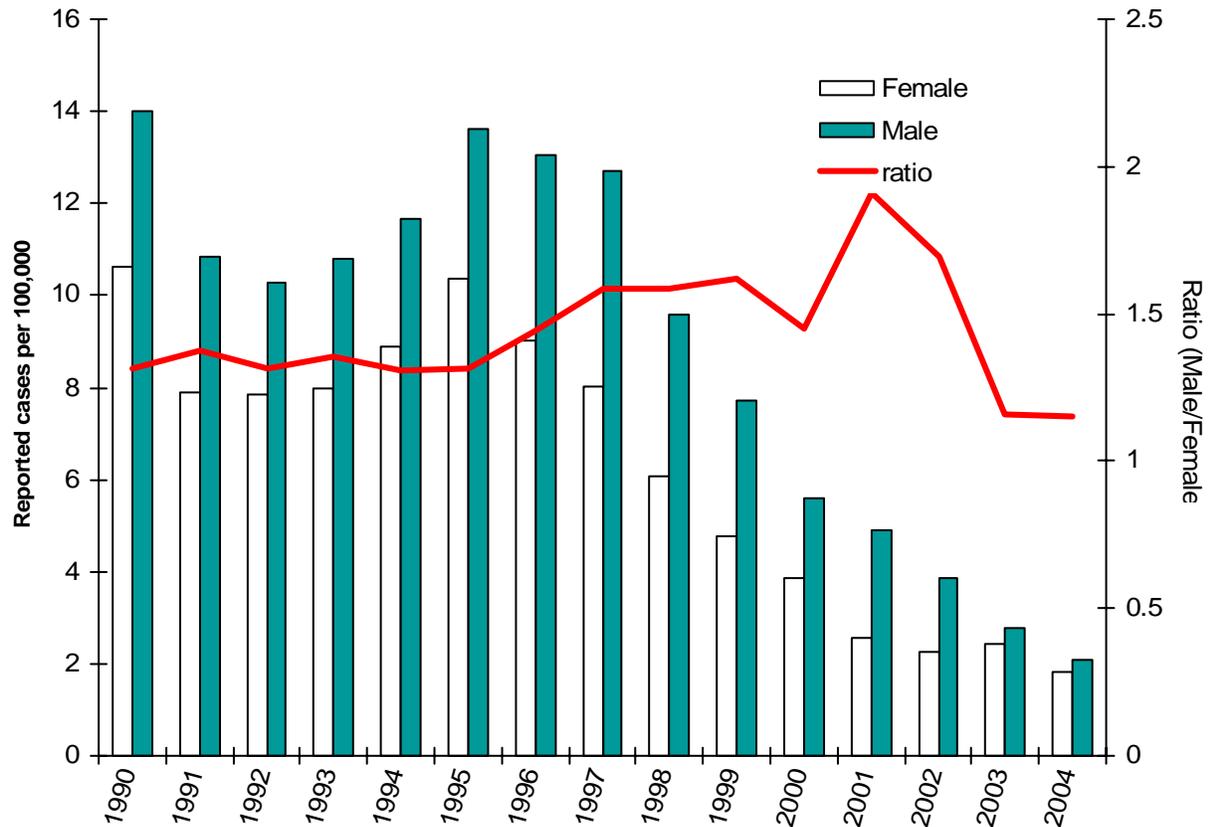
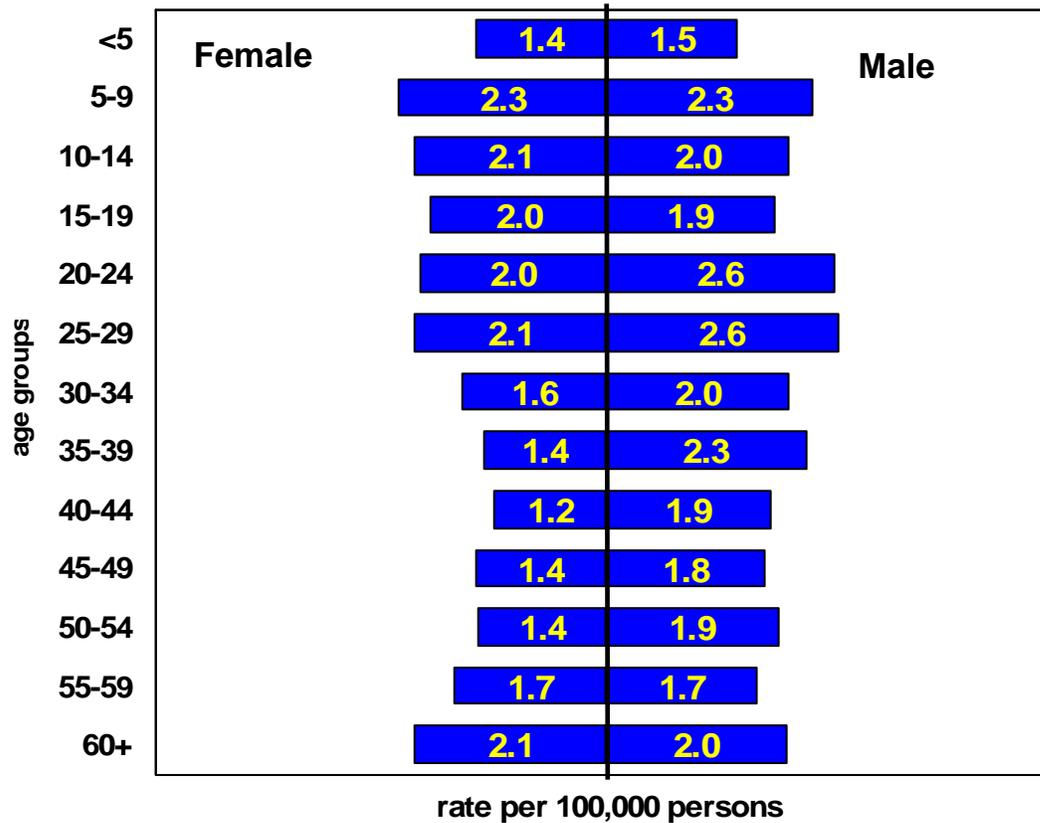


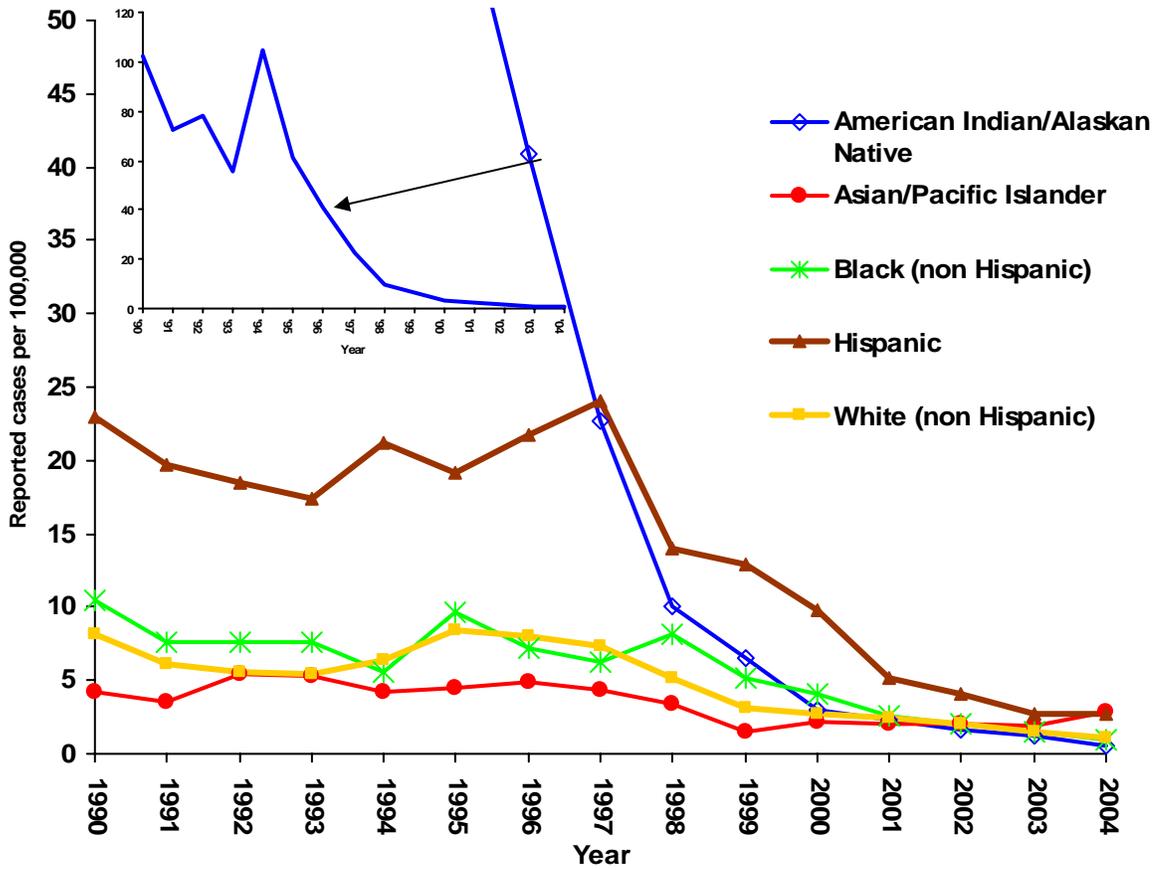
Figure 7: Incidence of Hepatitis A, by Sex, United States, 1990-2004

Note: The bars indicate the rate per 100,000 (the left y-axis) by gender; the line is the ratio (right y-axis) of the incidence rate among males to that among females

Figure 8: Incidence of Hepatitis A, by Age and Sex, United States, 2004

* A total of 5683 cases of hepatitis A were reported. Rates exclude patients with missing data for age or sex.

Figure 9: Incidence of Hepatitis A, by Race and Ethnicity, United States, 1990-2004



**Table 6: Epidemiologic Characteristics of Patients with Hepatitis A,
by Age, United States, 2004**

Exposures during the 2-6 weeks before illness onset	Age Groups											
	<15			15-39			40+			Total		
	n	N	%	n	N	%	n	N	%	n	N	%
Sexual or household contact with hepatitis A patient	71	413	17.2	93	777	12.0	47	734	6.4	211	1,924	11.0
International travel†	189	501	37.7	138	909	15.2	68	853	8.0	395	2,263	17.5
Male homosexual activity ‡	.	11	.	10	394	2.5	7	285	2.5	17	690	2.5
Injection drug use	5	392	1.3	180	772	23.3	43	633	6.8	228	1,797	12.7
Child/employee in day-care center	65	488	13.3	65	887	7.3	23	812	2.8	153	2,187	7.0
Suspected food- or waterborne outbreak	102	416	24.5	52	736	7.1	36	716	5.0	190	1,868	10.2
Contact of day-care child/employee	41	449	9.1	58	764	7.6	23	711	3.2	122	1,924	6.3
Other contact with hepatitis A patient¥	101	413	24.5	73	777	9.4	35	734	4.8	209	1,924	10.9
No risk factor identified	181	534	33.9	497	1,024	48.5	706	942	74.9	1,384	2,500	55.4
No risk factor data submitted	.	642	.	.	1,056	.	.	1,373	.	.	3,071	.
TOTAL	.	1,176	.	.	2,080	.	.	2,315	.	.	5,571	.

*During the 2 to 6 weeks prior to illness

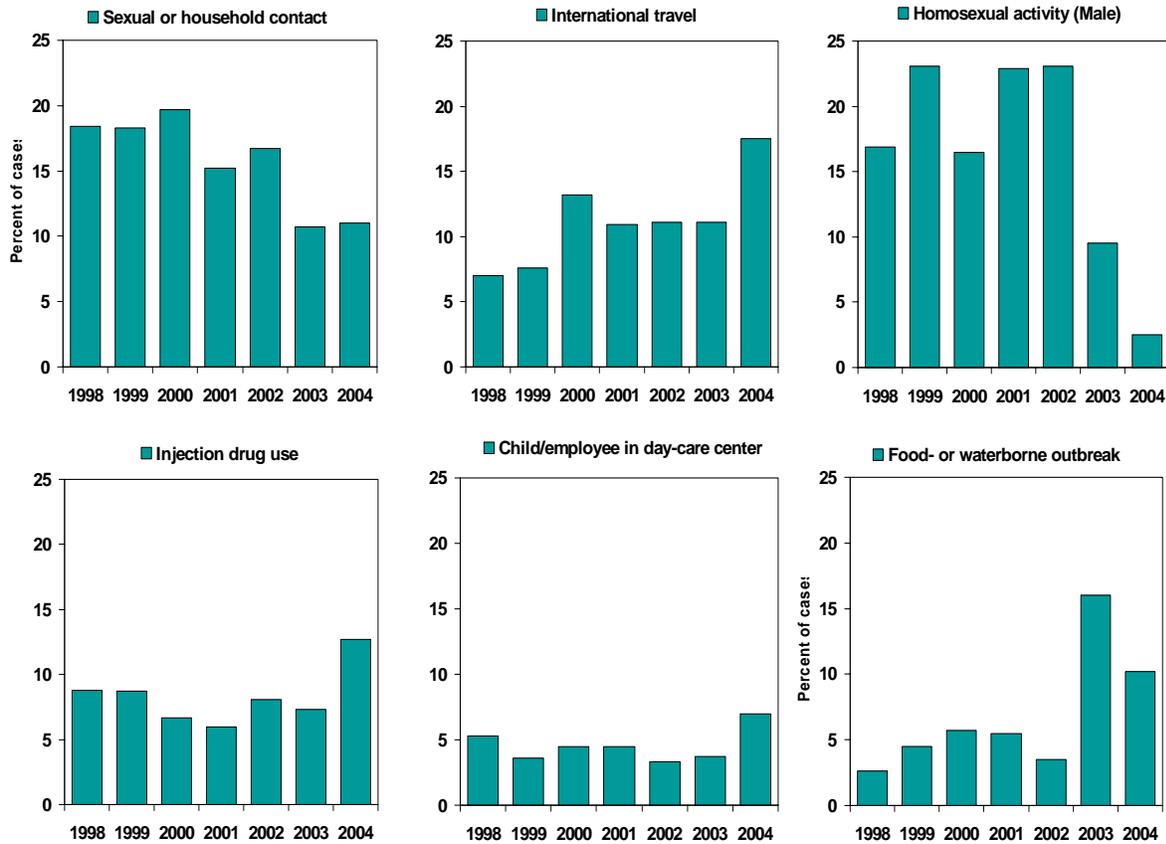
† Of cases attributed to travel to a region endemic for hepatitis A, 59% traveled from South/Central America, 28% from Asia/South Pacific, 4% from Africa and 9% from the Middle East. The high proportion of cases associated with travel from Asia/South Pacific reflects an outbreak in several U.S. states that occurred among refugee populations recently relocated from a single refugee camp in Thailand.

‡ Among male cases, 5% were attributed to homosexual behavior

¥ Examples of other contact include playmate, drug sharing contact, or care provider.

Note: The percentage of cases reporting a specific risk factor was calculated based on the total number of cases reporting any information for that exposure. Multiple risk factors can be reported for a single case.

Figure 10: Trends in Selected Epidemiologic Characteristics among Patients with Hepatitis A, by Year, United States, 1998-2004



Note: The percentage of cases reporting a specific risk factor was calculated based on the total number of cases reporting any information for that exposure. Multiple risk factors can be reported for a single case.

**Table 7 : Clinical Characteristics of Patients with Hepatitis A, By Age,
United States, 2004**

	<5			5-14			15-39			40-59			60+			All		
	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%
Died from Hepatitis	0	151	0.0	1	365	0.3	1	980	0.1	8	546	1.5	4	342	1.2	14	2,384	0.6
Hospitalized for Hepatitis	17	142	12.0	80	348	23.0	223	641	34.8	153	435	35.2	161	364	44.2	634	1,930	32.8
Jaundice	60	138	43.5	309	386	80.1	779	957	81.4	393	532	73.9	156	343	45.5	1,697	2,356	72.0

A total of 5,683 cases of hepatitis A including 14 deaths were reported. Percentages are calculated based upon the number of cases with non-missing data for age, and for outcome of interest (i.e. jaundice, hospitalization or death)

Acute Hepatitis B, 2004

Summary

Over the past 15 years, a comprehensive strategy has been developed and implemented for achieving the elimination of HBV transmission in the United States⁶. The primary elements of this strategy are: universal vaccination of infants beginning at birth; prevention of perinatal HBV infection through routine screening of all pregnant women for hepatitis B surface antigen (HBsAg) and the provision of immunoprophylaxis to infants born to HBsAg-positive women or to women of unknown HBsAg status; routine vaccination of previously unvaccinated children and adolescents; and vaccination of previously unvaccinated 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 multiple sex partners or a STD, men who have sex with men, and injecting drug users).

As highlighted below, the incidence of hepatitis B has declined dramatically since implementation of the strategy, particularly among the younger age groups covered by the recommendation for routine childhood immunization. However, high rates of disease continue among adults, particularly males 25-39 years of age, and the high proportion of cases occurring among persons in identified risk groups (i.e. injection drug users, men who have sex with men and persons with multiple sex partners) indicate a need to strengthen efforts to reach these populations with vaccine.

- With 6,212 acute, symptomatic cases reported nationwide, the overall incidence rate of acute hepatitis B in 2004 was 2.1/100,000. This rate is the lowest rate recorded and represents a decline of more than 80% since 1985 when incidence peaked at 11.5/100,000. From 1999 to 2003, rates declined relatively slowly (average 2% per year) but between 2003 and 2004, declined by approximately 19%. If asymptomatic infection and underreporting are taken into account, the number of cases reported is estimated to represent 60,000 new infections in 2004.

[Figure 11](#)

- For the past decade, hepatitis B rates have been similar for all U.S. regions with rates in the West and Southeast only slightly higher than in the Northeast and Midwest ([Figure 12](#), [Figure](#)

[13](#)). In 2004, rates were similar in the West, Midwest and Northeast but remained higher in the Southeast.

- Hepatitis B rates vary by age with the highest rates among persons 25-44 years of age (4.0/100,000 persons) and the lowest among persons less than 15 years of age (0.1/100,000). Rates have declined in all age groups with the greatest percent decline since 1990 occurring among children <15 years of age (95%) and young adults 15-24 years of age (87% decline). Although less dramatic than the declines in the younger age groups, most of which are covered by the recommendations for routine hepatitis B vaccination, there have also been substantial decreases in the hepatitis B rates among older persons with a 71% and 51% decrease in rates observed for 25-44 year olds and 45+ year old categories respectively. [Figure 14](#)
- As in previous years, the rate of acute hepatitis B in males (2.7/100,000) continues to be higher than in females (1.6/100,000). The ratio of cases occurring among males to those occurring among females increased gradually since 1990. In 2004, the rate in males was approximately 1.7 times higher than in females. (Figure 15). This difference in hepatitis B rates by sex occurs primarily in persons more than 19 years of age and is greatest in persons more than 35 years of age where the ratio of male/female cases is approximately 2.0. [Figure 15](#), [Figure 16](#)
- Rates of hepatitis B continue to decline among all racial and ethnic groups. [Figure 17](#) Rates of hepatitis B remain highest among non-Hispanic blacks (2.9/100,000) and are lowest (1.0/100,000) among Hispanics, whose rate dropped below that of non-Hispanic whites for the first time in 2003. The downward trend in the rate among Asians/Pacific Islanders continues and in 2004, the rate in this group is approximately the same as that among non-Hispanic whites.
- Among cases for which information about exposures during the incubation period was available, approximately one third of cases reported at least one sexual risk factor (10% sexual contact with a known hepatitis B case, 33% multiple sexual partners, and 12% male homosexual activity). Injecting drug use was reported by 16% of cases. Receiving hemodialysis or a blood transfusion, both of which historically were major sources of infection, are reported rarely by cases (0.5% and 0.6% of cases respectively) as a result of continued improvements in infection

control and the required screening of donated blood for markers of HBV infection. The percentage of cases reporting occupational exposure to blood continues to be low (approximately 0.5%) following ongoing hepatitis B vaccination of health care workers. [Table 6](#), [Figure 18](#)

- Among cases of hepatitis B cases reported in 2004, 76% had jaundice, 39% were hospitalized because of their illness and 0.5% resulted in death. The proportion of cases that was jaundiced ranged from a low of 38% among children <15 years of age to 78% among persons 15-39 years of age. The proportion of cases hospitalized increased with age from 17% among children <15 years of age to 42% among persons 60 years of age or older. [Table 7](#)

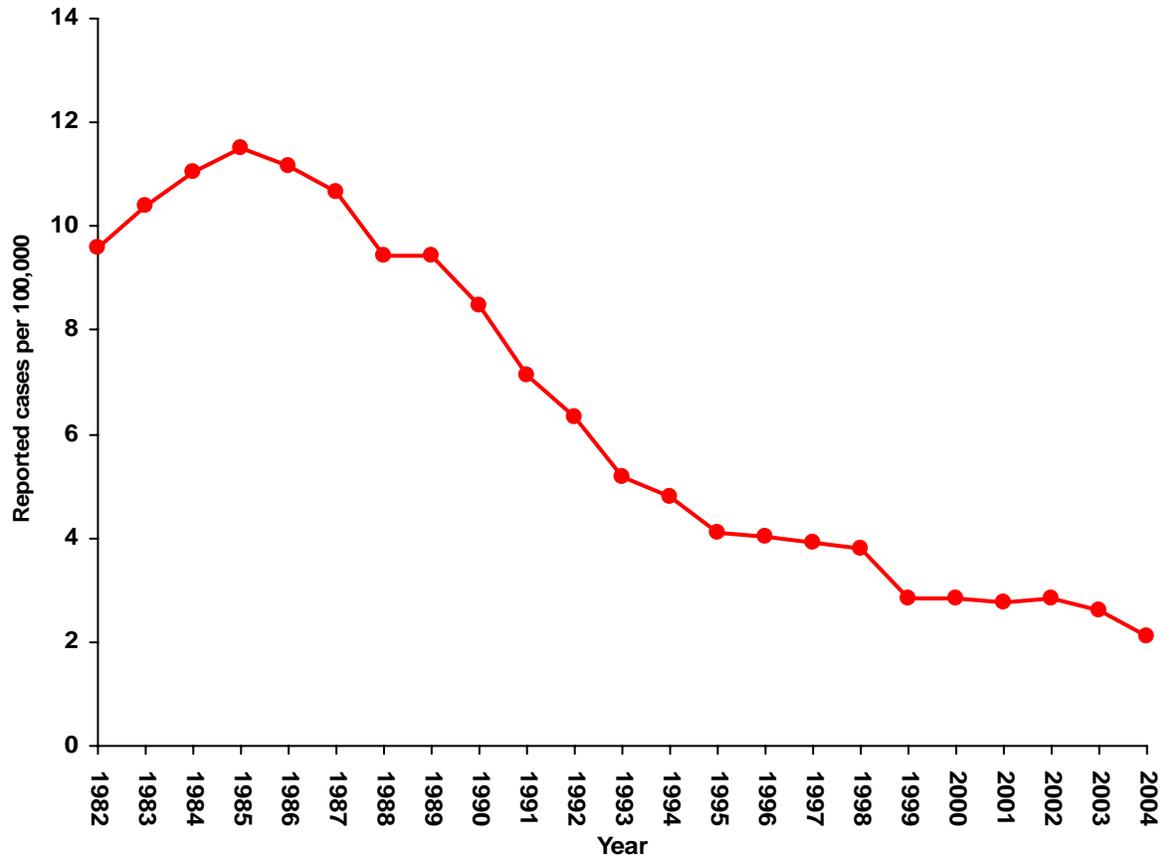
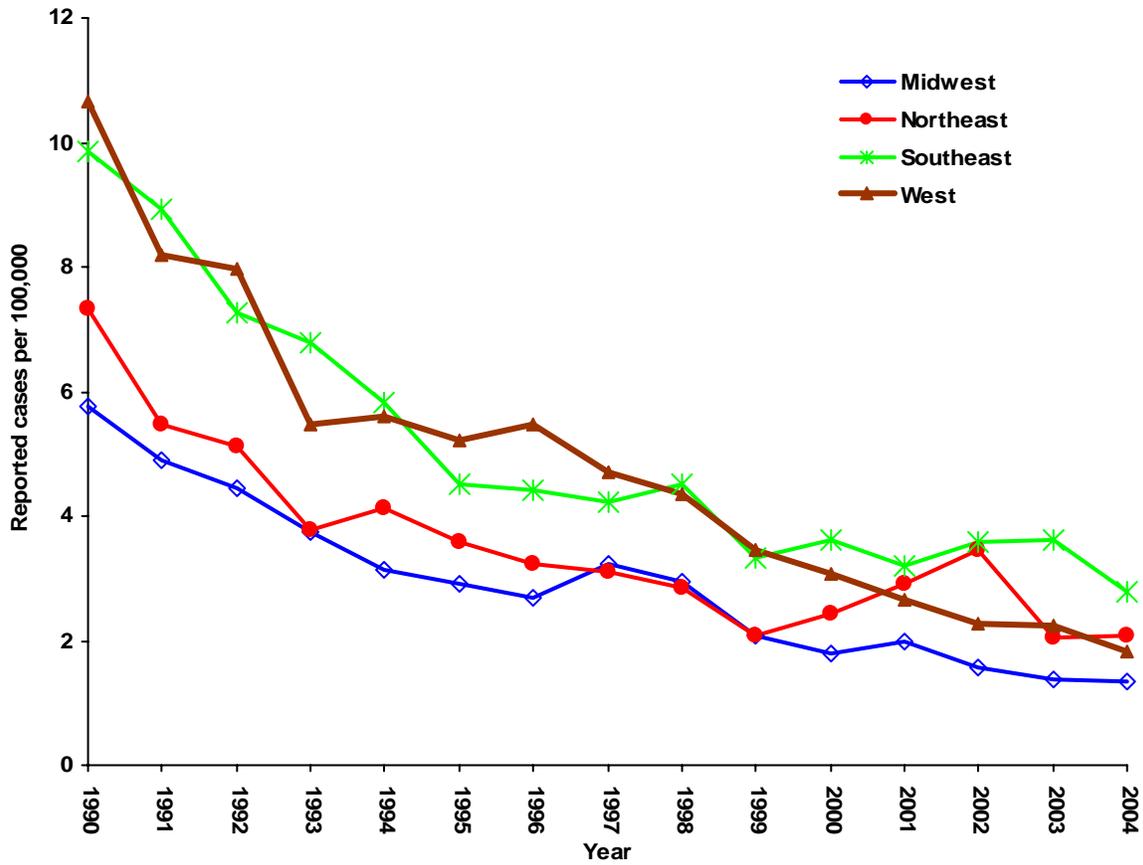
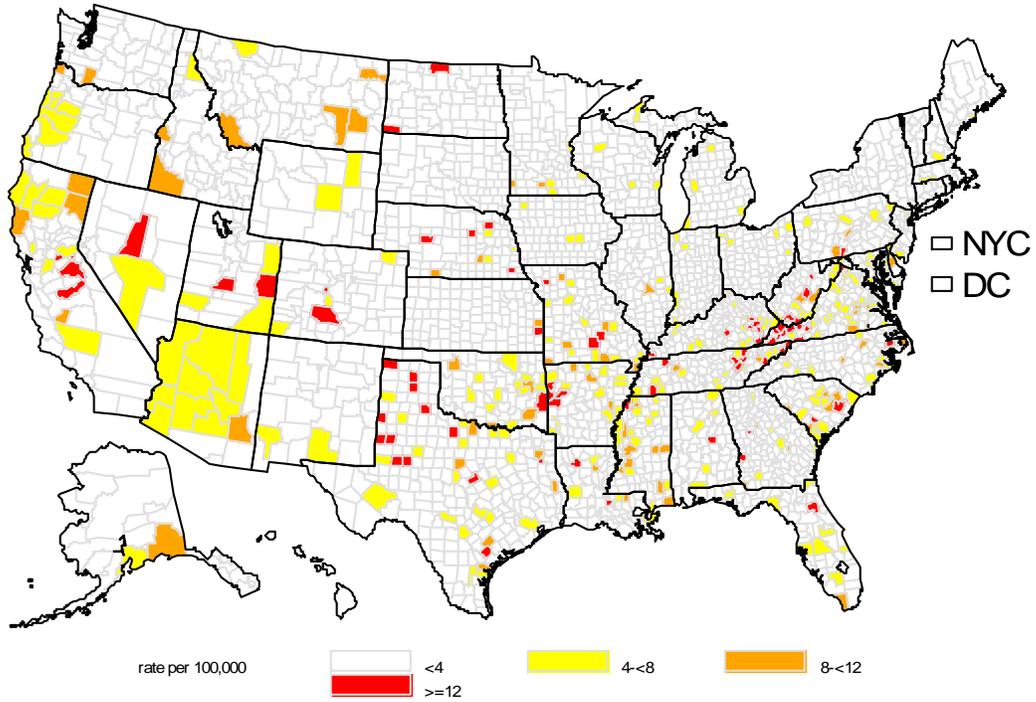
Figure 11: Incidence of Acute Hepatitis B, United States, 1982-2004

Figure 12: Incidence of Acute Hepatitis B, by Region, United States, 1990-2004



See page 5 for regional categories

Figure 13: Incidence of Acute Hepatitis B, by County, United States, 2004



Source: NNDSS

Figure 14: Incidence of Acute Hepatitis B, by Age, United States, 1990-2004

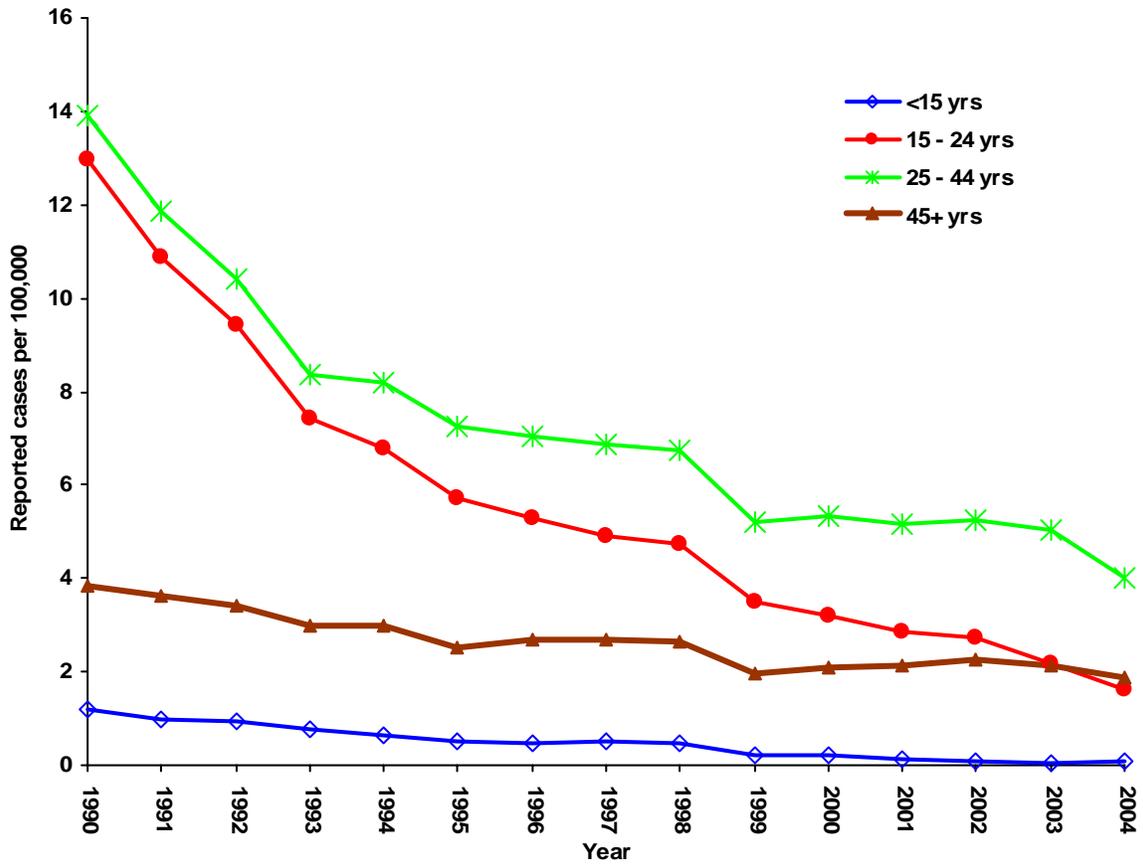
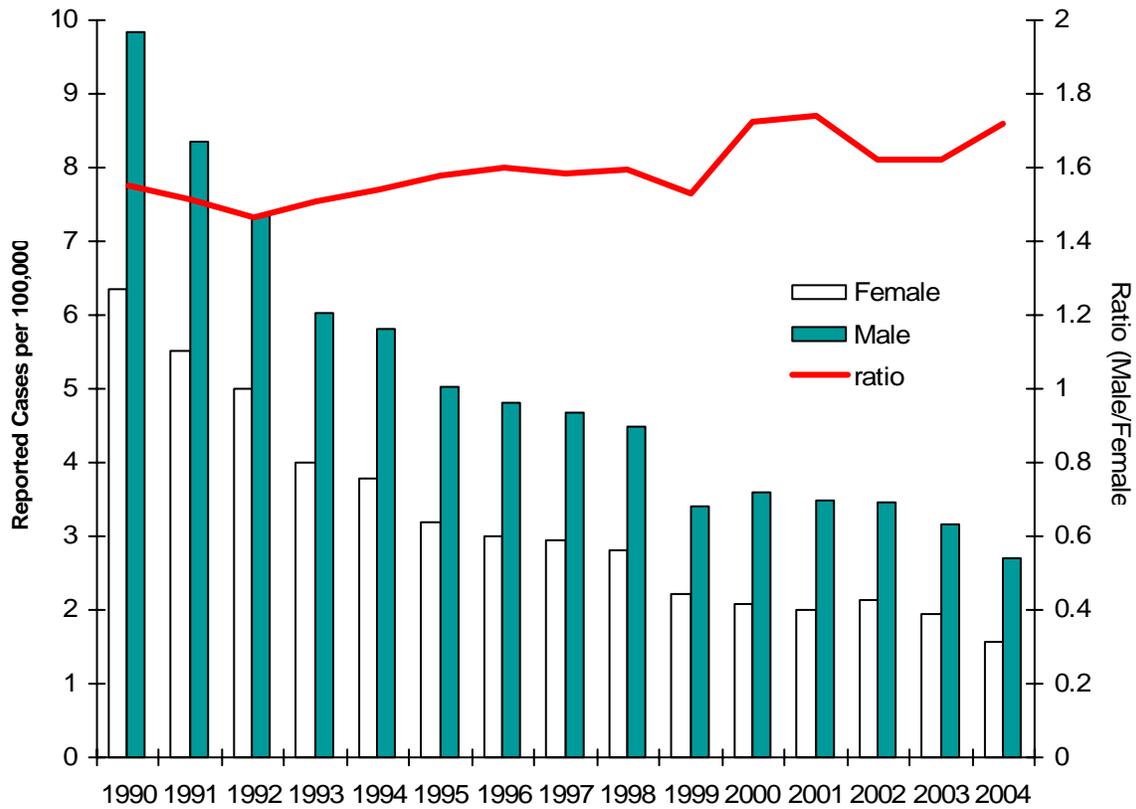
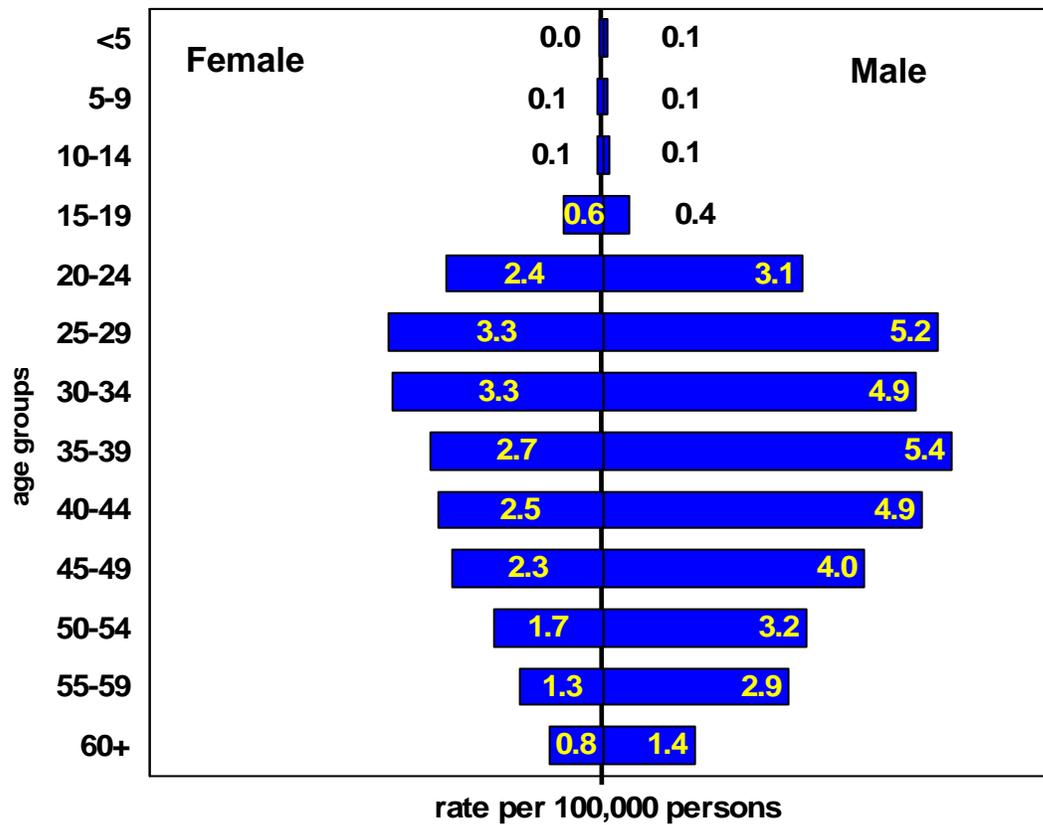


Figure 15: Incidence of Acute Hepatitis B, by Sex, United States, 1990-2004

Note: The bars indicate the rate per 100,000 (the left y-axis) by gender; the line is the ratio (right y-axis) of the incidence rate among males to that among females

Figure 16: Incidence of Acute Hepatitis B, by Age and Sex, United States, 2004



* A total of 6212 cases of hepatitis B were reported. Rates exclude patients with missing data for age or sex.

Figure 17: Incidence of Acute Hepatitis B, by Race and Ethnicity, United States, 1990-2004

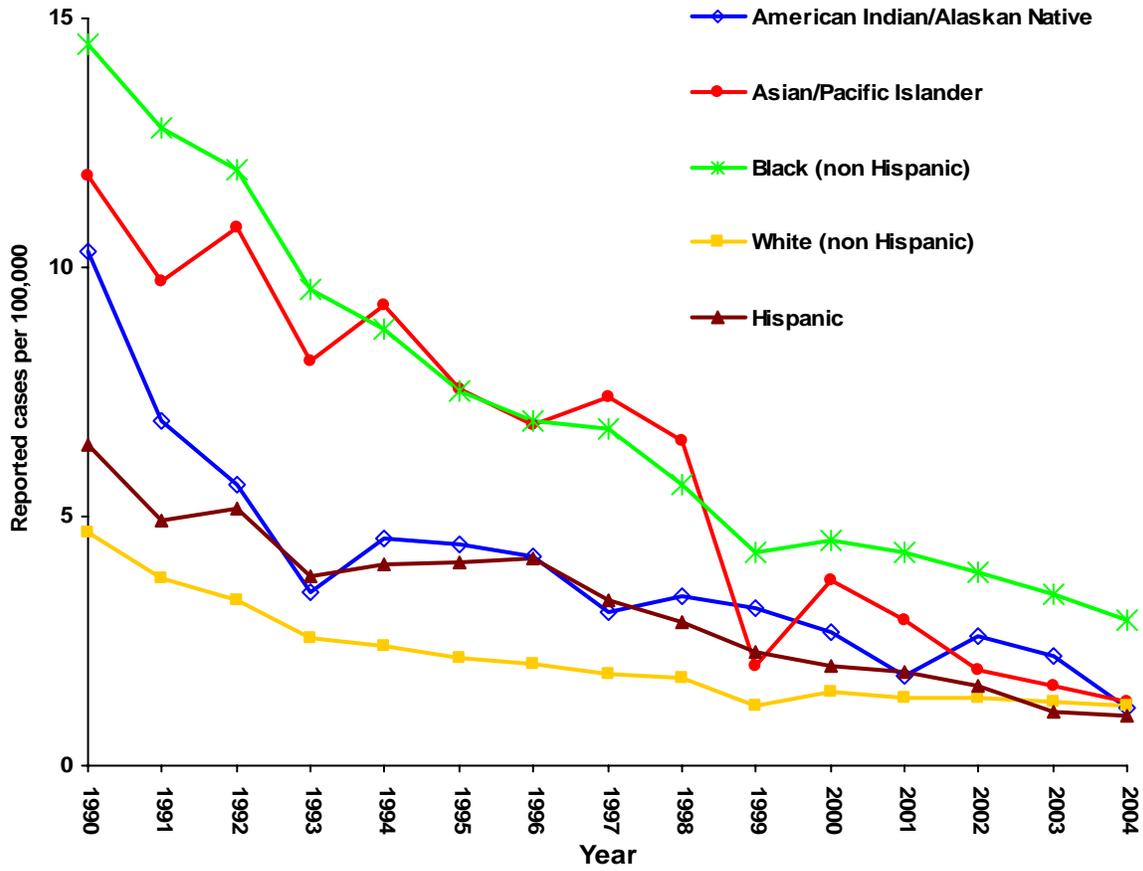


Table 8: Epidemiologic Characteristics of Patients with Acute Hepatitis B, by Age, United States, 2004

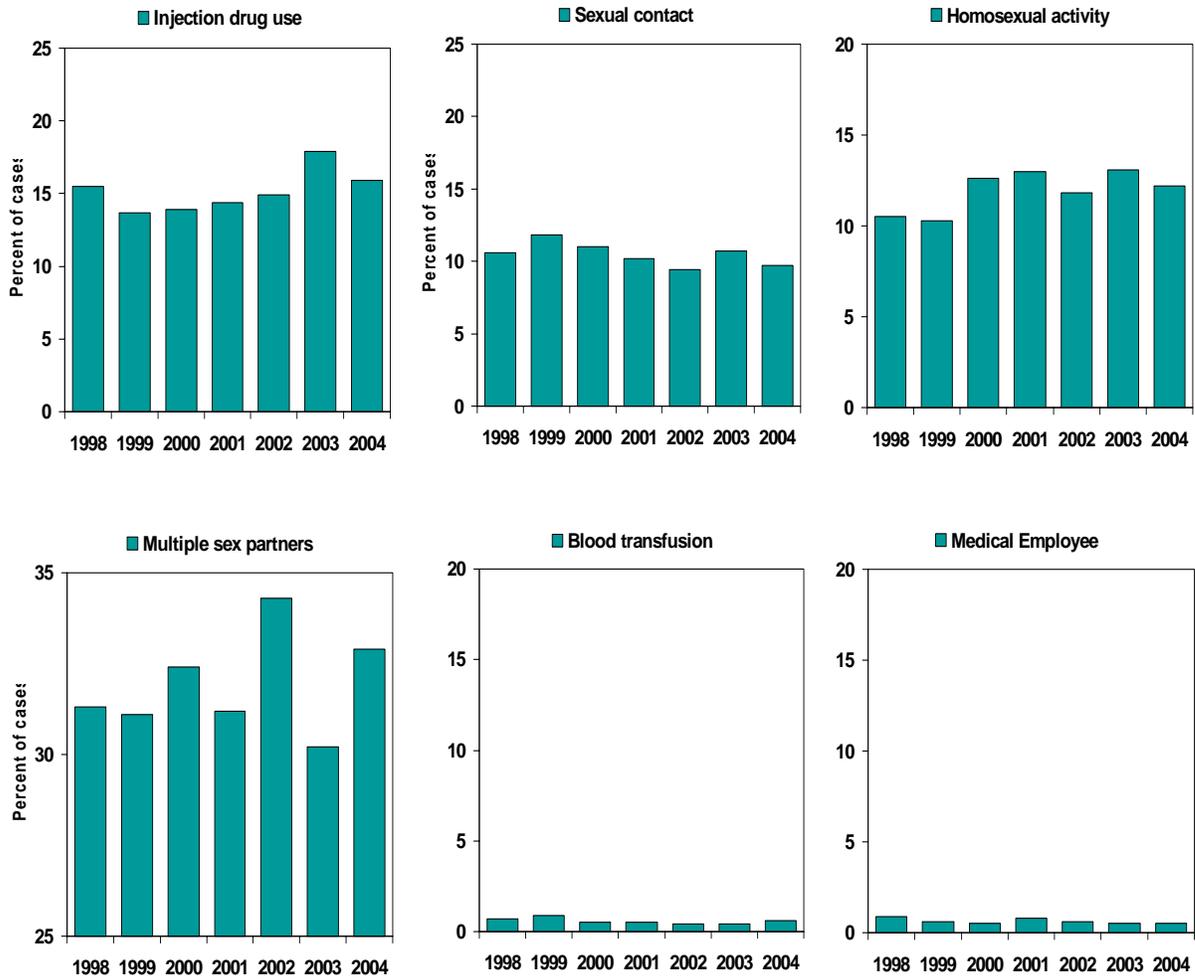
Exposures during the 6 weeks -6 months before illness onset	Age Groups								
	<45*			45+			Total		
	n	N	%	n	N	%	n	N	%
Injection drug use	301	1,540	19.5	61	742	8.2	362	2,282	15.9
Sexual contact with hepatitis B patient	122	1,109	11.0	39	553	7.1	161	1,662	9.7
Household contact of hepatitis B patient	25	1,109	2.3	18	553	3.3	43	1,662	2.6
Male homosexual activity‡	119	843	14.1	27	358	7.5	146	1,201	12.2
Medical employee with blood contact	4	1,554	0.3	7	763	0.9	11	2,317	0.5
Hemodialysis	5	1,287	0.4	5	597	0.8	10	1,884	0.5
More than one sex partner	402	1,098	36.6	130	518	25.1	532	1,616	32.9
Heterosexual	348	1,002	34.7	118	497	23.7	466	1,499	31.1
Male homosexual or bisexual	54	96	56.3	12	21	57.1	66	117	56.4
Blood transfusion	2	1,573	0.1	13	752	1.7	15	2,325	0.6
Surgery	97	1,460	6.6	85	717	11.9	182	2,177	8.4
Percutaneous injury (e.g. needlestick)	50	1,340	3.7	25	665	3.8	75	2,005	3.7
No risk factor identified	934	1,803	51.8	513	835	61.4	1,447	2,638	54.9
No risk factor data submitted	.	2,279	.	.	1,187	.	.	3,466	.
TOTAL	.	4,082	.	.	2,022	.	.	6,104	.

*104 (2%) of all cases were <19 years of age

‡ When calculated for male cases only, 20% homosexual behavior.

Note: The percentage of cases reporting a specific risk factor was calculated based on the total number of cases reporting any information for that exposure. Multiple risk factors can be reported for a single case.

Figure 18: Trends in Selected Epidemiologic Characteristics among Patients with Acute Hepatitis B, 1998-2004, United States



Note: The percentage of cases reporting a specific risk factor was calculated based on the total number of cases reporting any information for that exposure. Multiple risk factors can be reported for a single case.

Table 9: Clinical Characteristics of Patients with Acute Hepatitis B, by Age, United States, 2004

	<5			5-14			15-39			40-59			60+			All		
	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%
Died From Hepatitis	0	4	0.0	0	16	0.0	6	1,391	0.4	5	1,008	0.5	2	204	1.0	13	2,623	0.5
Hospitalized for Hepatitis	0	3	0.0	3	15	20.0	551	1,470	37.5	433	1,064	40.7	93	221	42.1	1,080	2,773	38.9
Jaundice	1	3	33.3	5	13	38.5	1,127	1,454	77.5	776	1,021	76.0	137	224	61.2	2,046	2,715	75.4

Note: A total of 6212 cases of hepatitis B, including 13 deaths were reported. Percentages are calculated based upon the number of cases with non-missing data for age, and for outcome of interest (i.e. jaundice, hospitalization or death).

Acute Hepatitis C/NANB Hepatitis, 2004

Summary

With an estimated 3.2 million chronically infected persons nationwide⁷, hepatitis C virus (HCV) infection is the most common bloodborne infection in the United States. No effective vaccine against this infection is available. National recommendations for prevention and control of HCV infection⁸, issued in 1998, rely on primary prevention activities to reduce the risk for HCV transmission. These activities include: screening and testing of blood donors, viral inactivation of plasma-derived products, risk-reduction counseling and services, and implementation and maintenance of infection control practices.

Incidence of hepatitis C has been declining since the late 1980s. This decline is largely the result of a decrease in cases among injecting drug users (IDU), the reasons for which are unknown. The majority of hepatitis C cases continue to occur in adult age groups (persons >25 years of age) with injecting drug use the most commonly identified risk factor for infection. Transmission of HCV associated with transfusion, an important risk factor for infection in the past, is rare. Ongoing surveillance is needed to ensure that any new cases of hepatitis C are identified and investigated to determine the source of infection and limit further spread of the virus.

- In 2004, there were 758 cases of confirmed acute hepatitis C yielding an overall national rate of 0.3 per 100,000. If asymptomatic infection and underreporting are taken into account, the number of cases reported is estimated to represent 26,000 new HCV infections in 2004. [Figure 19](#)
- Rates have been declining in all age groups since the mid-1990s. The greatest decline in incidence has been among 25-39 year olds, which has historically been the age group with the highest rates of disease. In this age group, incidence has declined by 62% since 2000 (and 92% since 1992) to 0.4/100,000 in 2004. Few cases are reported in persons <15 years of age. [Figure 20](#)

- As in previous years, the rate of hepatitis C in 2004 is higher among males (0.3 per 100,000) than among females (0.2 /100,000). However, this differential has declined over the decade. In 2004, the ratio of male to female cases was the smallest observed since reporting began. This difference in hepatitis C rates by sex is most evident in persons 45-49 years of age and to a lesser extent, in persons 50-54 years of age. [Figure 21](#), [Figure 22](#)
- Incidence of hepatitis C has declined in all racial groups since 1995. In 2004, the rates were increasingly similar across racial/ethnic groups and ranged from 0.1/100,000 among Asian/Pacific Islanders to 0.5/100,000 among American Indians/Alaska Natives. Hispanics historically had rates that were higher than those of non-Hispanic whites (but lower than those of non-Hispanic blacks) but, since 2000, they have had lower rates than all other racial/ethnic groups except Asian/Pacific Islanders. [Figure 23](#)
- Among cases for which information about exposures during the incubation period was available, the most common risk factor reported for hepatitis C in 2004 was injection drug use (42%). Over the past decade, an average of 39% of cases reported injection drug use (range: 31-45%). Another 14% reported sexual contact with a known case and 27% of cases reported having had multiple sexual partners during the incubation period. Four percent of cases reported occupational exposure to blood. [Table 8](#)

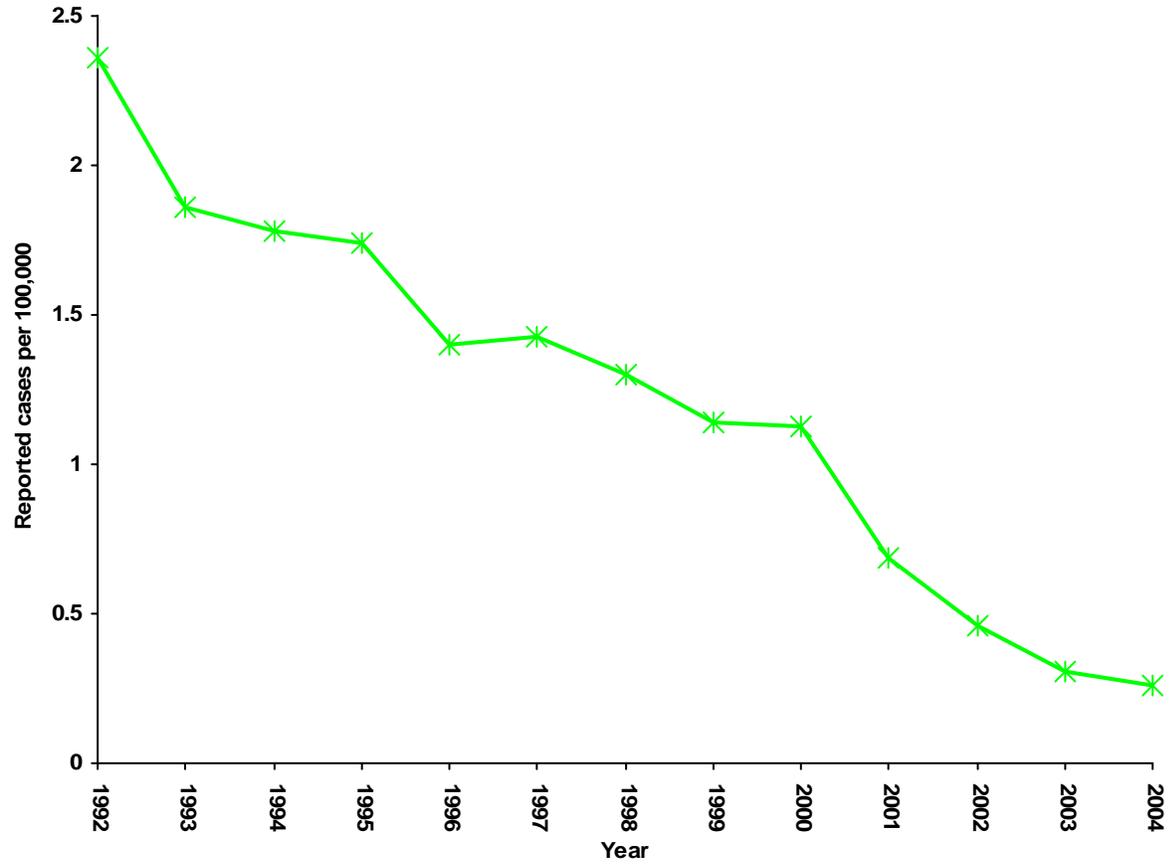
Figure 19: Incidence of Acute Hepatitis C/NANB, United States, 1992-2004

Figure 20: Incidence of Acute Hepatitis C/NANB, by Age, United States, 1992-2004

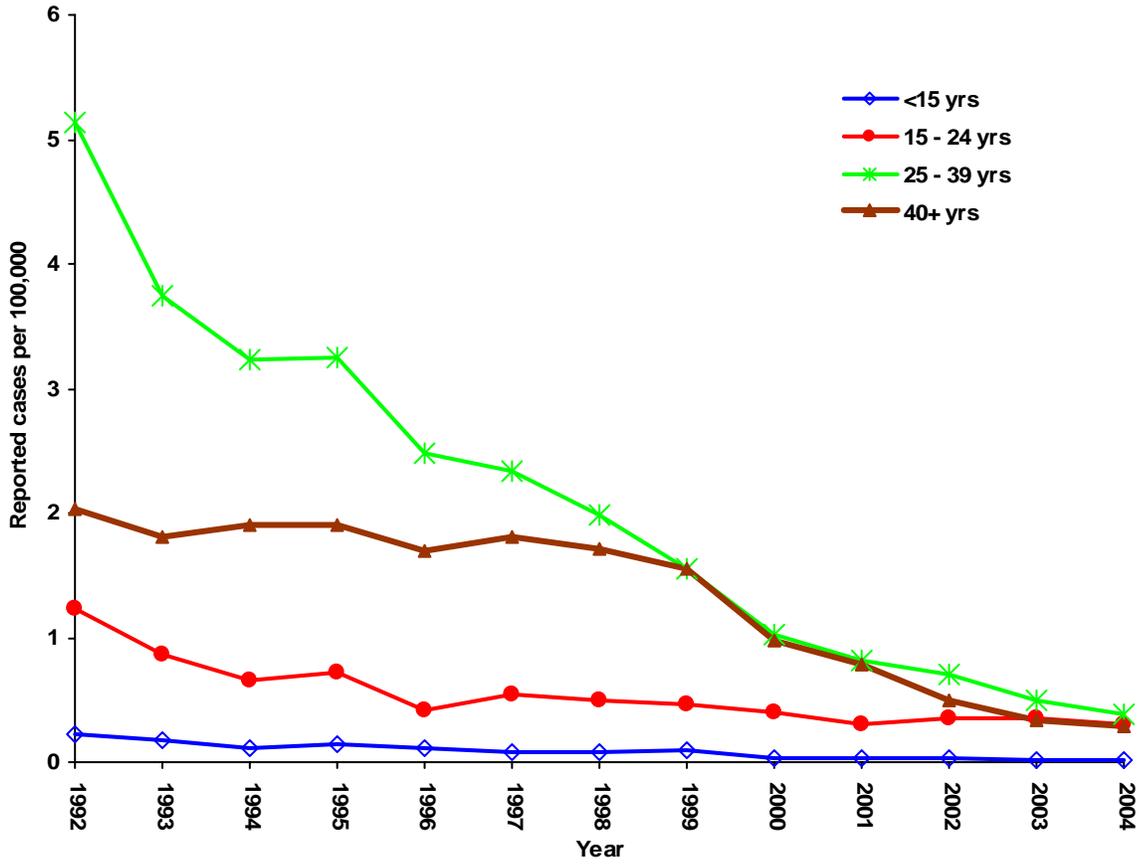
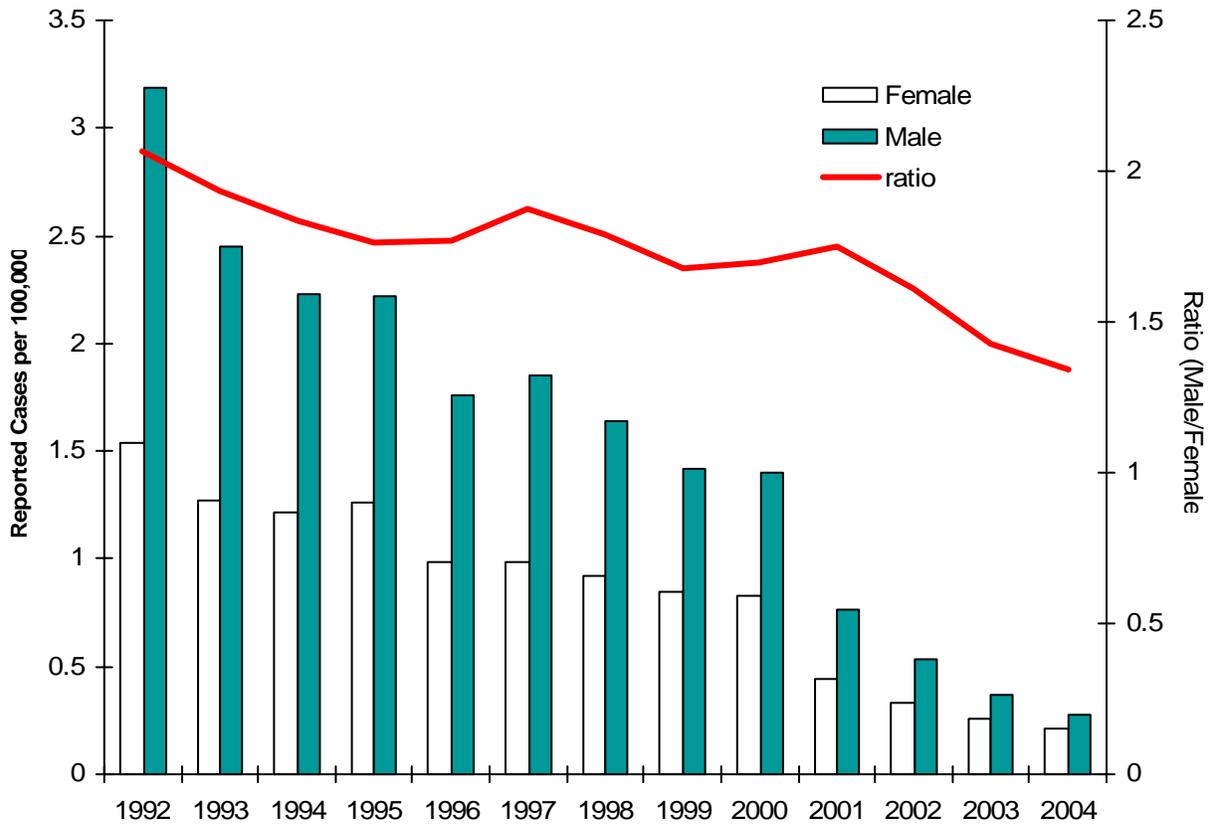


Figure 21: Incidence of Acute Hepatitis C/NANB, by Sex, United States, 1992-2004



Note: The bars indicate the rate per 100,000 (the left y-axis) by gender; the line is the ratio (right y-axis) of the incidence rate among males to that among females

Figure 22: Incidence of Acute Hepatitis C, by Age and Sex, United States, 2004

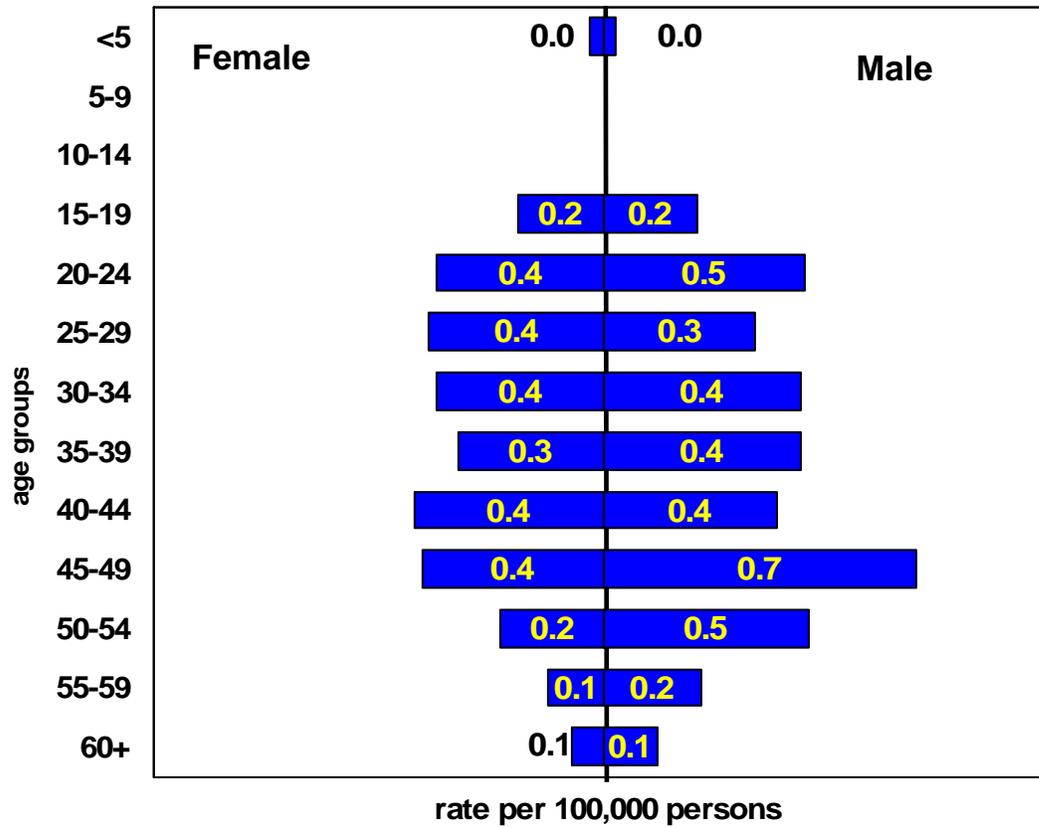


Figure 23 Incidence of Acute Hepatitis C/NANB, by Race and Ethnicity, United States, 1992-2004

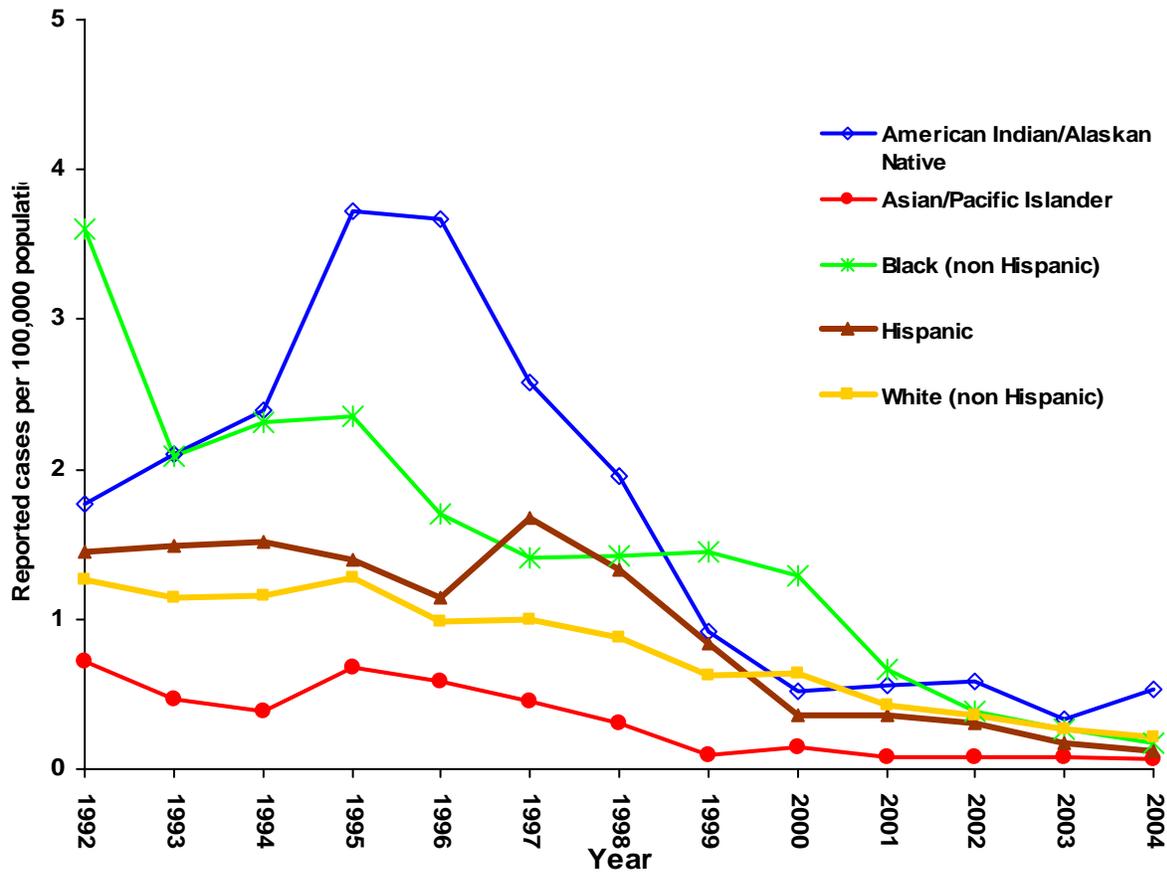


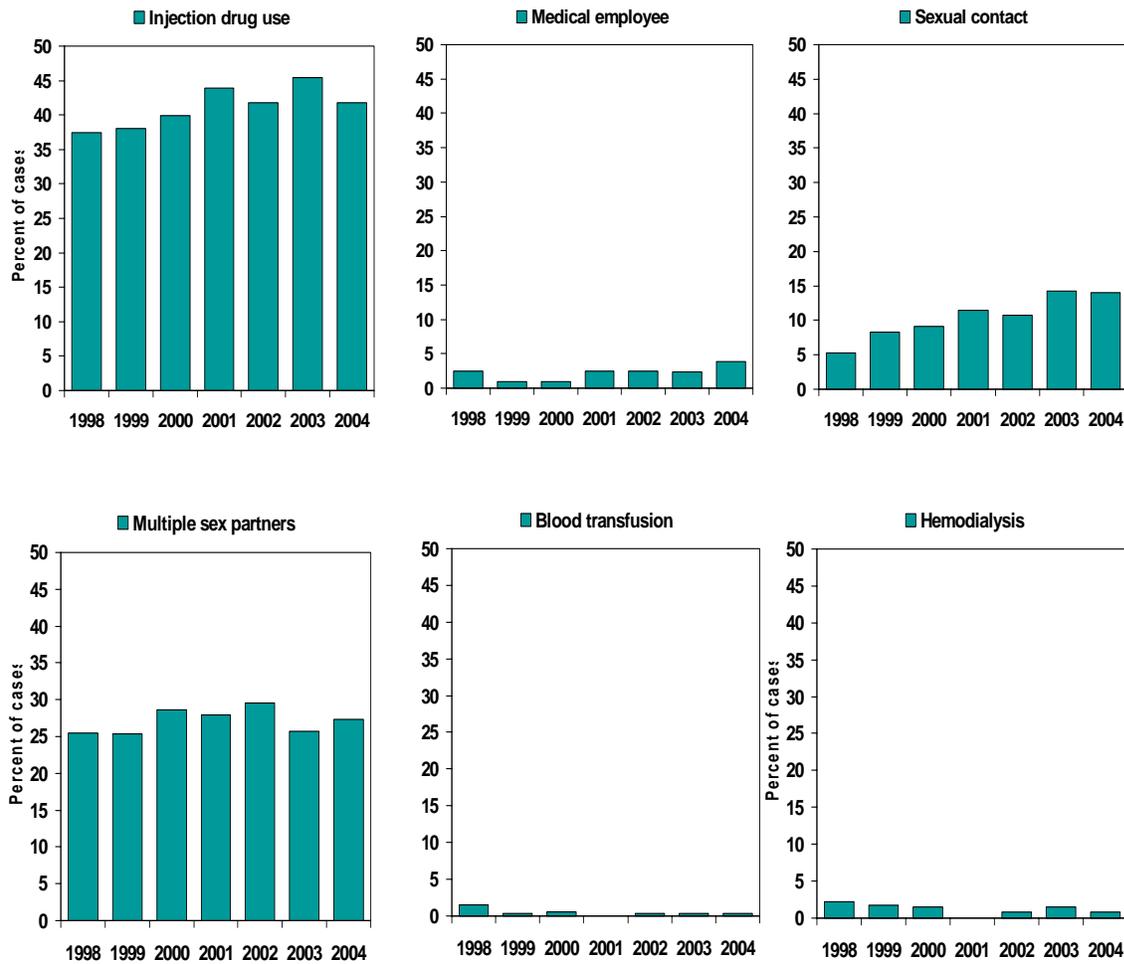
Table 10: Epidemiologic Characteristics of Patients with Acute Hepatitis C, by Age, United States, 2004

Exposures during the 6 weeks -6 months before illness onset	Age Groups								
	<40*			40+			Total		
	n	N	%	n	N	%	n	N	%
Injection drug use	81	150	54.0	31	118	26.3	112	268	41.8
Employment in medical/dental field	2	141	1.4	8	114	7.0	10	255	3.9
Hemodialysis	.	133	.	2	110	1.8	2	243	0.8
Sexual contact with hepatitis C patient	11	77	14.3	9	66	13.6	20	143	14.0
Household contact of hepatitis C patient	6	77	7.8	2	66	3.0	8	143	5.6
More than one sex partner	31	86	36.0	11	68	16.2	42	154	27.3
Blood transfusion	.	148	.	1	120	0.8	1	268	0.4
Surgery	14	125	11.2	30	109	27.5	44	234	18.8
Percutaneous injury (e.g. needlestick)	5	119	4.2	5	102	4.9	10	221	4.5
No risk factor identified	60	177	33.9	65	137	47.4	125	314	39.8
No risk factor data submitted	.	199	.	.	242	.	.	441	.
TOTAL	.	376	.	.	379	.	.	755	.

*33 (4%) cases were <19 years of age

Note: The percentage of cases reporting a specific risk factor was calculated based on the total number of cases reporting any information for that exposure. Multiple risk factors can be reported for a single case.

Figure 24: Trends in Selected Epidemiologic Characteristics among Patients with Acute Hepatitis C/NANB, by Year



Note: The percentage of cases reporting a specific risk factor was calculated based on the total number of cases reporting any information for that exposure. Multiple risk factors can be reported for a single case.

Table 11: Clinical Characteristics of Patients with Acute Hepatitis C by Age, United States, 2004

	<5			5-14			15-39			40-59			60+			All		
	N	N	%	n	N	%	n	N	%	n	N	%	n	N	%	n	N	%
Died From Hepatitis	0	2	0.0	0	2	0.0	1	199	0.5	1	113	0.9	1	16	6.3	3	332	0.9
Hospitalized for Hepatitis	2	2	100.0	1	3	33.3	83	218	38.1	66	151	43.7	5	14	35.7	157	388	40.5
Jaundice	2	3	66.7	2	3	66.7	150	216	69.4	87	143	60.8	9	13	69.2	250	378	66.1

A total of 758 cases of hepatitis C were reported. Percentages are calculated based upon the number of cases with non-missing data for age, and for outcome of interest (i.e. jaundice, hospitalization or death).

-
- ¹ CDC. Prevention of hepatitis A through active or passive immunization. MMWR 1996; 45(RR:15)
- ² CDC. Prevention of hepatitis A through active or passive immunization. MMWR 1999; 48(RR:12)
- ³ CDC. Prevention of Hepatitis A through Active or Passive Immunization: Recommendations of the Advisory Committee on Immunization Practices. MMWR 2006;55(*in press*):
- ⁴ Bell, BP, Kruszon-Moran D, Shapiro CN et al. Hepatitis A virus infection in the United States: Serologic results from the Third National Health and Nutrition Examination Survey. *Vaccine* 23(2005):5798-5806.
- ⁵ CDC. Positive test results for acute hepatitis A virus infection among persons with no recent history of acute hepatitis—United States, 2002-2004. MMWR 2005; 54(18):453-456.
- ⁶ CDC. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States. Part 1: immunization of infants, children, and adolescents. MMWR 2005; 54(RR:16)
- ⁷ Armstrong GL, Wasley AM, Simard EP, McQuillan GM, Kuhnert WL and Alter MJ.. The prevalence of hepatitis C virus infection in the United States, 1999 through 2002. *Ann Int Med* 2006 (in press).
- ⁸ CDC. Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. MMWR 1998; 47(RR:19)