

## Hepatitis B

*Hepatitis B acute illness, carriage in pregnancy, and perinatal infection are class B diseases and must be reported to the state within one business day. Hepatitis B carriage (chronic), other than in pregnancy, is a class C disease and must be reported to the state within five business days.*

### Background

Hepatitis B is a liver infection caused by the hepatitis B virus (HBV). The disease can cause liver damage leading to cirrhosis and cancer and approximately 2% to 6% of adults of infected adults will become chronic carriers. HBV is transmitted when semen, blood, or another bodily fluid from a person infected with HBV enters the body of someone who is not infected. Transmission of the virus can occur through unprotected sexual contact; sharing needles, syringes, or other drug-injection equipment; or from mother to infant at birth. HBV can present symptoms very much like the flu. Symptoms include: fever, headache, loss of appetite, vomiting, tan-colored bowel movements, jaundice (yellowish eyes and skin), and dark urine.

An HBV infection can cause either an acute infection or a chronic infection. When a person is newly infected with HBV, it is called an acute infection. Most healthy adults infected with HBV do not have any symptoms and are able to get rid of the virus without any problems; however, those that are still infected after six months are diagnosed as having chronic HBV. Developing chronic HBV is directly related to the age at which a person is first exposed to HBV. The younger the exposed person, the greater is the risk of developing a chronic HBV infection.

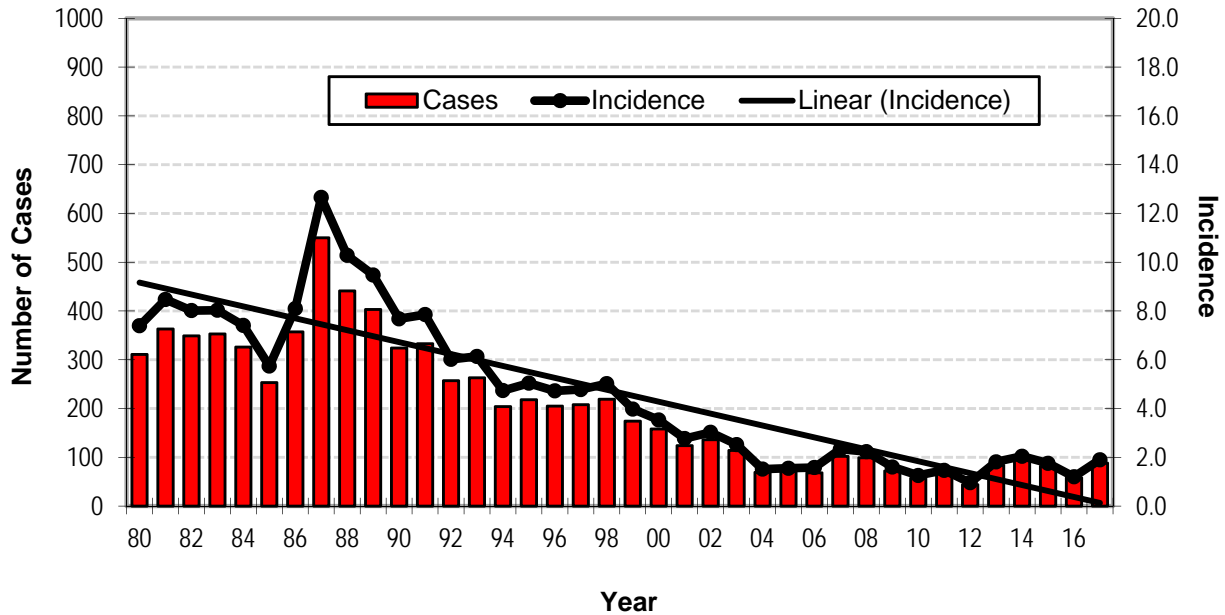
HBV in pregnant women poses a serious health risk to infants at birth. According to the Centers of Disease Control and Prevention (CDC), without immunoprophylaxis, approximately 90% of infants in the U.S. born to HBV-infected mothers will develop chronic HBV, one-fourth of whom will eventually die from chronic liver disease.

### 1. Acute Hepatitis B

#### Incidence / Prevalence

Using national statistics from the CDC, there were 3,218 acute HBV infections reported in 2016, an overall incidence of 1 per 100,000 population. This is down from over 4,500 cases reported in 2006. The introduction of the vaccine in 1982 and the generalization of immunizations have resulted in a steady decline in the number of reported cases of HBV over the past 35 years. However, in recent years, the number of new, acute cases reported nationally has slightly increased. Approximately 5% of the U.S. population has been infected by HBV; in Louisiana this would represent some 225,000 people. The number of new, acute cases reported in Louisiana was 158 in 2000 and 88 in 2017. This is an incidence of 1.9 new cases of HBV per population of 100,000 in 2017 (Figure 1).

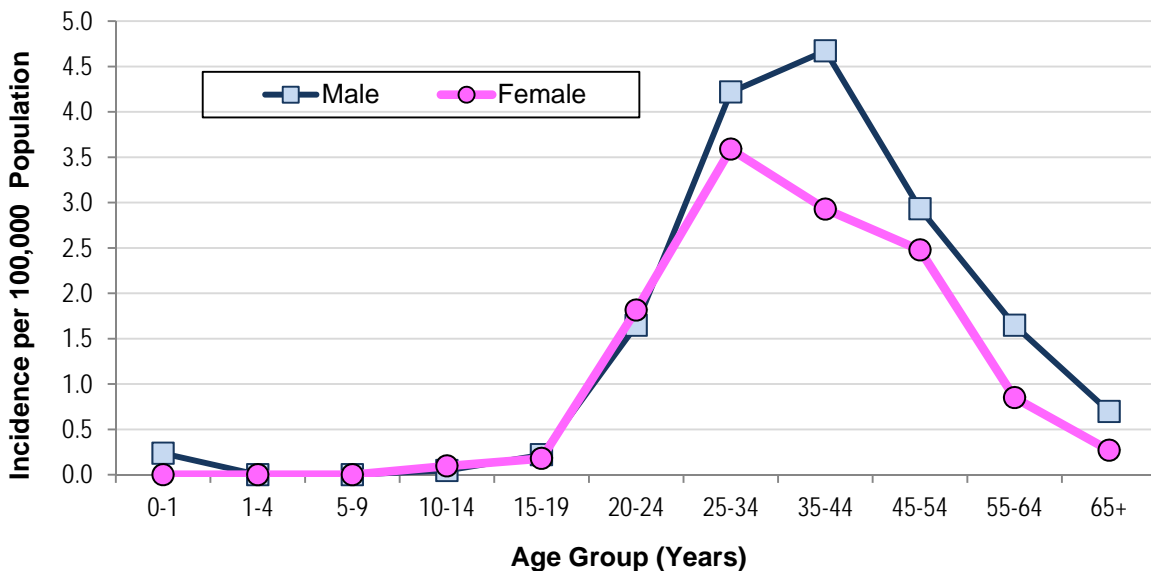
Figure 1: Number of New Cases and Incidence of HBV Infection Reported - Louisiana, 1980-2017



### Age Group / Race Distribution

The age group distribution of HBV infections shows very low rates among children and a sharp increase in early adulthood. The increase continues in adults until 25 to 34 years of age for both males and females. Adult males are at a slightly higher risk of infection than adult females (56% of all reported cases), a difference commonly attributed to intravascular drug abuse and homosexual contact (Figure 2).

Figure 2: Incidence of New Cases by Age and Gender - Louisiana, 2005-2017



Tables 1 and 2 show a comparison of the HBV infection rates by age and sex between two periods: 1991 to 2000; 2001 to 2010 and 2001 to 2010; 2011-2017.

The main differences observed in Table 1 are:

- large infection rate reductions among the younger age groups (75% to 100% for males) in the latest period, attributable to universal immunization of infants
- more modest reduction in young adults and some increases in older adults
- an increase in the rate of HBV infection in females aged 45 to 54 years

Table 1: HBV Incidence Rates by Sex - Louisiana, 1991-2000, 2001-2010

Age		1991-2000	2001-2010	% Change		1991-2000	2001-2010	% Change
0-1	Male	4.4	0.3	↓92%	Female	1.0	0.0	↓100%
1-4		0.6	0.1	↓88%		0.2	0.1	↓68%
5-9		0.7	0.0	↓100%		0.7	0.1	↓91%
10-14		1.4	0.2	↓88%		1.3	0.2	↓85%
15-19		3.7	0.7	↓80%		8.4	1.1	↓87%
20-24		10.5	5.1	↓51%		9.0	3.5	↓61%
25-34		12.7	5.6	↓55%		8.4	4.3	↓49%
35-44		9.2	4.7	↓49%		5.4	2.5	↓53%
45-54		6.2	3.9	↓38%		2.7	2.8	↑4%
55-64		3.3	3.0	↓10%		2.2	0.8	↓64%
65+		3.1	1.1	↓63%		1.8	0.7	↓60%

The main differences observed in Table 2 are:

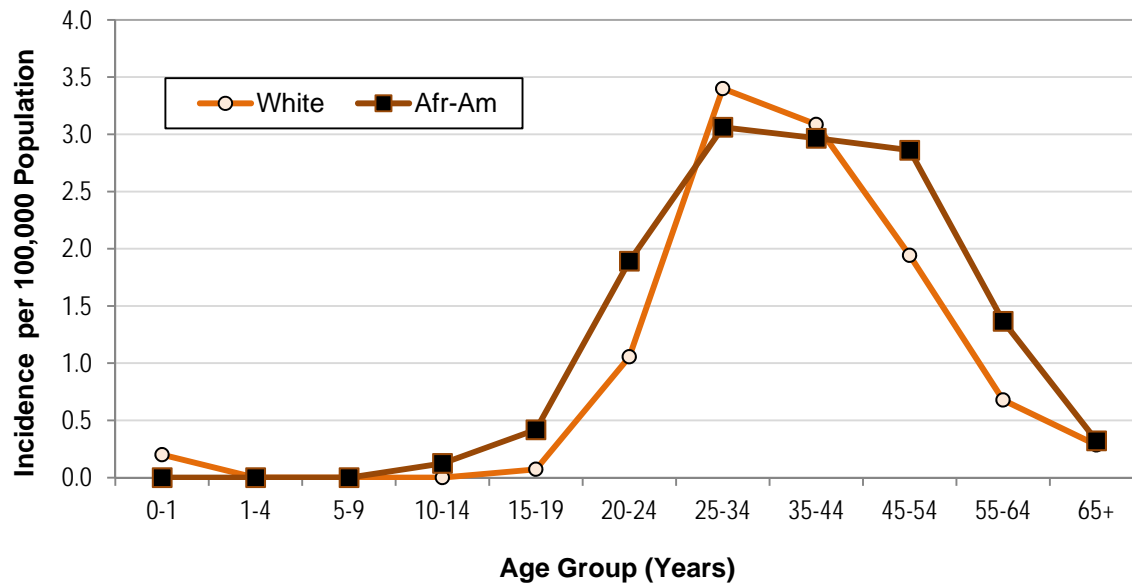
- an increase in HBV infection rate in both males and females aged to 35-44 years
- an increase in females aged 55-64 years

Table 2: HBV Incidence Rates by Sex - Louisiana, 2001-2010, 2011-2017

Age		2001-2010	2011-2017	% Change		2001-2010	2011-2017	% Change
0-1	Male	0.3	0.0	↓100%	Female	0.0	0.0	0
1-4		0.1	0.0	↓100%		0.1	0.0	↓100%
5-9		0.0	0.0	0		0.1	0.0	↓100%
10-14		0.2	0.0	↓100%		0.2	0.0	↓100%
15-19		0.7	0.1	↓88%		1.1	0.0	↓100%
20-24		5.1	0.5	↓90%		3.5	1.2	↓67%
25-34		5.6	3.6	↓36%		4.3	3.0	↓31%
35-44		4.7	5.2	↑10%		2.5	3.2	↑30%
45-54		3.9	2.6	↓32%		2.8	2.2	↓22%
55-64		3.0	1.2	↓59%		0.8	1.1	↑36%
65+		1.1	0.5	↓51%		0.7	0.3	↓56%

HBV immunization is recommended at birth, two months, and six months. The high uptake of HBV immunization seems to protect all children regardless of race. Racial differences appear in young adulthood and persist through the early sixth decade. African-Americans between 15 and 25 years of age as well as between 35 and 64 years of age are disproportionately affected by acute HBV (Figure 3).

Figure 3: Incidence of New Cases by Age and Race - Louisiana, 2005-2017



### Geographical Distribution

W. Baton Rouge, E. Feliciana, and Livingston parishes, all part of the Baton Rouge metropolitan area, have some of the highest rates of acute HBV infection in the state. Caldwell Parish, the fifth least-populated parish in Louisiana, has the third highest rate of acute HBV infection. As yet, this large variation in geographic distribution remains unexplained (Table 3).

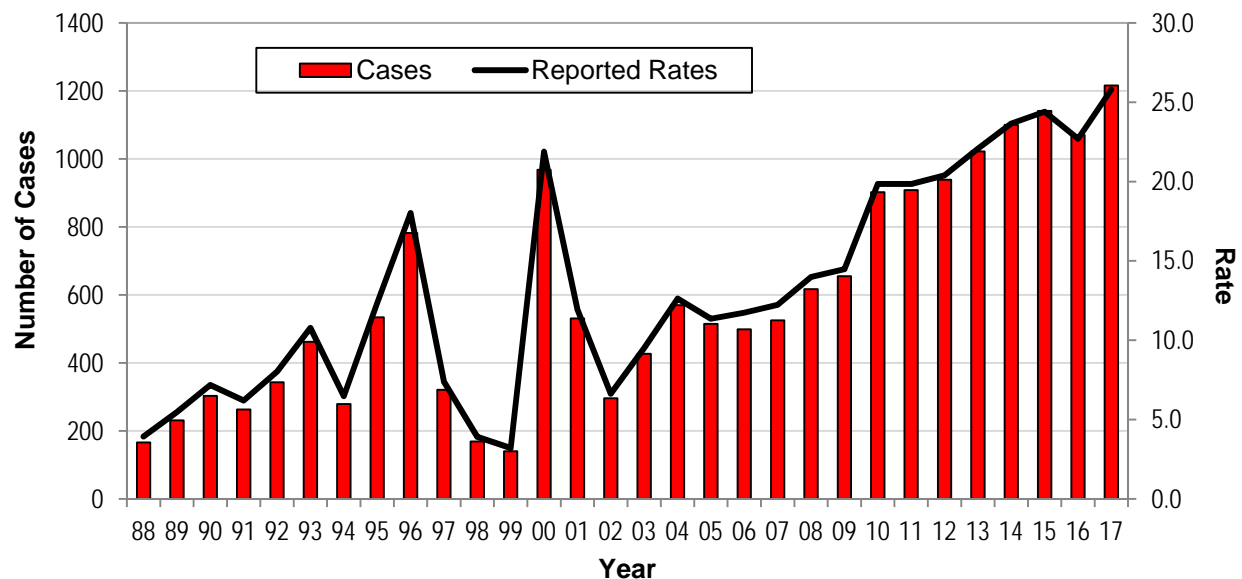
Table 3: Acute Hepatitis B Cases and Incidence Rates by Parish per 100,000  
Louisiana, 1991-2010 and 2011-2017

Parish	1991-2010		2011-2017		Parish	1991-2010		2011-2017	
	Avg. No. of Cases	Avg. Rate	Avg. No. of Cases	Avg. Rate		Avg. No. of Cases	Avg. Rate	Avg. No. of Cases	Avg. Rate
ACADIA	2	2.56	0.7	1.12	MADISON	0	1.91	0.1	1.14
ALLEN	1	2.33	0.1	0.54	MOREHOUSE	2	5.18	1.1	3.94
ASCENSION	2	2.18	1.7	1.54	NATCHITOCHE	1	3.40	0.1	0.35
ASSUMPTION	1	2.37	0.7	2.94	ORLEANS	37	8.72	3.7	1.04
AVOUELLES	1	2.42	0.3	0.66	OUACHITA	7	4.38	2.0	1.26
BEAUREGARD	0	1.23	0.1	0.39	PLAQUEMINES	1	4.52	0.1	0.60
BIENVILLE	0	1.25	0.1	0.96	POINT COUPEE	1	4.89	0.1	0.60
BOSSIER	3	3.44	0.6	0.47	RAPIDES	2	1.86	1.4	1.05
CADDO	12	4.71	1.4	0.54	RED RIVER	0	2.05	0.0	0.00
CALCASIEU	6	3.12	1.7	0.86	RICHLAND	0	2.13	0.3	1.33
CALDWELL	0	1.91	0.6	5.44	SABINE	1	2.50	0.0	0.00
CAMERON	0	2.87	0.0	0.00	ST. BERNARD	2	4.10	1.0	2.69
CATAHOULA	0	2.23	0.3	2.65	ST. CHARLES	1	2.25	0.3	0.52
CLAIBORNE	0	2.62	0.0	0.00	ST. HELENA	1	4.85	0.0	0.00
CONCORDIA	0	0.24	0.1	0.66	ST. JAMES	0	0.70	0.4	1.87
DESOTO	0	1.55	0.0	0.00	ST. JOHN	1	1.82	0.3	0.60
EAST B. R.	16	3.97	9.9	2.16	ST. LANDRY	3	3.10	0.6	0.66
EAST CARROLL	0	1.08	0.3	3.55	ST. MARTIN	1	2.09	0.6	1.06
EAST	0	2.20	1.1	5.44	ST. MARY	1	1.15	0.4	0.76
EVANGELINE	1	2.61	0.1	0.41	ST. TAMMANY	3	1.68	3.3	1.36
FRANKLIN	0	0.45	0.1	0.66	TANGIPAHOA	7	6.68	4.3	3.42
GRANT	0	1.06	0.1	0.62	TENSAS	0	0.74	0.3	5.25
IBERIA	2	3.02	0.3	0.38	TERREBONNE	1	1.05	2.9	2.47
IBERVILLE	1	2.23	1.1	3.30	UNION	0	1.35	0.1	0.61
JACKSON	0	0.95	0.0	0.00	VERMILION	2	4.25	0.6	0.95
JEFFERSON	12	2.63	3.9	0.86	VERNON	1	1.13	0.9	1.58
JEFFERSON	1	3.15	0.3	0.87	WASHINGTON	3	6.74	5.6	11.4
LA SALLE	0	1.41	0.1	0.93	WEBSTER	1	2.10	0.3	0.67
LAFAYETTE	5	2.76	2.9	1.24	WEST B. R.	0	1.92	0.4	1.74
LAFOURCHE	2	1.89	0.6	0.57	WEST CARROLL	0	1.22	0.0	0.00
LINCOLN	1	1.51	0.3	0.59	WEST FELICIANA	0	3.11	0.0	0.00
LIVINGSTON	2	2.24	12.3	9.26	WINN	0	1.71	0.3	1.80

## 2. Chronic Hepatitis B (Carriers)

The incidence of new infections has decreased as a result of the Hepatitis B vaccine, but the prevalence of chronic HBV remains high. In 2010, there was a 41% increase in chronic HBV cases reported to Louisiana. This increase was likely due to improved electronic reporting systems. Incidence of newly reported chronic HBV infections continued to increase through 2015. Between 2016 and 2017 the rate of newly reported chronic HBV infections increased by 14% (Figure 4).

Figure 4: Number of Cases Newly Reported and Reporting Rates of HBV Chronic Infection Louisiana, 1988-2017



According to a 2009 estimate by the CDC, an estimated 850,000 to 2.2 million persons in the U.S. have chronic HBV infections. The CDC estimates that 40% of infants born to HBV-infected mothers will develop chronic HBV if not treated with postexposure immunoprophylaxis. Cases of chronic HBV reported to the Louisiana Department of Health (LDH), Office of Public Health (OPH) are not new infections but are newly detected chronic infections.

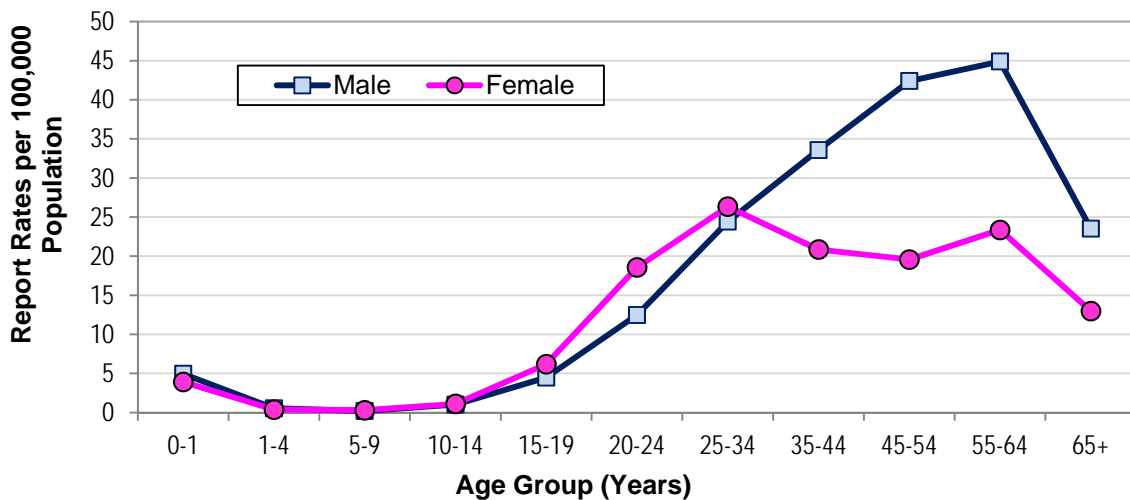
Approximately 0.5% of the population of Louisiana (21,000 people) are estimated to be chronic carriers of HBV, meaning that they are chronically infected with the virus.

Chronic carriers of HBV are easily diagnosed by the presence of the Hepatitis surface antigen in the blood (HBsAg). A case of chronic HBV infection is confirmed when HBsAg is detected in the blood twice, with tests at least six months apart. Among those chronically infected with HBV, some 5% to 10% (1,000 to 2,000 people) develop chronic liver disease during their lifetime. The peaks and troughs displayed throughout the past decades are very likely reporting and documentation artifacts.

### Age Group / Race Distribution

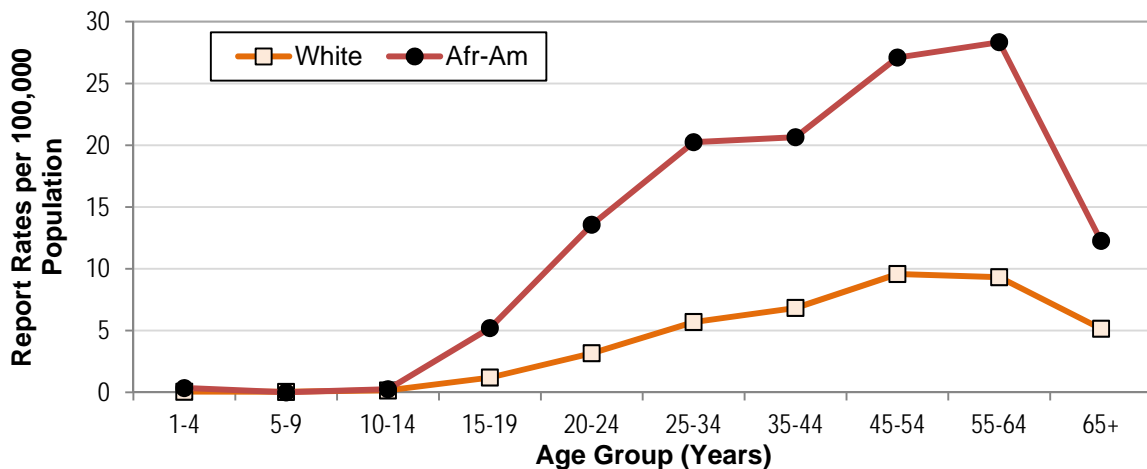
The reporting rates of chronic HBV infections by age and gender and race and gender look very similar to the incidence rates of acute HBV. Reporting rates for women between the ages of 10 and 24 years of age are higher than for men the same age. The reporting rates for women begin to decrease in the 25 to 34 year-old age group. Rates for men increase steadily from 10 years of age to 54 years of age with the highest rate being in the 55 to 64-year-old age group (Figure 5).

Figure 5: Newly Reported Chronic Hepatitis B Cases by Age and Gender - Louisiana, 2005-2017



As with acute HBV, racial disparities appear in the late teens and become interestingly apparent from young adulthood through the sixth decade with a considerably higher burden of HBV carriage present in African-Americans than Whites (Figure 6).

Figure 6: Newly Reported Chronic Hepatitis B Cases by Age and Race - Louisiana, 2005-2017



## Geographical Distribution

Chronic HBV distribution rates are higher in urban centers (greater New Orleans and Baton Rouge). As with the geographical distribution of acute HBV, rural parishes with high rates have few numbers and a low population which gives a higher rate (Table 4).

Table 4: Chronic Hepatitis B Average Rate of Reporting by Parish per 100,000 Population

Parish	1991-2010		2011-2017		Parish	1991-2010		2011-2017	
	Avg. No. of Cases	Avg. Rate	Avg. No. of Cases	Avg. Rate		Avg. No. of Cases	Avg. Rate	Avg. No. of Cases	Avg. Rate
ACADIA	6.45	11.0	10.3	16.07	MADISON	1.3	9.93	1.6	12.54
ALLEN	1.4	5.94	6.3	23.55	MOREHOUSE	2.95	9.26	6.7	23.16
ASCENSION	4.1	5.41	17.6	15.82	NATCHITOUCHE	2.4	6.27	4.9	11.85
ASSUMPTION	1.45	6.24	3.7	15.31	ORLEANS	106.9	24.9	168.3	47.25
AVOUELLES	1.55	3.75	5.6	12.78	OUACHITA	20.2	13.5	33.0	20.72
BEAUREGARD	0.45	1.38	3.3	8.90	PLAQUEMINES	1.95	8.01	7.7	32.32
BIENVILLE	0.5	3.12	1.1	7.69	POINT COUPEE	2	8.51	2.9	12.10
BOSSIER	7.95	8.29	14.0	11.55	RAPIDES	6.7	5.18	20.6	15.09
CADDO	43.6	17.4	61.3	23.20	RED RIVER	0.3	3.07	0.6	6.07
CALCASIEU	13.95	7.64	34.0	17.03	RICHLAND	0.85	4.03	2.9	13.31
CALDWELL	0.5	4.77	1.6	14.97	SABINE	1.1	4.59	1.9	7.40
CAMERON	0.3	3.45	1.3	18.15	ST. BERNARD	5.35	9.32	12.0	32.27
CATAHOULA	0.25	2.23	0.7	6.63	ST. CHARLES	1.45	2.97	8.3	15.15
CLAIBORNE	2.1	12.2	2.0	11.23	ST. HELENA	0.3	2.91	2.1	18.46
CONCORDIA	0.65	3.10	2.9	13.25	ST. JAMES	0.8	3.73	2.0	8.73
DESOTO	1.55	6.02	2.9	10.35	ST. JOHN	2.95	6.70	7.7	16.21
EAST B.R.	51.9	12.7	124.6	27.32	ST. LANDRY	11.6	13.5	17.4	20.18
EAST CARROLL	0.65	7.05	2.1	26.66	ST. MARTIN	6.05	12.6	11.7	21.68
EAST	2	9.79	5.1	24.49	ST. MARY	3.2	5.66	12.4	21.95
EVANGELINE	2.1	6.10	2.4	6.90	ST. TAMMANY	11.7	6.13	30.0	12.39
FRANKLIN	0.85	3.83	3.9	17.93	TANGIPAHOA	15.35	15.4	24.0	19.13
GRANT	0.55	2.91	2.0	8.65	TENSAS	0.5	7.39	0.7	13.13
IBERIA	9.4	12.9	16.9	22.22	TERREBONNE	8.95	8.53	25.3	21.82
IBERVILLE	3.7	11.8	15.3	44.19	UNION	1.1	4.95	3.7	15.78
JACKSON	1.05	6.64	1.4	8.47	VERMILION	6.8	12.8	14.0	23.30
JEFFERSON	46.5	10.2	120.1	26.81	VERNON	1.65	3.10	9.7	17.92
JEFF. DAVIS	1.95	6.14	5.1	15.71	WASHINGTON	5.8	13.2	15.7	32.16
LA SALLE	0.5	3.54	4.7	30.56	WEBSTER	2.5	5.84	5.6	13.05
LAFAYETTE	32.65	17.3	51.3	22.34	WEST B. R.	1.95	9.35	4.4	17.97
LAFOURCHE	4.3	4.78	14.9	14.89	WEST	0.3	2.44	1.3	10.70
LINCOLN	1.4	3.24	5.0	10.33	WEST	1.6	12.4	4.6	28.24
LIVINGSTON	4.35	4.74	22.1	16.70	WINN	1.75	9.97	1.0	6.30



### 3. Hospitalizations

In 1997, the Louisiana Legislature mandated the reporting of hospital discharge data. The Louisiana Hospital Discharge Database (LaHIDD) serves as the state registry containing inpatient discharge data submitted to LDH, OPH by Louisiana hospitals. Yearly LaHIDD datasets contain parish, age, admit date, demographic and diagnosis information on all inpatients. These datasets are a tremendous resource allowing epidemiologists to examine absolute numbers and trends due to infectious diseases, for example, hepatitis related disease (Table 5).

Table 5: Hepatitis B-Related Hospitalizations (Main and Secondary Diagnoses)  
Louisiana, 1999-2014

Year	Hospitalizations	Rate per 100,000	Males	Females	Percent Males
1999	676	15.5	391	285	57.8%
2000	796	18.0	433	363	54.4%
2001	955	21.5	567	388	59.4%
2002	835	18.7	455	380	54.5%
2003	895	19.9	525	370	58.7%
2004	937	20.8	533	404	56.9%
2005	818	18.0	468	350	57.2%
2006	635	14.9	360	275	56.7%
2007	739	17.2	437	302	59.1%
2008	1,003	22.7	608	395	60.6%
2009	1,018	22.5	613	405	60.2%
2010	986	21.7	616	370	62.5%
2011	1,124	24.6	697	427	62.0%
2012	824	17.9	484	340	58.7%
2013	824	17.5	476	346	57.8%
2014	879	18.3	515	364	58.6%

HBV hospital discharge rates increased by over 50% since 2005 and peaked in 2011 with a rate of 24.5 per 100,000 population. The increase is likely due to higher rates of testing for HBV. Males have made up the majority of the hospital admissions related to HBV in the period from 1999 to 2014.

### 4. Mortality

According to the CDC, from 2,000 to 4,000 deaths each year in the U.S. are attributed to hepatitis B.

The ICD-10 codes for hepatitis B-related deaths are:

B16.0, B16.1, B16.2 and B16.9 for acute hepatitis B

B18.0 and B 18.1 for chronic hepatitis B.

The number of acute HBV-related deaths in Louisiana has decreased since 1999 (Table 6). There are very few chronic HBV-related deaths each year in Louisiana.

Table 6: Hepatitis B Related Deaths- Louisiana 1999-2014

<b>Year</b>	<b>Acute Hepatitis B</b>	<b>Chronic Hepatitis B</b>
1999	56	3
2000	53	1
2001	55	9
2002	45	5
2003	43	1
2004	39	3
2005	24	4
2006	23	2
2007	27	2
2008	27	2
2009	27	2
2010	30	2
2011	21	0
2012	39	1
2013	27	2
2014	48	2