

CHAPTER 3

Viral Hepatitis

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The primary forms of viral hepatitis in the United States are hepatitis A, B, and C (see ICD codes in Appendix 1). Hepatitis A is common and can be serious or even lethal. It does not have a chronic form. Hepatitis B can cause both acute and chronic disease, whereas acute hepatitis C is often asymptomatic, and its burden is predominantly due to chronic disease.

HEPATITIS A

Although the infection is common, hepatitis A is infrequently recognized in the ambulatory care or hospital setting. It was too infrequent to appear in the office-based sample of the National Ambulatory Medical Care Survey (Table 1). Hospitalization rates declined by about 75 percent between 1979 and 1993, and remained relatively stable through 2004. An effective vaccine to prevent infection was introduced in the 1990s, but it has not had a noticeable effect on reducing hospitalizations (Figure 1). Mortality from hepatitis A was rare, with fewer than 100 deaths per year (Table 2). Unlike recently stable rates of hospitalizations, the death rate from viral hepatitis A was halved between 1999 and 2004 (Figure 2).

HEPATITIS B

Viral hepatitis B is a more significant disease than hepatitis A. In the United States, infections were most commonly recognized between ages 15 and 44 years, and hospitalizations with the diagnosis occurred across the age range of adults (Table 3). Rates of both ambulatory care visits and hospitalizations with hepatitis B were higher among blacks than whites and among males than females. Hepatitis B was rarely the first-listed hospital diagnosis. There has been a vaccine available for hepatitis B since the 1980s, but the rates of both ambulatory care and hospitalizations have increased markedly since 1999 (Figure 3). This increase has been attributed to increased rates of immigration of chronic carriers of hepatitis B virus. Although not a common cause of death, viral hepatitis B resulted in about 10 times as many deaths as hepatitis A (Table 4). The majority of deaths with hepatitis B as

either underlying or contributing cause occurred in middle age, between age 45 and 64 years. As with other forms of infections, hepatitis B was more often listed as a contributing than as an underlying cause. Deaths from hepatitis B increased between 1979 and 1994, but mortality steadily declined thereafter, in spite of (or perhaps related to) the increased rates of medical care (Figure 4). As an underlying cause, rates in 2004 were similar to those in 1979, but as a contributing cause, rates were considerably higher in 2004 than they had been 25 years earlier. Age-adjusted mortality was higher among blacks than whites.

HEPATITIS C

The hepatitis C virus was discovered in 1989, and tests for it soon followed. Most prior cases of non-A, non-B hepatitis are believed to have been viral hepatitis C. In both the outpatient and inpatient setting, more than half the cases were in persons ages 45–64 years (Table 5). Rates were at least twice as high among blacks as whites and among males as females. Viral hepatitis C was rarely the first-listed diagnosis at hospital discharge, but was frequently listed as a secondary diagnosis. As a result, only 2.6 percent of hospital discharge diagnoses for hepatitis C listed it as the first-listed diagnosis. Where hepatitis C was not the first-listed diagnosis, the most common underlying (first-listed) causes were chronic liver disease and its sequelae (10.4 percent), mood disorders (4.5 percent), cellulitis (3.8 percent), complications of procedures (2.6 percent), pneumonia (2.5 percent), and HIV (2.4 percent). The majority of hospitalizations, however, appeared to be unrelated to hepatitis C, suggesting that the diagnoses may appear as a result of testing for hepatitis C, rather than as consequences of hepatitis C. Blacks and men had the highest age-adjusted rates.

Both outpatient and inpatient diagnoses have greatly increased since hepatitis C received its own ICD code in the early 1990s (Figure 5). The number of hospitalizations prior to 1992 was too small to provide estimates. Much of the increase can be attributed

to increasing recognition of the disease. There was also the introduction of antiviral therapy that required frequent patient monitoring. It is not clear how much of the increase can be attributed to the consequences of disease burden due to longstanding infection.

In 2004, 85 percent of hepatitis-related deaths were from viral hepatitis C. Hepatitis C was listed as a contributing cause of death more often than as the underlying cause (Table 6). About two-thirds of deaths occurred between the ages of 45 and 64 years. Age-adjusted death rates among blacks were nearly twice those of whites, and males had more than double the death rate of females. Hepatitis C contributed a high number of YPLL before the age of 75 years (87,500), because of the large number of deaths and because few deaths are attributed to the disease after age 75. This number placed hepatitis C as the fifth leading digestive disease cause of YPLL, behind esophageal cancer and ahead of gastric cancer. In keeping with the growing identification and long-term consequences of the disease, mortality rates increased rapidly from 1990 to 2004 (Figure 6). (The few deaths recorded prior to 1990 were for non-A, non-B viral hepatitis.) Of note, the mortality rate for hepatitis C as underlying cause leveled off beginning in 2001 and as underlying or contributing cause in 2002.

ALL VIRAL HEPATITIS

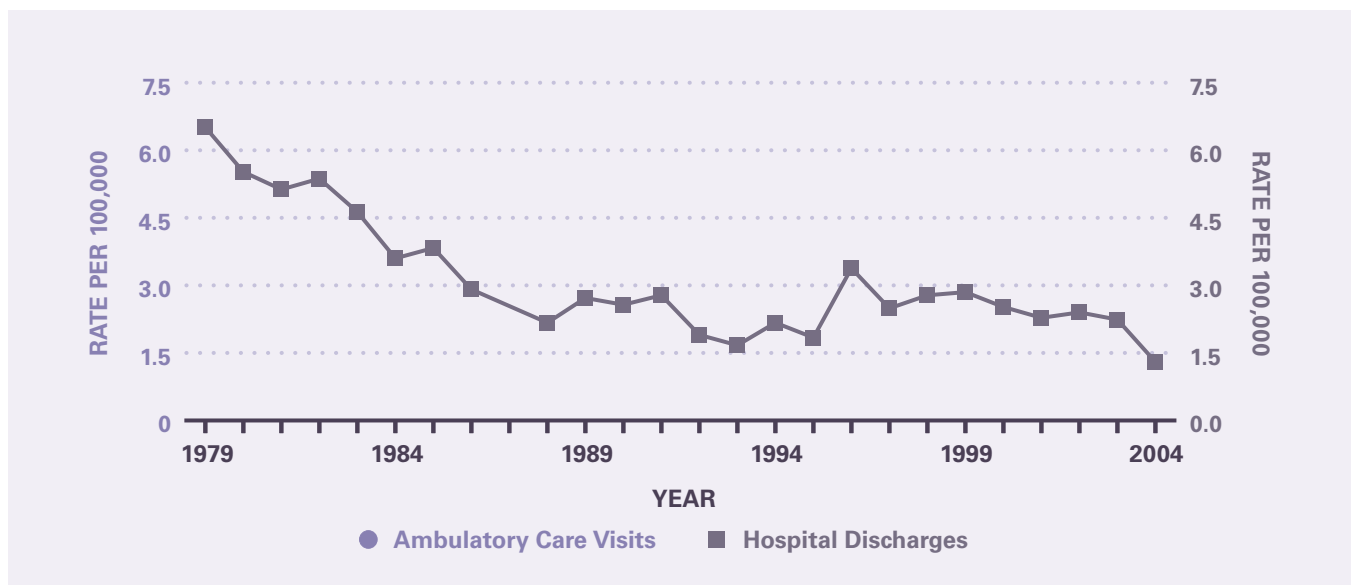
The burden of all viral hepatitis primarily reflected that of hepatitis B in past years and, more recently, hepatitis C (Tables 7 and 8, Figures 7 and 8). For example, 97.5 percent of the YPLL prior to age 75 years due to viral hepatitis was a result of hepatitis B (11.6 percent) or hepatitis C (85.9 percent).

MEDICATIONS The costliest prescriptions filled at retail pharmacies for viral hepatitis in 2004, according to the Verispan database (Appendix 2), are shown in Table 9. An estimated 637,000 outpatient prescriptions were filled, but these were represented by few drugs, which were prescribed exclusively for hepatitis B (adefovir and lamivudine) or hepatitis C (ribavirin and peginterferon). When used to treat hepatitis C, ribavirin was nearly always used with interferon. For a full course of therapy, each of the medications in Table 9 would have required multiple prescriptions.

Table 1. Hepatitis A: Number and Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With First-Listed and All-Listed Diagnoses by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	AMBULATORY CARE VISITS				HOSPITAL DISCHARGES				
	First-Listed Diagnosis		All-Listed Diagnoses		First-Listed Diagnosis		All-Listed Diagnoses		
	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	
AGE (Years)	Under 15	—	—	—	—	0	1	0	1
	15–44	—	—	—	—	1	1	3	3
	45–64	—	—	—	—	0	1	4	5
	65+	—	—	—	—	0	1	2	6
RACE	White	—	—	—	—	2	1	7	3
	Black	—	—	—	—	0	0	2	4
SEX	Female	—	—	—	—	1	1	5	3
	Male	—	—	—	—	1	1	5	3
TOTAL		—	—	—	—	2	1	10	3

SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (3-year average, 2003–2005), and Healthcare Cost and Utilization Project Nationwide Inpatient Sample (HCUP NIS)

Figure 1. Hepatitis A: Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With All-Listed Diagnoses in the United States, 1979–2004 (Ambulatory Care Visit Data Unavailable)

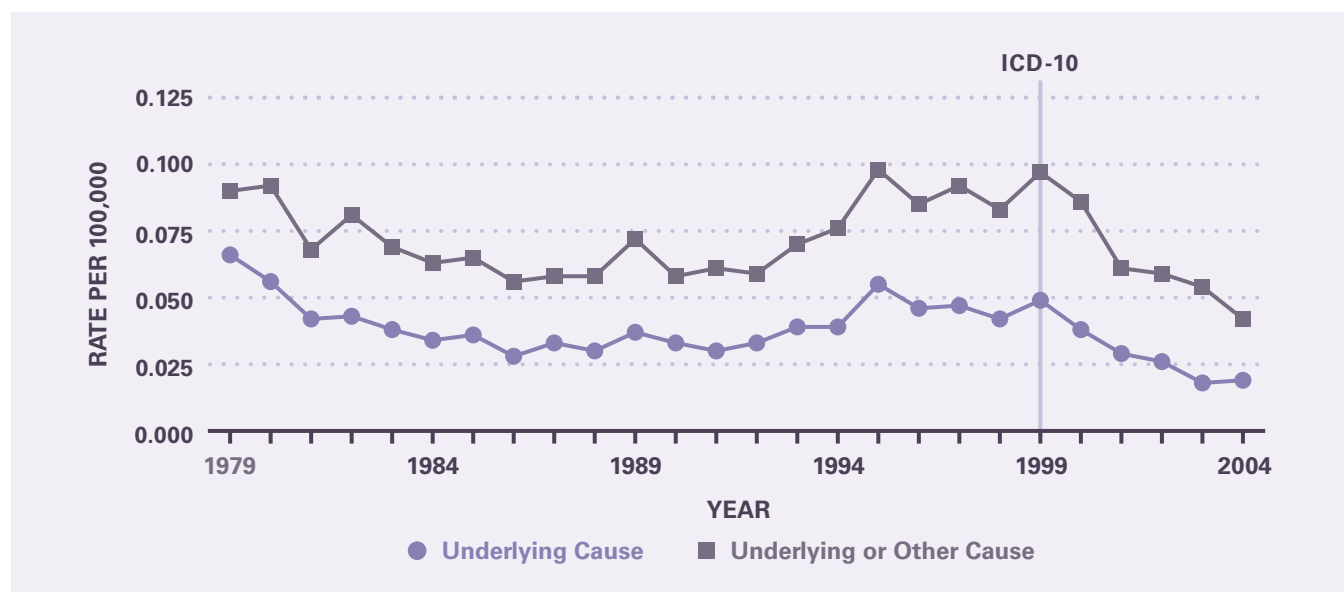
SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (averages 1992–1993, 1994–1996, 1997–1999, 2000–2002, 2003–2005), and National Hospital Discharge Survey (NHDS)

Table 2. Hepatitis A: Number and Age-Adjusted Rates of Deaths and Years of Potential Life Lost (to Age 75) by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	UNDERLYING CAUSE			UNDERLYING OR OTHER CAUSE		
	Number of Deaths	Rate per 100,000	Years of Potential Life Lost in Thousands	Number of Deaths	Rate per 100,000	
AGE (Years)	Under 15	—	—	—	—	—
	15–44	6	0.0	0.2	13	0.0
	45–64	27	0.0	0.6	61	0.1
	65+	25	0.1	0.0	55	0.2
RACE	White	48	0.0	0.7	101	0.0
	Black	7	0.0	0.1	20	0.1
SEX	Female	28	0.0	0.3	57	0.0
	Male	30	0.0	0.5	72	0.1
TOTAL		58	0.0	0.8	129	0.0

SOURCE: Vital Statistics of the United States

Figure 2. Hepatitis A: Age-Adjusted Rates of Death in the United States, 1979–2004

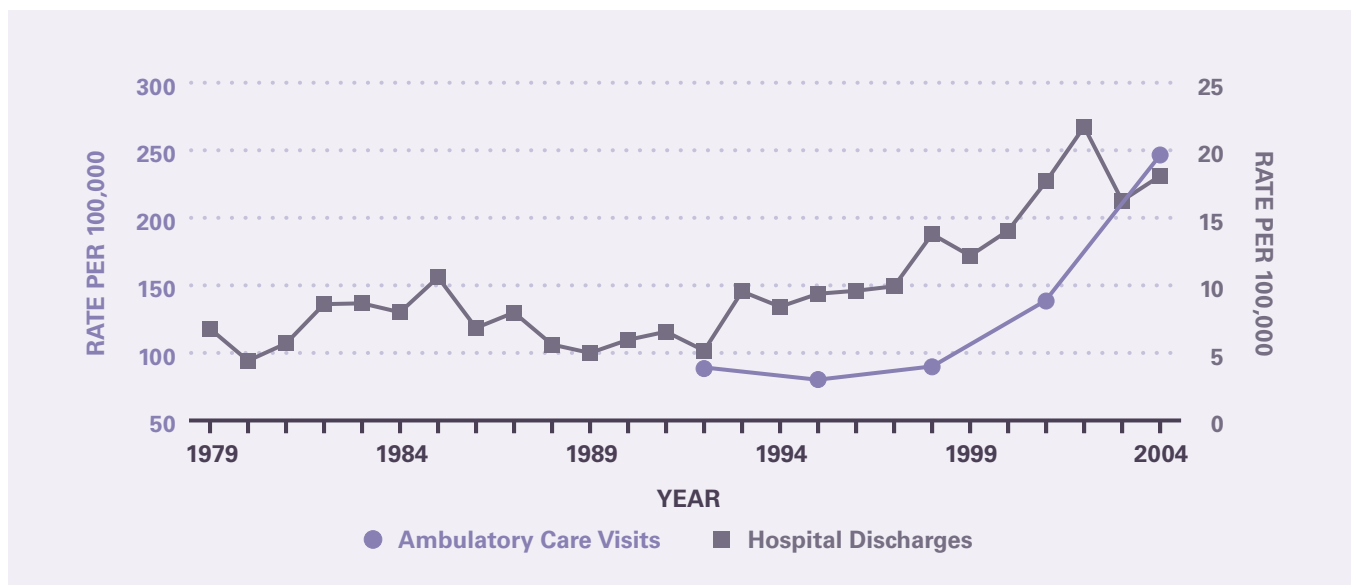


SOURCE: Vital Statistics of the United States

Table 3. Hepatitis B: Number and Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With First-Listed and All-Listed Diagnoses by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	AMBULATORY CARE VISITS				HOSPITAL DISCHARGES				
	First-Listed Diagnosis		All-Listed Diagnoses		First-Listed Diagnosis		All-Listed Diagnoses		
	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	
AGE (Years)	Under 15	—	—	—	—	—	—	—	—
	15–44	—	—	385	306	2	1	26	21
	45–64	—	—	277	392	1	2	33	47
	65+	—	—	—	—	0	1	9	26
RACE	White	—	—	242	98	2	1	40	16
	Black	—	—	183	510	1	3	19	55
SEX	Female	—	—	122	83	1	1	26	17
	Male	—	—	607	418	2	1	43	29
TOTAL		448	152	729	248	4	1	69	23

SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (3-year average, 2003–2005), and Healthcare Cost and Utilization Project Nationwide Inpatient Sample (HCUP NIS)

Figure 3. Hepatitis B: Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With All-Listed Diagnoses in the United States, 1979–2004

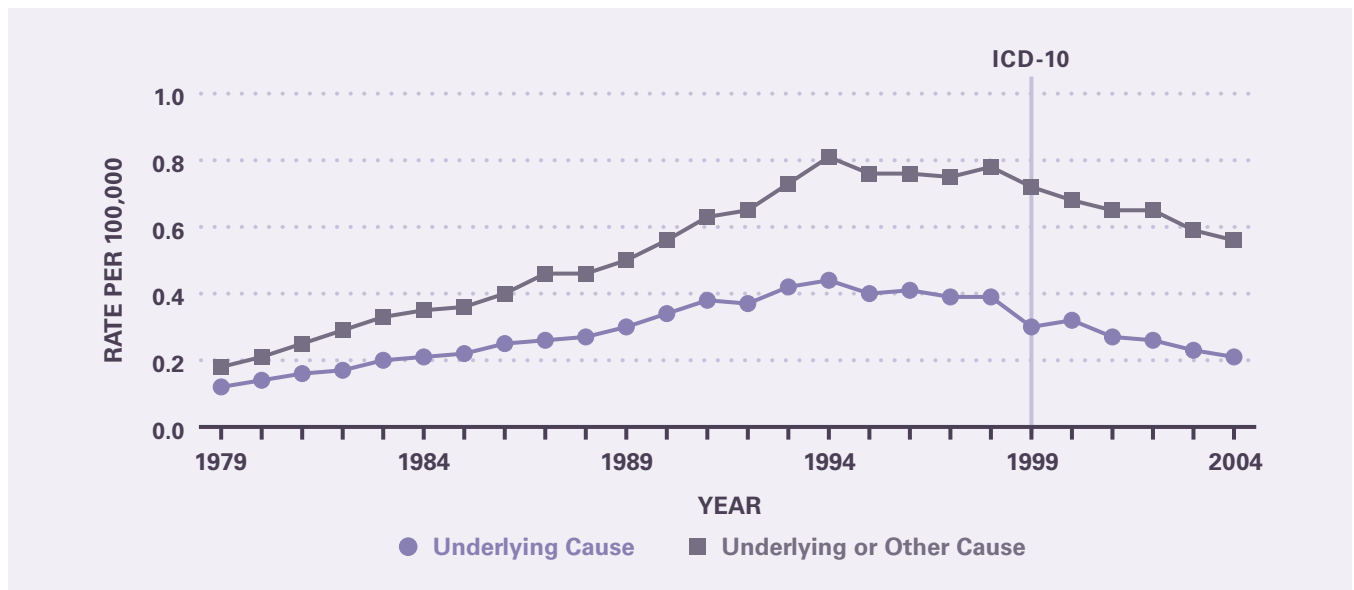
SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (averages 1992–1993, 1994–1996, 1997–1999, 2000–2002, 2003–2005), and National Hospital Discharge Survey (NHDS)

Table 4. Hepatitis B: Number and Age-Adjusted Rates of Deaths and Years of Potential Life Lost (to Age 75) by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	UNDERLYING CAUSE			UNDERLYING OR OTHER CAUSE	
	Number of Deaths	Rate per 100,000	Years of Potential Life Lost in Thousands	Number of Deaths	Rate per 100,000
AGE (Years)	Under 15	—	—	1	0.0
	15–44	115	0.1	291	0.2
	45–64	346	0.5	962	1.4
	65+	184	0.5	441	1.2
RACE	White	424	0.2	984	0.4
	Black	124	0.4	390	1.2
SEX	Female	174	0.1	428	0.3
	Male	471	0.3	1,267	0.9
TOTAL	645	0.2	11.8	1,695	0.6

SOURCE: Vital Statistics of the United States

Figure 4. Hepatitis B: Age-Adjusted Rates of Death in the United States, 1979–2004

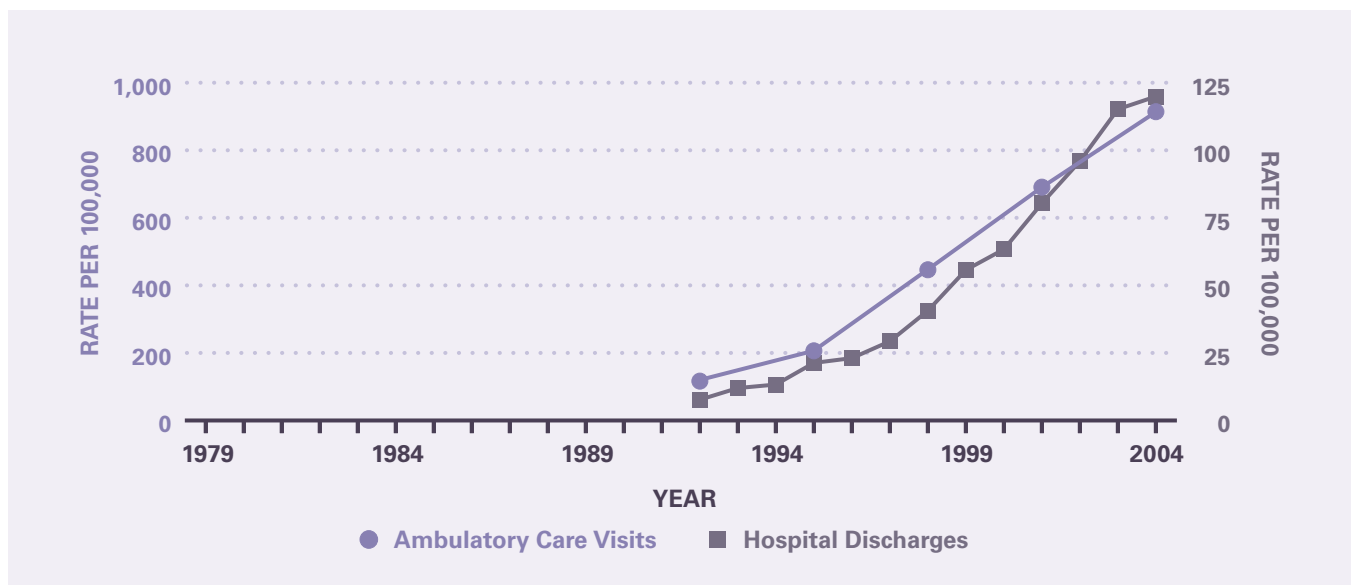


SOURCE: Vital Statistics of the United States

Table 5. Hepatitis C: Number and Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With First-Listed and All-Listed Diagnoses by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	AMBULATORY CARE VISITS				HOSPITAL DISCHARGES				
	First-Listed Diagnosis		All-Listed Diagnoses		First-Listed Diagnosis		All-Listed Diagnoses		
	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	
AGE (Years)	Under 15	—	—	—	—	—	—	0	0
	15–44	382	304	791	628	2	2	127	101
	45–64	918	1,298	1,603	2,268	7	10	248	351
	65+	—	—	353	970	1	4	43	118
RACE	White	1,110	451	1,828	742	9	3	298	120
	Black	235	662	739	2,122	2	5	99	286
SEX	Female	514	331	925	604	4	3	161	105
	Male	974	677	1,823	1,261	7	4	258	176
TOTAL		1,487	506	2,747	936	11	4	419	143

SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (3-year average, 2003–2005), and Healthcare Cost and Utilization Project Nationwide Inpatient Sample (HCUP NIS)

Figure 5. Hepatitis C: Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With All-Listed Diagnoses in the United States, 1979–2004

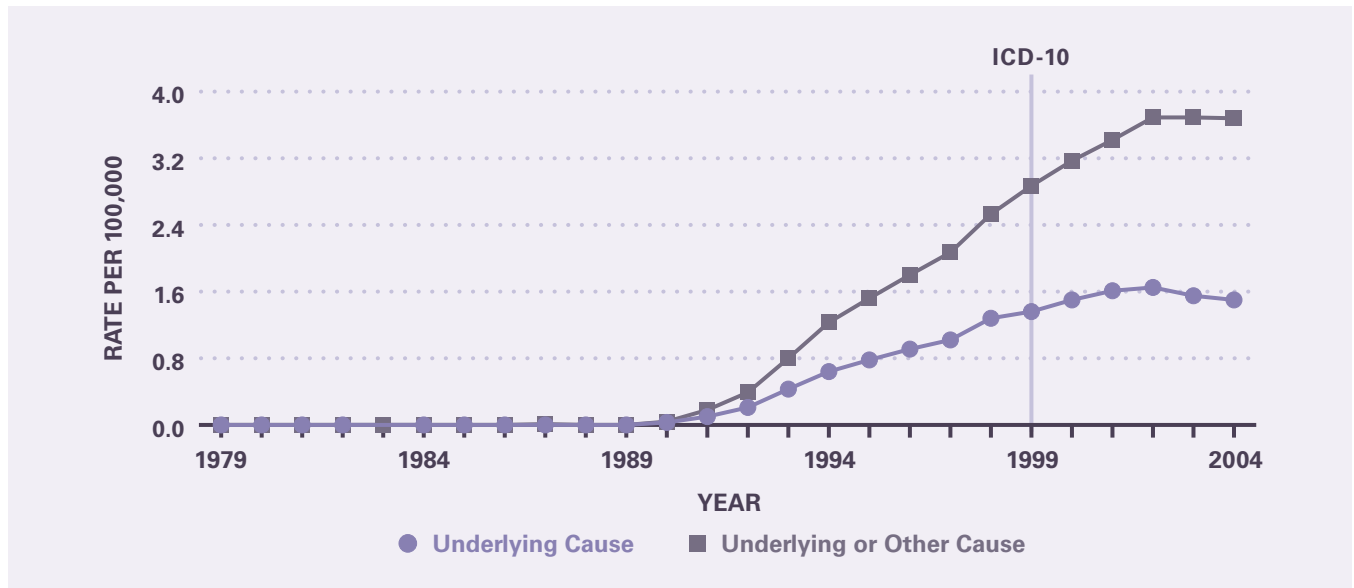
SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (averages 1992–1993, 1994–1996, 1997–1999, 2000–2002, 2003–2005), and National Hospital Discharge Survey (NHDS)

Table 6. Hepatitis C: Number and Age-Adjusted Rates of Deaths and Years of Potential Life Lost (to Age 75) by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	UNDERLYING CAUSE			UNDERLYING OR OTHER CAUSE		
	Number of Deaths	Rate per 100,000	Years of Potential Life Lost in Thousands	Number of Deaths	Rate per 100,000	
AGE (Years)	Under 15	2	0.0	0.1	3	0.0
	15–44	547	0.4	18.6	1,445	1.1
	45–64	3,062	4.3	66.1	7,590	10.7
	65+	984	2.7	2.7	2,253	6.2
RACE	White	3,712	1.4	71.0	8,771	3.4
	Black	718	2.2	14.2	2,111	6.4
SEX	Female	1,625	1.0	26.8	3,448	2.2
	Male	2,970	2.0	60.8	7,844	5.3
TOTAL		4,595	1.6	87.5	11,292	3.8

SOURCE: Vital Statistics of the United States

Figure 6. Hepatitis C: Age-Adjusted Rates of Death in the United States, 1979–2004

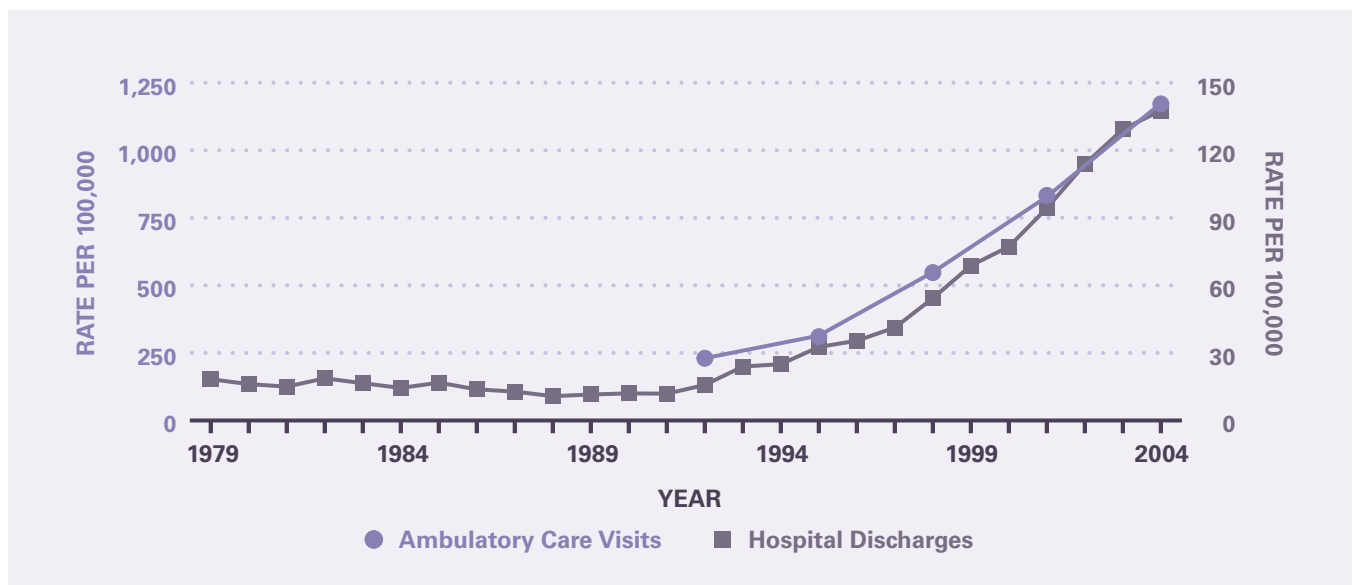


SOURCE: Vital Statistics of the United States

Table 7. All Viral Hepatitis: Number and Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With First-Listed and All-Listed Diagnoses by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	AMBULATORY CARE VISITS				HOSPITAL DISCHARGES				
	First-Listed Diagnosis		All-Listed Diagnoses		First-Listed Diagnosis		All-Listed Diagnoses		
	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	Number in Thousands	Rate per 100,000	
AGE (Years)	Under 15	—	—	—	—	1	1	1	2
	15–44	627	499	1,174	933	6	5	150	119
	45–64	1,118	1,582	1,914	2,708	10	14	271	383
	65+	—	—	399	1,099	2	6	53	147
RACE	White	1,260	509	2,101	852	14	6	330	133
	Black	315	869	919	2,625	3	9	113	326
SEX	Female	620	404	1,071	703	8	5	185	121
	Male	1,356	936	2,439	1,685	11	7	290	198
TOTAL		1,977	673	3,510	1,195	19	6	475	162

SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (3-year average, 2003–2005), and Healthcare Cost and Utilization Project Nationwide Inpatient Sample (HCUP NIS)

Figure 7. All Viral Hepatitis: Age-Adjusted Rates of Ambulatory Care Visits and Hospital Discharges With All-Listed Diagnoses in the United States, 1979–2004

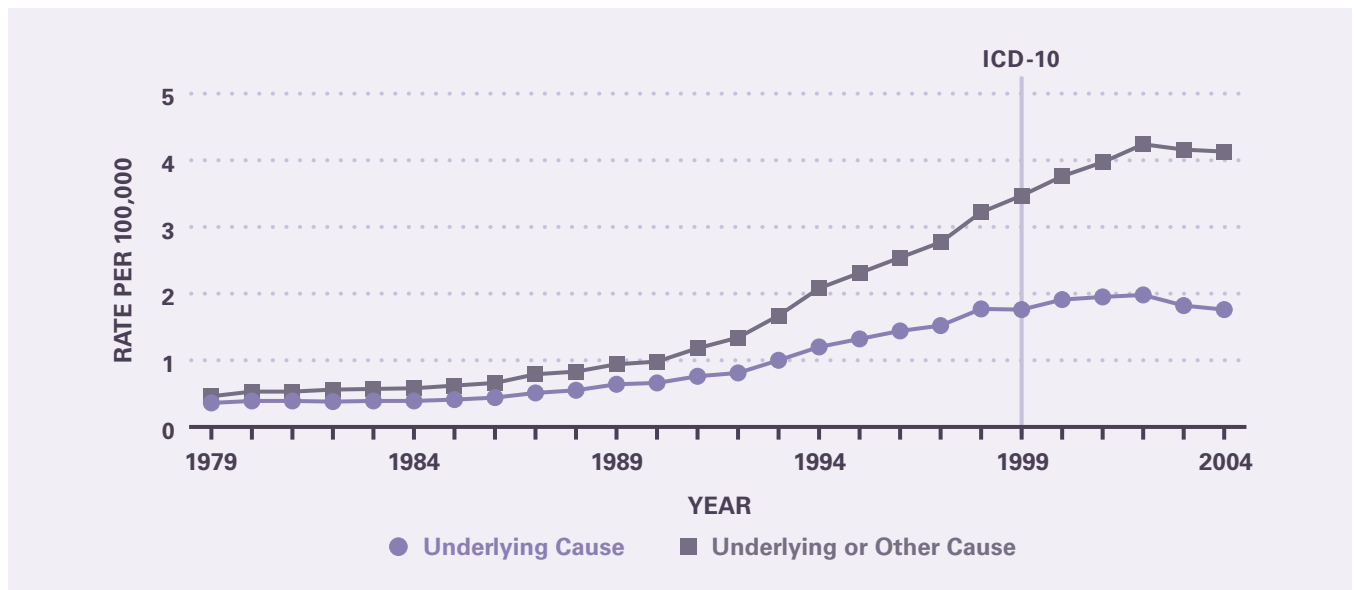
SOURCE: National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (averages 1992–1993, 1994–1996, 1997–1999, 2000–2002, 2003–2005), and National Hospital Discharge Survey (NHDS)

Table 8. All Viral Hepatitis: Number and Age-Adjusted Rates of Deaths and Years of Potential Life Lost (to Age 75) by Age, Race, and Sex in the United States, 2004

DEMOGRAPHIC CHARACTERISTICS	UNDERLYING CAUSE			UNDERLYING OR OTHER CAUSE		
	Number of Deaths	Rate per 100,000	Years of Potential Life Lost in Thousands	Number of Deaths	Rate per 100,000	
AGE (Years)	Under 15	3	0.0	0.2	9	0.0
	15–44	684	0.5	23.7	1,674	1.3
	45–64	3,477	4.9	74.7	8,249	11.7
	65+	1,229	3.4	3.2	2,723	7.5
RACE	White	4,254	1.7	80.4	9,538	3.7
	Black	866	2.6	17.1	2,401	7.3
SEX	Female	1,872	1.2	30.5	3,850	2.4
	Male	3,521	2.4	71.3	8,806	6.0
TOTAL		5,393	1.8	101.8	12,656	4.3

SOURCE: Vital Statistics of the United States

Figure 8. All Viral Hepatitis: Age-Adjusted Rates of Death in the United States, 1979–2004



SOURCE: Vital Statistics of the United States

Table 9. All Viral Hepatitis: Costliest Prescriptions

DRUG	Prescription (#)	Prescription	Retail Cost	Cost
Ribavirin	221,035	34.7%	\$229,351,616	40.0%
Peginterferon alfa-2a	131,001	20.5	191,754,177	33.5
Peginterferon alfa-2b	64,398	10.1	84,943,979	14.8
Adefovir	86,784	13.6	43,120,493	7.5
Lamivudine	134,657	21.1	23,580,159	4.2
TOTAL	637,875	100.0%	\$572,750,424	100.0%

SOURCE: Verispan