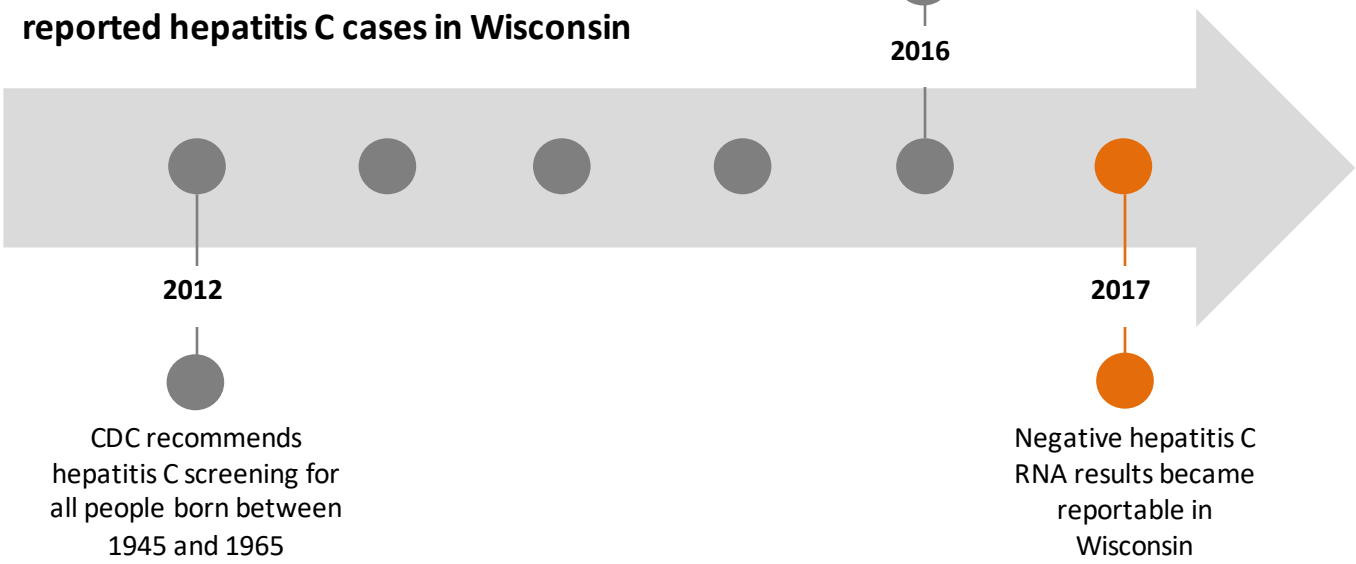
Wisconsin Hepatitis C Virus Surveillance

Annual Review, 2017

Newly Reported Cases, Prevalent Cases, and Trends

Timeline of events impacting hepatitis C surveillance and the number of reported hepatitis C cases in Wisconsin



WISCONSIN DEPARTMENT of HEALTH SERVICES

Division of Public Health
AIDS/HIV Program
P-00440-2017 (06/2018)

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Hepatitis C Virus

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV). HCV is spread primarily by exposure to blood of a person with HCV. Acute HCV infection is a short-term illness that occurs within the first six months after exposure to the virus. For most people, acute infection leads to chronic infection. Chronic HCV infection is a long-term illness that occurs when HCV remains in a person's body. HCV infection can last a lifetime and lead to serious liver problems, including cirrhosis (scarring of the liver) or liver cancer. It is the most common bloodborne infection in the U.S. with approximately 3.5 million persons with current infection.[1] The majority of persons with HCV are not aware of their infection because they do not have symptoms, but they are a source of transmission to others and at risk for chronic liver disease. Often these persons were infected many years ago through exposure to contaminated blood or medical equipment before screening and infection control procedures were established, or through injection drug use. Among people who become infected today, infection most often occurs by sharing needles or other equipment used to inject drugs. Although less common, HCV can also be spread from an infected mother to her infant, by invasive health care procedures, or sexually.

Surveillance Summary for 2017

New Reports and Disease Status: During 2017, 3,067 HCV diagnoses (2,968 chronic, 99 acute) were reported in Wisconsin at a rate of 53.1 cases per 100,000 people. The change to the surveillance system in 2017, described in the next section, limits the ability to compare 2017 to previous years. The number of confirmed cases, which was not affected by this change, increased slightly, by 32 cases, from 2016 to 2017.

Acute Hepatitis C: In 2017, 99 reports of acute HCV were reported at a rate of 1.7 cases per 100,000. Reports of acute HCV infection increased 136% from 2013 to 2017 in Wisconsin. Surveillance data indicate the majority of these acute infections resulted from injection drug use.

Geography: In 2017, new HCV cases were reported from 71 of Wisconsin's counties. Milwaukee County accounted for 24%, Dane County for 7% and Kenosha and Waukesha County each for 4% of HCV reports in 2017. Of the 72 counties, 37 (51%) reported an increase in the number of confirmed cases from 2016 to 2017.

Prevalence: Recent estimates of HCV infection in the U.S. suggest 3.5 million people are living with HCV. Based on national estimates of age, sex, and race-specific sero-prevalence, approximately 90,000 Wisconsin residents have evidence of HCV infection, of which 42,516 have been identified.

Age: In 2017, there were 721 HCV infections reported among people aged 15-29 in Wisconsin. From 2008 to 2017, the rate of HCV in this age group more than tripled, from 19.3 to 63.0 cases per 100,000. Infections in this age group are attributed to a rise in injection drug use. In 2017, there were 1,214 HCV infections reported among people born during 1945-1965. This group represents the baby boomer generation who, in the U.S., are five times more likely than other adults to be chronically infected.

Sex: In 2017, there were 1,205 females and 1,862 males reported with HCV infection in Wisconsin. From 2008 to 2017, the number of females of reproductive age (15-44 years) reported with HCV infection increased 140%.

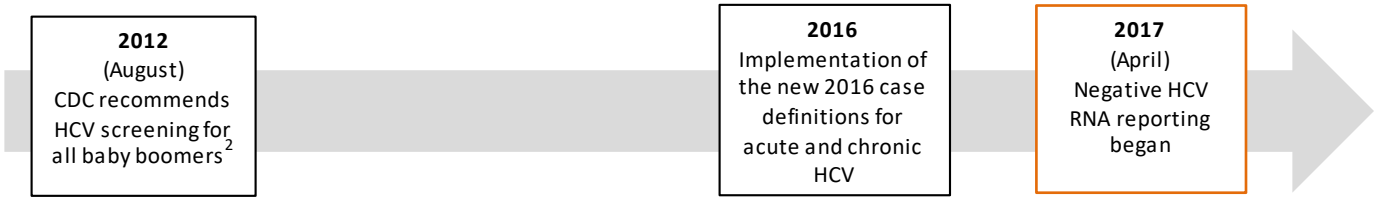
Race and Ethnicity: In 2017, similar to previous years, the reported rates of HCV among American Indians and non-Hispanic Blacks were substantially higher than the rate among non-Hispanic Whites.

Risk: The primary risk factor for acute HCV infection was injection drug use, reported by 62 (63%) of 99 persons with acute HCV. Among those who reported injection drug use, 58% reported sharing "works" (injection equipment).

Important change to the surveillance system and its impact on 2017 results

This report summarizes information reported to the Wisconsin Department of Health Services, Division of Public Health (DPH), via the Wisconsin Electronic Disease Surveillance System (WEDSS) from laboratories, health care providers, and local health departments regarding reports of acute and chronic HCV infection in Wisconsin by the year the infection was first reported to WEDSS. Since 2012, several changes have occurred to the surveillance system that have impacted the number of new HCV reports in Wisconsin (**Box 1**). During 2017, negative HCV ribonucleic acid (RNA) results became reportable to WEDSS. The importance of this information, the impact on the 2017 data, and the implications for comparing 2017 data to previous years are described below.

Box 1. Timeline of events impacting the number of HCV reports in Wisconsin



Negative HCV RNA results became reportable in 2017. As a result, HCV total case counts and rates for 2017 are not directly comparable to 2016 and previous years.

Why are negative HCV RNA results important?

- Negative HCV RNA results after a positive HCV antibody result indicate the person cleared the infection (either naturally or through treatment), and is *not* chronically infected with HCV.
- With this information, chronic HCV cases with detectable HCV viral load can be prioritized, and those with no detectable viral load can be accurately classified as "not a case" of chronic HCV (see **Box 2**).
- In future analyses, negative RNA results can be used to estimate how many HCV cases have been cured through treatment.

How were the 2017 results impacted by this change?

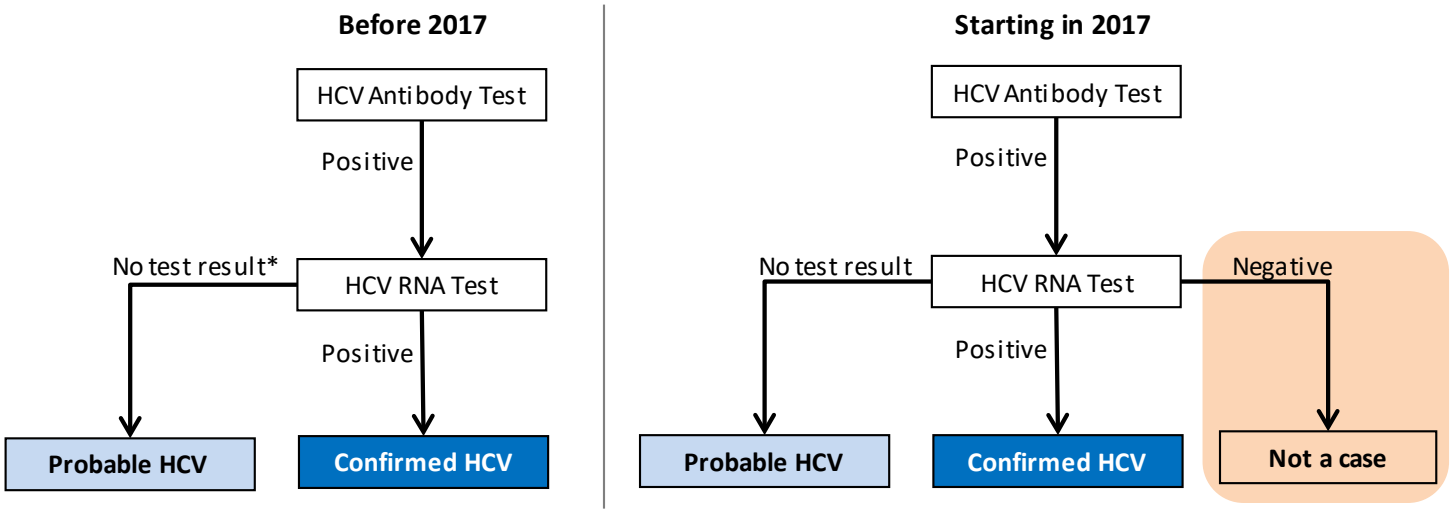
- Persons first reported to WEDSS in 2017 with negative RNA results (and no positive RNA results) are excluded from this report. Previously, these individuals were included in the annual surveillance reports as probable cases (see **Box 2**), which resulted in an overestimate of the number of probable chronic HCV cases in previous years.
- As a result of negative RNA reporting, the number of probable cases and the number of total HCV cases reported in 2017 are lower than in 2016 (see **Box 2**).

Can we assess any changes in trend from 2016 to 2017?

- The number of confirmed HCV cases is not affected by the reporting of negative RNA results.
- Therefore, trends in HCV from 2016 to 2017 can be evaluated using the difference in the number of confirmed cases from 2016 to 2017.
- In this report, an up arrow (⇧) is shown when the number of confirmed cases increased from 2016 to 2017.
- However, it is important to interpret these data with caution. Trends in the number of HCV cases can be impacted by several factors, such as increased HCV screening and HCV RNA testing, as described in the technical notes at the end of this report.

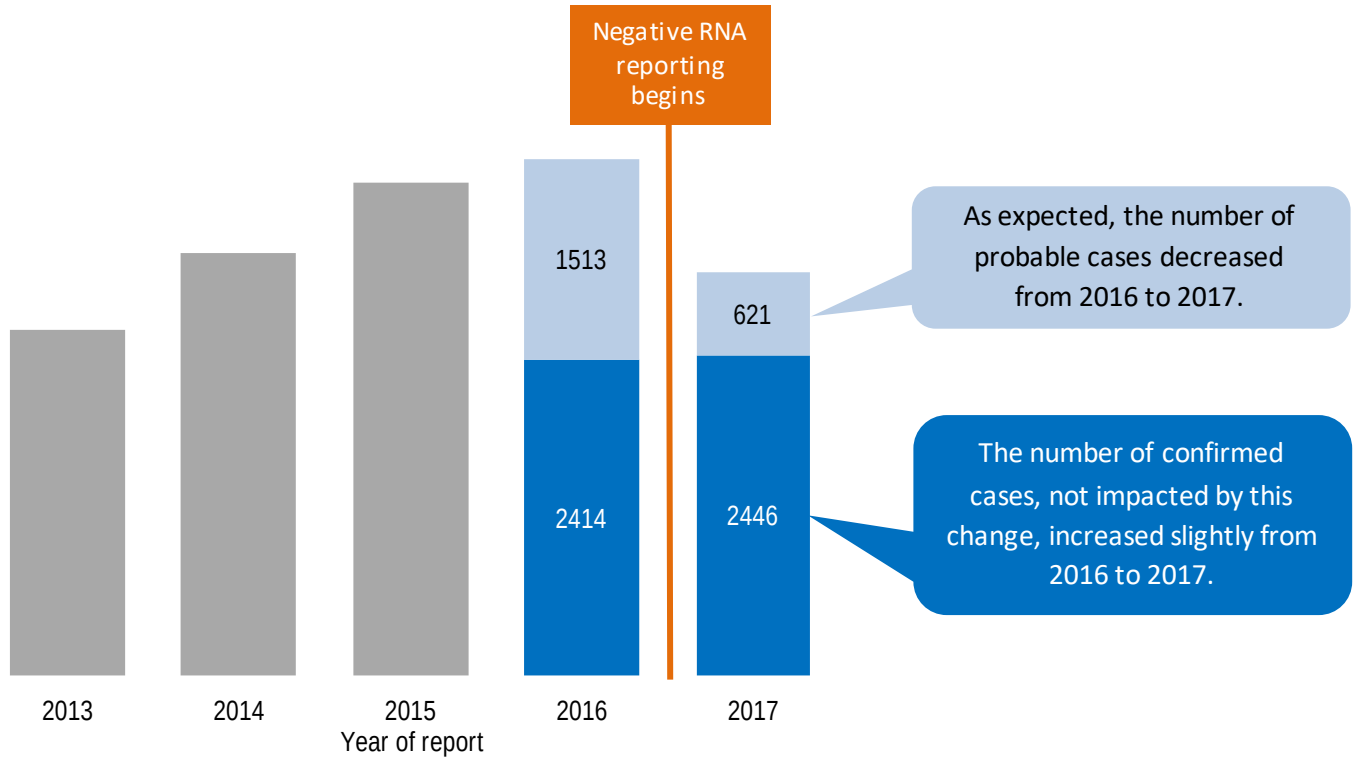
Box 2. This report includes HCV cases classified as confirmed or probable, based on the test results reported to WEDSS. Before 2017, only positive HCV test results (antibody and RNA) were reported to WEDSS, and individuals with positive HCV antibody results and negative HCV RNA results were classified as probable cases of chronic HCV. With negative HCV RNA results being reportable in 2017, individuals with positive HCV antibody results and negative HCV RNA results are now classified as 'not a case' of chronic HCV and are not included in this report. As a result, the number of probable cases and the number of total HCV cases reported in 2017 are lower than in 2016.

Classification of HCV reports based on the test results reported to WEDSS



*Includes negative test results

Impact of negative RNA reporting on the number of HCV reports in Wisconsin in 2017



All Cases

Table 1. HCV reports in Wisconsin, 2017

Case definition	Number	Rate per 100,000
Hepatitis C, Chronic†	2,968	51.4
Hepatitis C, Acute‡	99	1.7
Total	3,067	53.1

†Includes 2,352 confirmed and 616 probable.
‡Includes 94 confirmed and 5 probable.

Case Definitions and Classifications, 2016

Hepatitis C, Chronic, Confirmed, and Probable can be found at: National Notifiable Diseases Surveillance System, Hepatitis C, Chronic

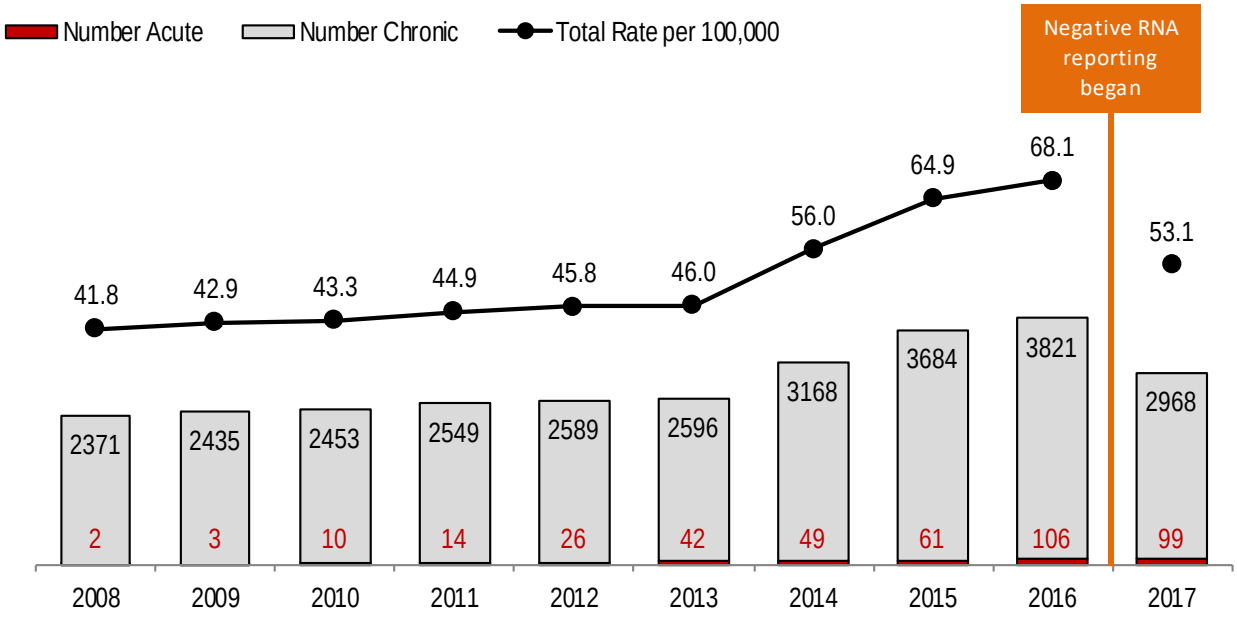
Hepatitis C, Acute, Confirmed, and Probable can be found at: National Notifiable Diseases Surveillance System, Hepatitis C, Acute

Table 2. History of HCV reports† in Wisconsin, 2008-2017

	Past/Present and Chronic		Acute		Total	
Year	Number	Rate per 100,000‡	Number	Rate per 100,000‡	Number	Rate per 100,000‡
2008	2,371	41.8	2	--	2,373	41.8
2009	2,435	42.9	3	--	2,438	42.9
2010	2,453	43.1	10	0.2	2,463	43.3
2011	2,549	44.7	14	0.2	2,563	44.9
2012	2,589	45.3	26	0.5	2,615	45.8
2013	2,596	45.3	42	0.7	2,638	46.0
2014	3,168	55.1	49	0.9	3,217	56.0
2015	3,684	63.9	61	1.1	3,745	64.9
2016±	3,821	66.2	106	1.8	3,927	68.1
2017§	2,968	51.4	99	1.7	3,067	53.1

†Includes probable and confirmed cases. ‡Rates based on counts less than five have been suppressed. Rates based on counts less than 12 are statistically unreliable. ±Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. §Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

Figure 1. The number and rate of HCV reports in Wisconsin increased from 2008 to 2016, but the change to the surveillance system during 2017 limits comparisons of 2017 data to previous years



All Cases: Reports by County

Table 3. Newly reported HCV by county of residence

County of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate† per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Adams	6	11	22	28	24	△ 117.0	1	-4
Ashland	8	13	6	10	7	44.1	0	-1
Barron	20	17	20	24	19	41.2	1	-1
Bayfield	3	10	13	5	6	39.8	0	↑ 2
Brown	123	108	139	156	78	30.2	3	-50
Buffalo	4	3	6	5	4	--	0	0
Burnett	5	11	22	18	12	△ 77.7	0	0
Calumet	12	20	18	18	9	17.7	0	-4
Chippewa	32	25	16	46	32	50.1	1	-1
Clark	9	10	11	14	12	34.5	0	↑ 2
Columbia	20	28	42	44	35	△ 61.4	1	↑ 11
Crawford	2	3	10	7	5	30.1	0	0
Dane	183	218	304	347	203	38.9	7	↑ 14
Dodge	23	20	42	49	44	49.2	1	↑ 2
Door	7	4	7	4	10	35.8	0	↑ 7
Douglas	42	50	40	23	31	△ 70.2	1	↑ 11
Dunn	19	15	22	19	11	24.7	0	-3
Eau Claire	52	58	65	80	41	40.2	1	↑ 2
Florence	9	1	3	10	4	--	0	-2
Fond du Lac	43	39	65	68	46	44.7	1	-8
Forest	9	7	7	11	11	△ 119.4	0	↑ 4
Grant	6	13	10	19	24	45.4	1	0
Green	9	12	14	15	15	40.6	0	↑ 4
Green Lake	9	9	14	16	11	△ 57.9	0	0
Iowa	2	6	10	15	7	29.5	0	↑ 1
Iron	2	4	6	2	2	--	0	↑ 1
Jackson	8	16	10	20	11	△ 53.2	0	↑ 3
Jefferson	25	42	56	56	40	47.4	1	↑ 2
Juneau	15	19	18	22	27	△ 100.9	1	↑ 7
Kenosha	83	122	121	91	110	△ 65.6	4	↑ 14
Kewaunee	5	2	5	3	6	29.1	0	↑ 4
La Crosse	53	59	78	74	67	△ 56.8	2	↑ 8
Lafayette	1	8	5	4	7	41.5	0	↑ 1
Langlade	13	26	24	22	12	△ 60.8	0	-3
Lincoln	14	16	15	19	21	△ 73.7	1	↑ 4
Manitowoc	36	42	53	54	38	47.0	1	-7
Marathon	60	53	48	78	56	41.3	2	↑ 4
Marinette	22	32	27	47	30	△ 72.9	1	-3
Marquette	4	9	6	18	18	△ 117.5	1	↑ 4
Menominee	1	2	7	4	3	--	0	↑ 1
Milwaukee	591	797	901	773	722	△ 76.0	24	-36
Monroe	20	50	44	34	32	△ 69.9	1	↑ 11

County of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate† per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Oconto	16	9	11	14	13	34.3	0	↑ 4
Oneida	21	12	22	8	19	52.8	1	↑ 12
Outagamie	69	66	107	128	60	32.8	2	-17
Ozaukee	18	16	18	19	10	11.4	0	-2
Pepin	1	5	3	3	1	--	0	-1
Pierce	9	8	25	15	16	38.8	1	↑ 3
Polk	12	17	14	12	20	45.5	1	↑ 7
Portage	16	15	31	23	16	22.6	1	-2
Price	7	8	15	15	3	--	0	-5
Racine	100	114	124	143	90	46.1	3	-5
Richland	2	15	10	8	1	--	0	-4
Rock	88	105	99	89	74	46.1	2	↑ 9
Rusk	5	5	5	5	2	--	0	-1
St. Croix	18	17	34	34	21	24.1	1	↑ 1
Sauk	27	27	28	77	32	51.0	1	-19
Sawyer	12	15	16	14	14	△ 84.2	0	↑ 1
Shawano	6	8	21	38	29	△ 69.8	1	0
Sheboygan	43	41	57	58	45	39.1	1	0
Taylor	3	2	1	2	0	--	0	-1
Trempealeau	6	13	14	13	6	20.4	0	-1
Vernon	5	7	16	12	11	36.2	0	↑ 1
Vilas	16	8	15	28	20	△ 92.7	1	-4
Walworth	26	39	50	44	37	36.0	1	↑ 2
Washburn	7	10	9	6	7	44.2	0	↑ 2
Washington	25	29	37	31	45	33.6	1	↑ 22
Waukesha	91	97	126	110	109	27.5	4	↑ 22
Waupaca	15	49	59	57	34	△ 65.3	1	-2
Waushara	3	6	9	19	9	36.9	0	-5
Winnebago	77	90	125	122	65	38.4	2	-6
Wood	26	30	37	29	41	△ 55.1	1	↑ 12
Unknown	1	2	2	5	0	--	0	-3
Federal Corrections	0	8	0	2	1	--	0	↑ 1
State Corrections	257	314	253	372	313	--	10	↑ 10
Total	**2,638**	**3,217**	**3,745**	**3,927**	**3,067**	**53.1**	**100**	↑ **32**

†Rates based on counts less than five have been suppressed. Rates based on counts less than 12 are statistically unreliable. Rates are not available for Corrections populations. △ Indicates the rate in 2017 is higher than the statewide rate. ↑ Indicates the number of confirmed cases of HCV increased from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

In 2017, new HCV cases were reported among residents of 71 of Wisconsin's 72 counties. Milwaukee County accounted for 24% of cases, Dane County for 7%, and Kenosha and Waukesha counties each for 4%. **Table 3** includes the number of HCV reports for each county for the past five years and the population-based rate for the current year. In terms of rate per county population, 21 counties reported a rate in 2017 that was higher than the statewide rate for the year (indicated with a triangle in Table 3). Of the 72 counties, 37 (51%) reported more confirmed cases in 2017 than in 2016 (indicated by the gray arrow in Table 3). Statewide, 32 more confirmed cases were reported in 2017 than in 2016.

Table 4. Newly reported HCV by region of residence†

Region of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Northern	218	220	259	276	232	47.5	8	↑ 22
Northeastern	491	536	730	824	504	40.5	18	-82
Southern	389	492	630	736	509	41.8	18	↑ 23
Southeasten	959	1,256	1,433	1,267	1,163	57.1	42	↑ 19
Western	322	389	438	445	345	43.7	13	↑ 42
Unknown	1	2	2	5	0	--	0	-3
Total	2,380	2,895	3,492	3,553	2,753		100	↑ 21

†Excludes cases reported from Wisconsin Department of Corrections and the Federal Correctional Institution. ↑ Indicates the number of confirmed cases of HCV increased from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

In 2017, 42% of reports were from the southeastern region of the state. All regions except the northeastern region reported more confirmed cases in 2017 than in 2016.

Changes in number and rate in a county or region may be due to an increase in new HCV infections, changes in provider HCV screening practices from year to year, differences in the amount of resources each jurisdiction has dedicated to HCV surveillance, or differences in reporting of positive and negative HCV test results to WEDSS.

All Cases: Prevalence

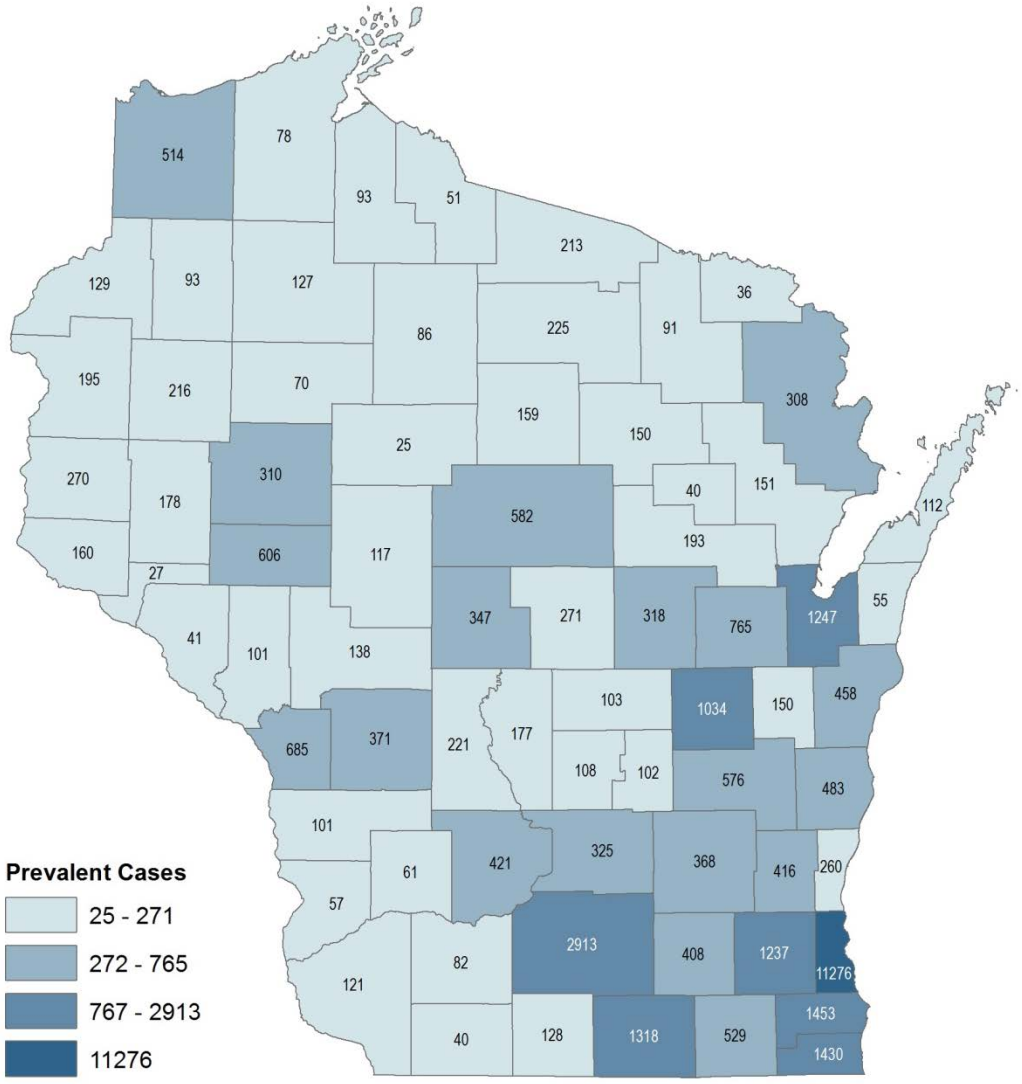
Recent estimates of HCV infection in the U.S. suggest 3.5 million people are living with HCV infection.[1] Infection is most common among those born between the years 1945 and 1965, the majority of whom were likely infected during the 1970s and 1980s when rates were highest. Since 2000, 42,516 HCV infections have been reported to DPH in individuals presumed to be alive as of December 2017. The CDC estimates that 45%–85% of persons with HCV have not been tested or identified so the true number of those with HCV in Wisconsin is unknown. Based on national estimates of age, sex, and race-specific prevalence of HCV antibody, approximately 90,000 Wisconsin residents have evidence of HCV infection.

Table 5. Prevalent reported HCV as of December 31, 2017, by region of residence

Public Health Region†	Number‡	Percent
Northern	2,534	7
Northeastern	6,203	16
Southern	6,333	17
Southeastern	17,006	45
Western	4,220	11
Unknown	1,544	4
Total	37,840	100

†Region represents region of residence at time of report.
‡Excludes 4,676 cases reported from the Wisconsin Department of Corrections and the Federal Correctional Institution.

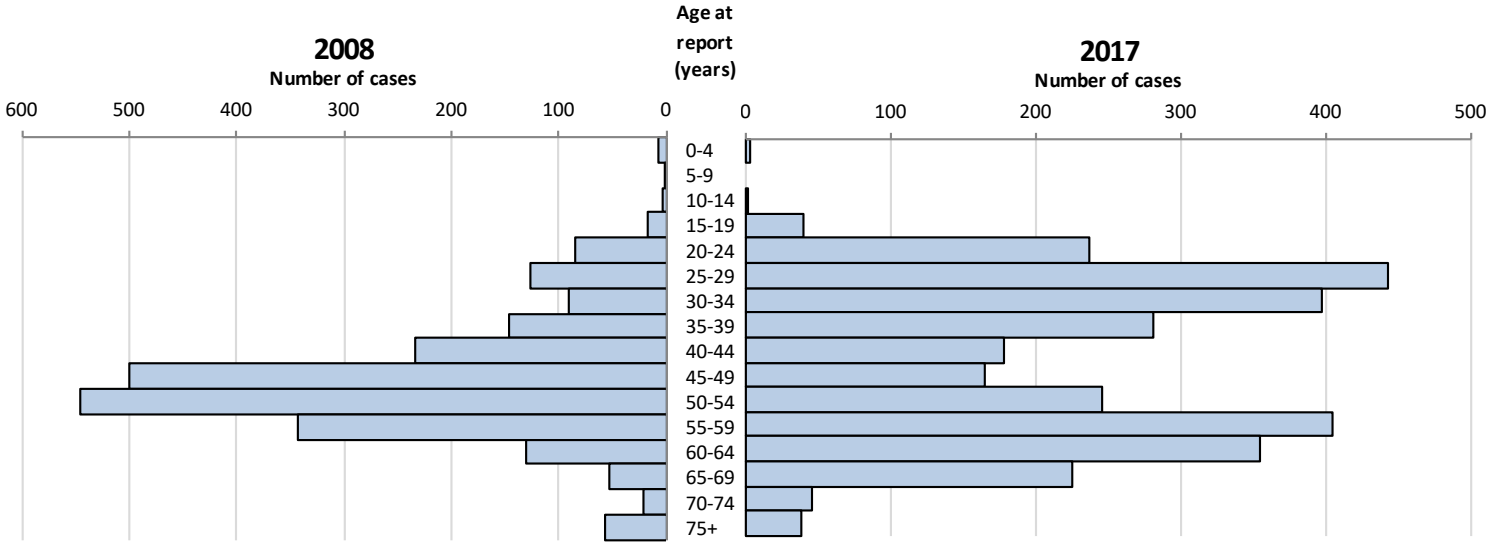
Figure 2. Prevalent reported HCV as of December 31, 2017, by county of residence†



†County represents county of residence at time of report. Cases originally reported from the Wisconsin Department of Corrections and the Federal Correctional Institution are not shown (n=4,676). County of residence is unknown for 1,544 reported cases.

All Cases: Reports by Age

Figure 3. During the past 10 years, the age distribution of new HCV reports has shifted from one peak among middle-aged adults to two peaks: one among younger adults and one among older adults



In 2017, nearly one-quarter (n=721) of new HCV reports were among people aged 15-29 years (**Table 6**). From 2008 to 2017, the number of HCV infections reported among people in this age group more than tripled (**Figure 3**). This increase has been attributed to increased heroin use in Wisconsin.[3] The same trends in HCV reports have been observed nationally[4] and have been attributed to increased injection drug use related to the opioid epidemic.[5]

In 2017, 40% (n=1,214) of new HCV reports were among people born during 1945-1965 (aged 52-72 in 2017). This group represents the baby boomer generation who, in the U.S., are five times more likely than other adults to be chronically infected. The number of reports among this birth cohort has increased since 2013, likely reflecting the 2012 recommendation that baby boomers be screened for HCV without prior ascertainment of HCV risk.[2]

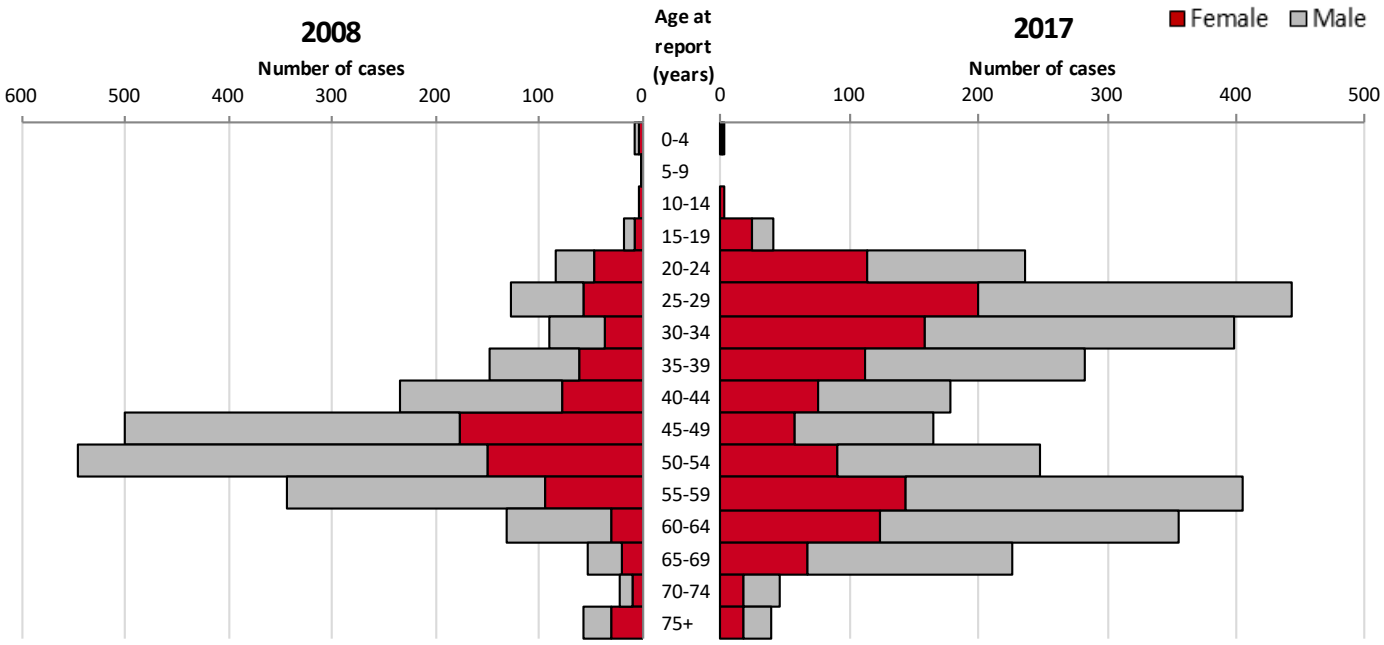
Table 6. Age at report of HCV in Wisconsin, 2013-2017

Age Group (Years)	2013		2014		2015		2016		2017		Change in number of confirmed cases 2016 to 2017	
	N	Rate†	N	Rate†	N	Rate†	N	Rate†	N	Rate†		
0-14	4	--	8	0.7	14	1.3	7	0.7	5	0.5	⇧	1
15-29	706	61.8	895	78.3	994	86.9	960	84.0	721	63.0		-52
30-39	430	60.9	520	72.9	667	93.5	754	104.6	680	93.5	⇧	26
40-49	411	54.7	420	57.6	412	56.5	428	60.1	343	49.3		-10
50-59	681	79.9	873	102.3	946	110.9	935	110.1	652	77.7		-12
60-69	328	53.1	418	65.1	624	97.2	730	109.2	581	83.8	⇧	62
70+	78	13.4	83	14.0	88	14.8	113	18.7	85	13.9	⇧	17
Total	2,638	46.2	3,217	56.1	3,745	65.3	3,927	68.1	3,067	53.1	⇧	32

†Rate is per 100,000 population in each age group. Rates based on counts less than five have been suppressed. Rates based on counts less than 12 are statistically unreliable. ⇧ Indicates the number of confirmed cases of HCV increased from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

All Cases: Reports by Sex

Figure 4. During the past 10 years, the number of women of reproductive age with HCV infection has increased by 140%



In 2017, there were 1,205 females and 1,862 males reported with HCV infection in Wisconsin. In 2017, 684 females of reproductive age (15-44 years) were reported with HCV infection, a 140% increase from 2008. Among females, the number of confirmed cases increased from 2016 to 2017 (**Table 7**).

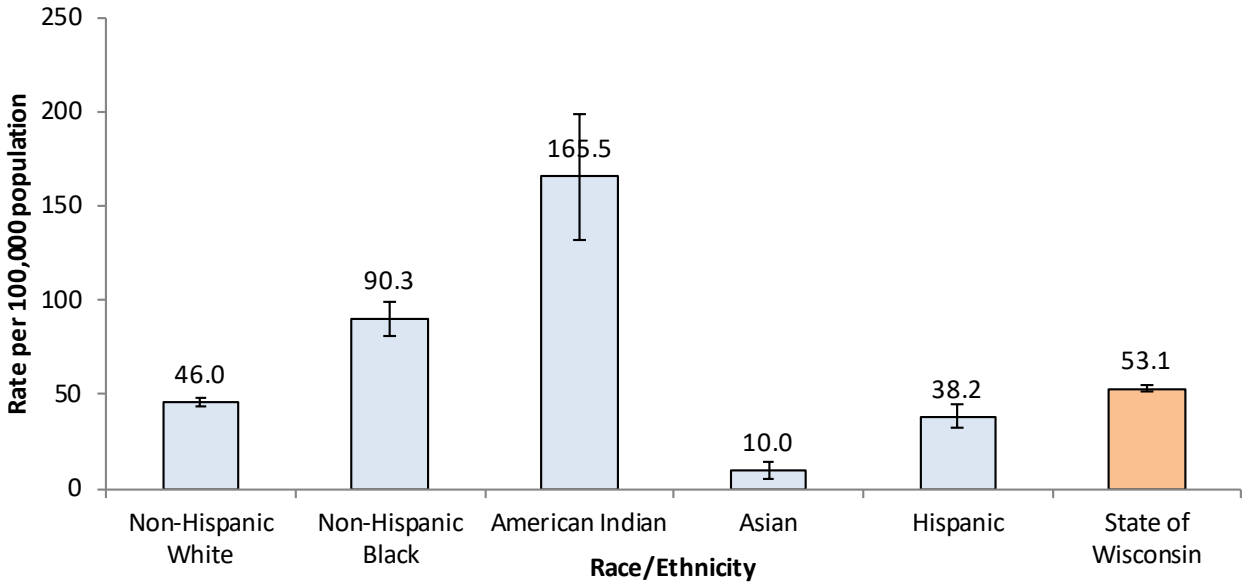
Table 7. Sex of reported HCV cases in Wisconsin, 2013-2017

	2013		2014		2015		2016		2017		Change in number of confirmed cases 2016 to 2017
Sex†	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	
Male	1,515	53.2	1,953	68.4	2,248	78.5	2,314	80.8	1,862	64.8	-24
Female	1,123	38.9	1,263	43.7	1,497	51.6	1,612	55.6	1,205	41.5	⇧ 57
Total	2,638	46	3,217	56	3,745	65.3	3,927	68.1	3,067	53.1	⇧ 32

†Sex of report was unknown for one in 2014 and one in 2016. ⇧ Indicates the number of confirmed cases of HCV increased from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

All Cases: Reports by Race and Ethnicity

Figure 5. American Indians and non-Hispanic Blacks had significantly higher rates† of reported HCV in 2017 compared to the statewide rate



†Numbers shown are the rate per 100,000 population. The error bars show 95% confidence intervals for the rate. Reports with unknown race (n=223, 7% of reports) were excluded from this figure.

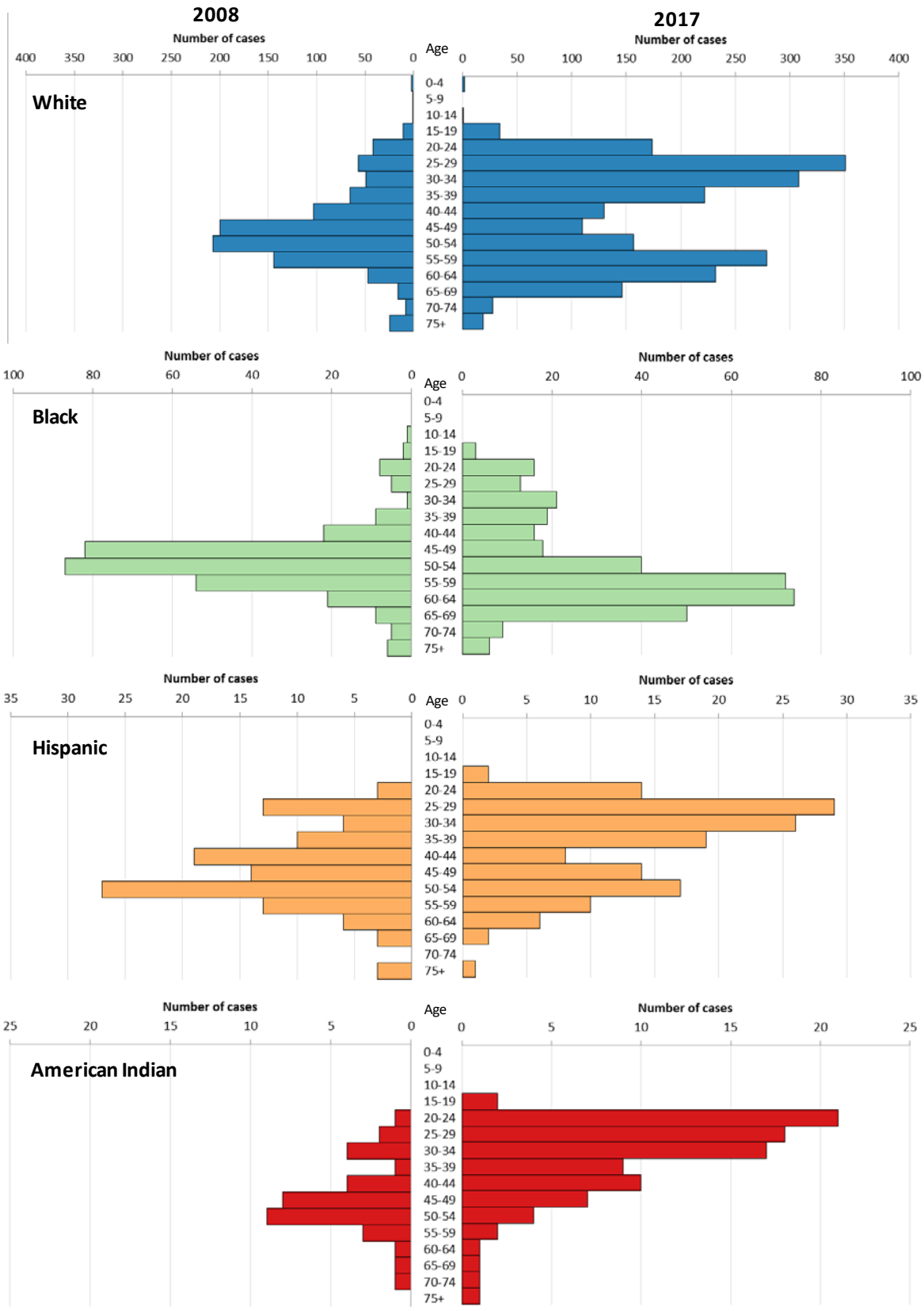
In 2017, the rate of HCV among American Indians was 3.6 times higher than the rate among non-Hispanic Whites, and the rate among non-Hispanic Blacks was two times higher than the rate among non-Hispanic Whites (**Figure 6**). The rate of HCV among American Indians and non-Hispanic Blacks has been substantially higher than the rate among non-Hispanic Whites for the past five years (**Table 8**). The disparity of higher rates of acute HCV among American Indians or Alaska Natives is also reported at the national level.[4] Non-Hispanic Whites comprise the largest number of new HCV reports in Wisconsin and accounted for 2,193 or 72% of all reports in 2017.

Table 8. Race and ethnicity of reported HCV in Wisconsin, 2013-2017

	2013		2014		2015		2016		2017		Change in number of confirmed cases 2016 to 2017
Race/Ethnicity	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	
Hispanic	140	38.6	158	42.5	190	51.2	163	42.8	148	38.2	⇧ 15
American Indian	77	138.8	75	134.2	77	137.7	135	240	94	165.5	-17
Asian	28	18.5	21	13.2	45	28.4	49	29.5	17	10.0	-11
Non-Hispanic Black	321	83	385	98.7	460	117.9	384	97.6	357	90.3	⇧ 11
Non-Hispanic White	1,787	37.4	2,213	46.4	2,628	55.1	2,817	59.1	2,193	46.0	⇧ 70
Other†	20	--	36	--	45	--	26	--	35	--	⇧ 12
Unknown	265	--	329	--	300		353	--	223	--	-48
Total	2,638	46	3,217	56	3,745	65.3	3,927	68.1	3,067	53.1	⇧ 32

†Rates were not calculated for the category Other Race due to unknown population denominator. ⇧ Indicates the increase in number of confirmed cases of HCV from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

Figure 6. During the past 10 years, the age distribution of new HCV reports has changed for every racial and ethnic group, most often demonstrating increased numbers of infections among younger adults



Acute Cases: Risk

Case follow-up and investigation for HCV were completed for over 90% of acute HCV infections in 2017. The primary risk factor for acute HCV infection was injection drug use, reported by 62 (63%) of 99 persons with acute HCV. Among those who reported injection drug use, 58% reported sharing "works" (injection equipment). Of 55 men with acute HCV infection, three reported sexual activity with a male (**Figure 8**). The spread of HCV in health care settings in Wisconsin is rare, but can occur through contaminated needles, syringes, or other sharp instruments. Of 99 persons with acute HCV, 14 (14%) reported recent hospitalization and 7 (7%) reported dental work or oral surgery in the last six months (**Figure 9**). Since more than one risk or exposure may be indicated, this may represent overlapping risk and not necessarily the source of exposure.

Figure 7. Reported acute HCV, by risk behavior, 2017†

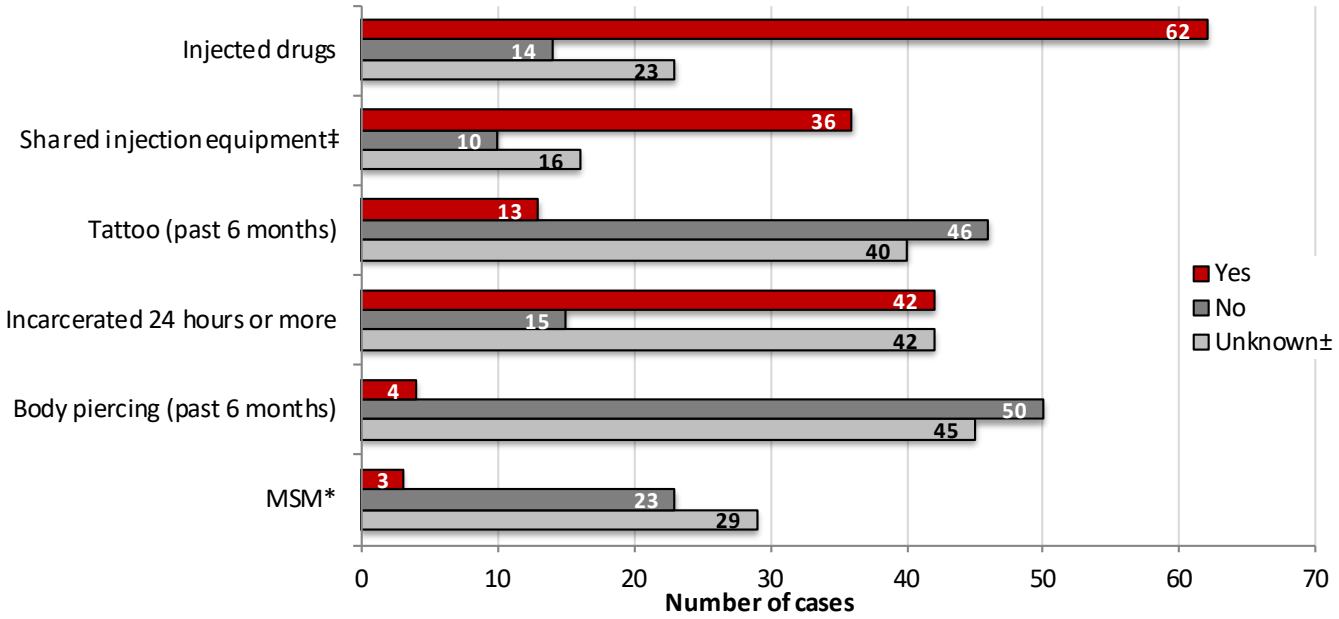
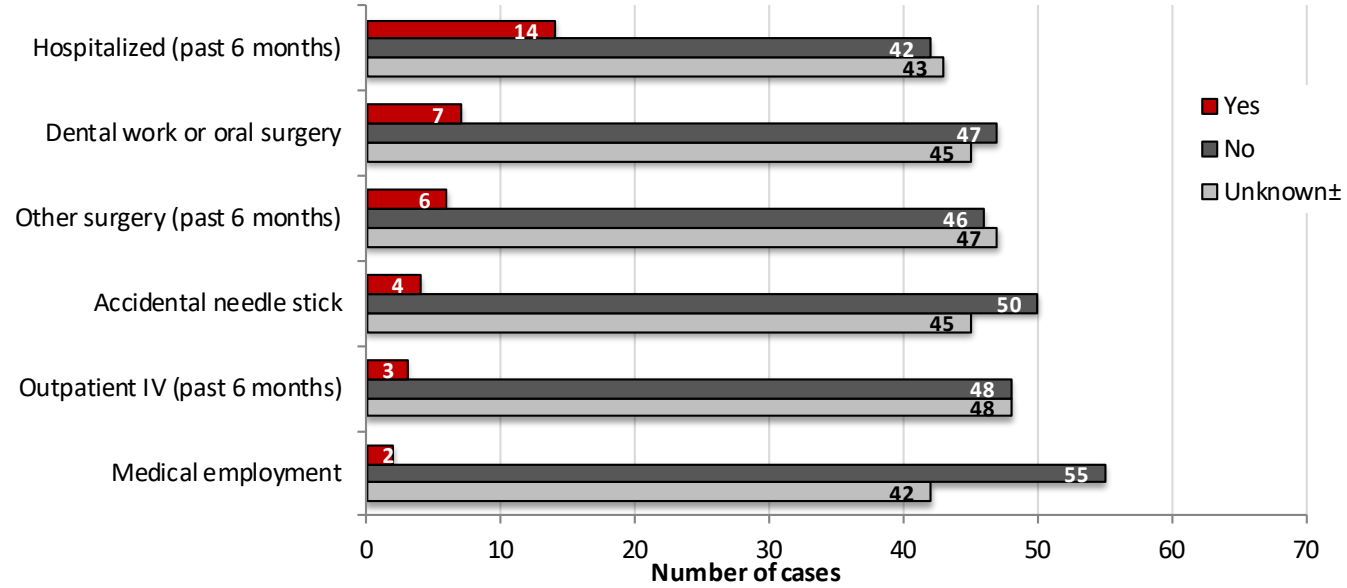


Figure 8. Reported acute HCV, by risk exposure, 2017†



†A total of 99 case reports of acute hepatitis C were received in 2017. More than one risk behavior may be indicated on each case report. ‡Shared injection equipment was evaluated as a risk factor among 62 case reports with injection drug use indicated. ±No risk data reported. *MSM: Men who have sex with men, which was evaluated as a risk factor among 55 men reported with acute HCV.

Acute Cases: Demographics

During 2017, 99 reports of acute HCV were reported at a rate of 1.7 cases per 100,000. Reports of acute HCV infection increased 280% from 2012 to 2017 in Wisconsin. In 2017, the median age of acute HCV cases was 33 years; 44% were aged 15-29, 44% were female and 80% were non-Hispanic White.

Table 9. History of acute HCV reports, Wisconsin, 2008-2017

Year	Number	Rate per 100,000†
2008	2	--
2009	3	--
2010	10	0.2
2011	14	0.2
2012	26	0.5
2013	42	0.7
2014	49	0.9
2015	61	1.1
2016	106	1.8
2017	99	1.7

†Rates based on counts less than five have been suppressed. Rates based on counts less than 12 are statistically unreliable.

Figure 9. Percent of acute hepatitis C virus reports by sex, 2008-2017

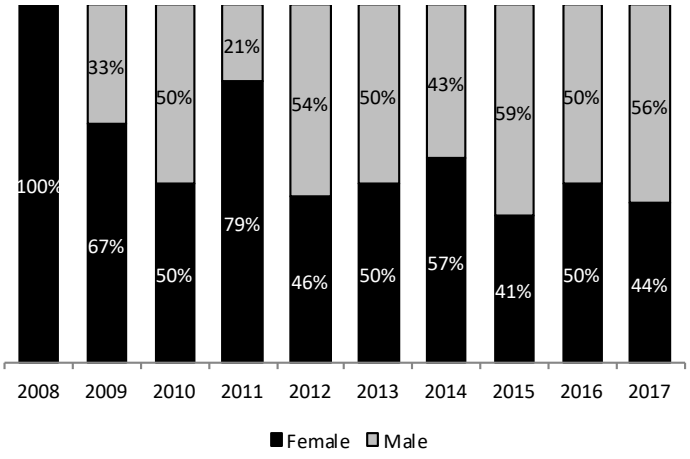
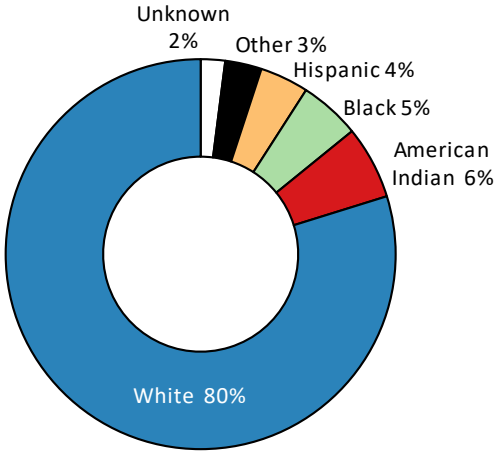


Figure 10. Percent of acute hepatitis C virus reports, by race/ethnicity, 2017



Hepatitis C Virus Reports among Persons Aged 15–29

Local and national data suggest that the majority of HCV infections in young people in recent years were associated with injection drug use.[5-7] Newly reported acute or chronic HCV infection in people aged 15–29 can be used as a surveillance indicator for recently acquired HCV infection. In 2017 alone, there were 721 new HCV infections reported among people aged 15–29 in Wisconsin. The rate of HCV in this age group more than tripled during 2008–2017, from 19.3 to 63.0 cases per 100,000 population. In 2017, 47% of HCV reports in this cohort were female, 78% were white, and 18% of all reports were residents of Milwaukee County.

HCV prevention among persons who inject drugs includes harm reduction programs (for example, access to sterile syringes and drug preparation equipment), opportunities for drug treatment programs, and access to comprehensive health services that include HCV testing and linkage to care.

Table 10. History of HCV reports among persons aged 15–29 in Wisconsin, 2008-2017

	Past/Present and Chronic		Acut	
Year	Number	Rate per 100,000	Number	R
2008	227	19.2	1	
2009	284	23.6	2	
2010	355	30.7	9	
2011	458	39.7	9	
2012	599	52.3	22	
2013	677	59.3	29	
2014	860	75.2	35	
2015	958	83.8	36	
2016‡	904	79.1	56	
2017±	677	59.1	44	

†Rates based on counts less than five have been suppressed. Rates based on counts less than 12 are statistically unreliable.
‡ Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed.
±Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

Figure 11. Percent of HCV reports among persons aged 15-29, by sex, 2008-2017

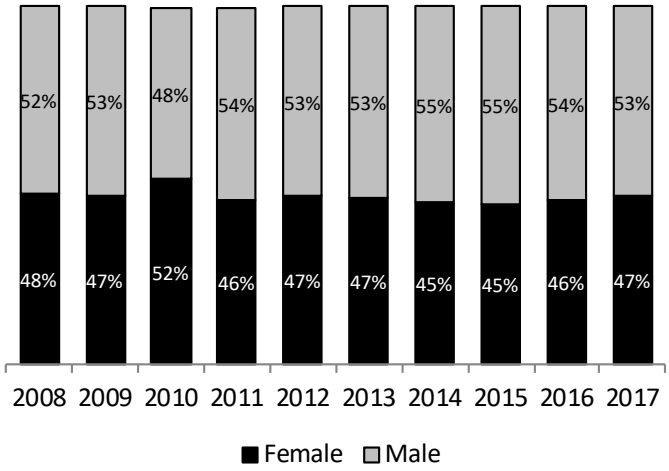


Figure 12. Percent of HCV reports among persons aged 15-29, by race/ethnicity, 2017

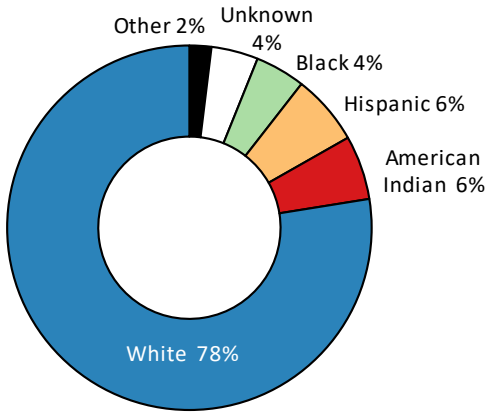


Table 11. Number, rate, and percent of newly reported HCV among persons aged 15–29, by county of residence, 2017

County of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate† per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Adams	1	0	7	7	6	--	1	-1
Ashland	2	3	0	2	3	--	0	1
Barron	2	1	1	5	5	--	1	1
Bayfield	1	4	1	1	0	--	0	-1
Brown	35	31	29	41	24	45.5	3	-11
Buffalo	0	0	2	1	1	--	0	0
Burnett	1	0	3	7	1	--	0	-5
Calumet	6	6	7	5	4	--	1	1
Chippewa	12	8	8	8	10	--	1	5
Clark	0	3	2	3	0	--	0	-2
Columbia	6	6	6	11	7	--	1	1
Crawford	0	0	1	2	1	--	0	0
Dane	40	51	84	56	36	29.3	5	-4
Dodge	8	5	17	23	9	--	1	-12
Door	1	0	0	0	1	--	0	1
Douglas	10	16	15	8	10	--	1	4
Dunn	5	3	5	3	3	--	0	2
Eau Claire	25	30	22	19	9	--	1	-3
Florence	5	0	1	0	0	--	0	0
Fond du Lac	15	17	22	26	19	△ 100.4	3	-1
Forest	2	1	3	6	6	--	1	1
Grant	1	2	3	2	2	--	0	1
Green	2	2	3	3	6	--	1	3
Green Lake	3	2	7	2	2	--	0	0
Iowa	0	3	4	1	2	--	0	1
Iron	1	1	3	0	0	--	0	0
Jackson	3	7	3	5	1	--	0	0
Jefferson	7	12	17	9	8	--	1	2
Juneau	4	6	3	5	6	--	1	1
Kenosha	14	32	18	16	19	53.4	3	2
Kewaunee	1	1	1	0	0	--	0	0
La Crosse	19	21	24	15	16	54.0	2	3
Lafayette	0	0	0	3	0	--	0	-2
Langlade	5	9	5	9	4	--	1	-3
Lincoln	5	4	3	5	5	--	1	2
Manitowoc	12	18	23	13	11	--	2	3
Marathon	24	19	13	27	21	△ 86.8	3	2
Marinette	10	9	5	12	8	--	1	-2
Marquette	1	1	5	3	3	--	0	1
Menominee	1	0	1	0	2	--	0	2
Milwaukee	111	161	181	153	132	59.8	18	-15
Monroe	10	19	9	8	5	--	1	2

County of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate† per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Oconto	3	5	4	3	2	--	0	-2
Oneida	3	6	9	1	9	--	1	⇧ 8
Outagamie	22	22	28	40	14	39.9	2	-15
Ozaukee	3	2	2	5	1	--	0	-2
Pepin	1	0	2	1	0	--	0	0
Pierce	1	0	5	1	0	--	0	-1
Polk	2	2	5	0	2	--	0	⇧ 1
Portage	9	2	8	5	5	--	1	⇧ 1
Price	3	5	12	4	1	--	0	⇧ 1
Racine	12	27	10	19	16	44.5	2	⇧ 3
Richland	.	4	6	0	0	--	0	0
Rock	9	22	21	11	12	38.6	2	⇧ 6
Rusk	1	0	0	0	0	--	0	0
St. Croix	2	1	4	3	2	--	0	0
Sauk	6	9	7	24	10	--	1	-8
Sawyer	1	3	1	2	6	--	1	⇧ 5
Shawano	0	0	2	10	5	--	1	-4
Sheboygan	15	15	14	15	17	△ 83.4	2	⇧ 3
Taylor	1	1	1	0	0	--	0	0
Trempealeau	0	6	7	2	3	--	0	⇧ 2
Vernon	0	4	3	2	0	--	0	-1
Vilas	3	3	6	13	5	--	1	-3
Walworth	4	7	8	6	5	--	1	0
Washburn	1	1	1	0	2	--	0	⇧ 2
Washington	9	13	17	13	10	--	1	0
Waukesha	29	37	47	35	29	42.4	4	-2
Waupaca	4	16	21	19	13	△ 161.8	2	-5
Waushara	1	0	5	1	2	--	0	⇧ 1
Winnebago	27	28	39	45	17	46.2	2	-14
Wood	6	10	14	12	9	--	1	-1
Unknown	0	0	0	1	0	--	0	-1
Federal Corrections	0	2	0	1	0	--	0	0
State Corrections	117	128	118	141	116	--	16	-6
Total	**706**	**895**	**994**	**960**	**721**	**63.0**	**100**	**-52**

†Rates based on counts less than 12 have been suppressed because they are statistically unreliable. Rates are not available for Corrections populations. △ Indicates the rate in 2017 is higher than the statewide rate among people aged 15–29. ⇧ Indicates the number of confirmed cases of HCV increased from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

Hepatitis C Virus Reports Among Adults Born During 1945–1965

National prevalence data indicate that people born during 1945–1965 are five times more likely than other adults to have hepatitis C.[8] In addition to testing adults of all ages at risk for HCV infection, the CDC recommends all adults born during 1945–1965 receive one-time testing for HCV, regardless of history of risk.[2] All persons identified with HCV infection should be referred to appropriate care and treatment services for HCV infection and related conditions. In 2017, there were 1,214 HCV infections newly reported in Wisconsin among adults born during 1945–1965. The rate of HCV in this age group increased 30% during 2012–2016, from 84.9 to 110.6 cases per 100,000 population. The increase likely reflects HCV screening among this cohort, consistent with recommendations issued by CDC in 2012 for identifying chronic HCV infection. In 2017, 35% of reports in this cohort were female, 66% were white, and 25% of all reports were residents of Milwaukee County.

Table 12. History of HCV reports among persons born 1945-1965, 2008-2017

	Past/Present and Chronic		Acute		Total	
Year	Number	Rate per 100,000	Number	Rate per 100,000†	Number	Rate per 100,000
2008	1,634	126.2	1	--	1,635	126.3
2009	1,552	117.3	0	--	1,552	117.3
2010	1,522	111.7	0	--	1,522	111.7
2011	1,377	97.8	1	--	1,378	97.9
2012	1,221	84.7	3	--	1,224	84.9
2013	1,120	76.2	1	--	1,121	76.3
2014	1,378	92.2	0	--	1,378	92.2
2015	1,622	107.0	2	--	1,624	107.0
2016‡	1,679	110.6	4	--	1,683	110.6
2017±	1,205	78.0	9	--	1,214	78.6

†Rates based on counts less than 5 have been suppressed. Rates based on counts less than 12 are statistically unreliable. ‡Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. ±Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C. Rates are not available for Corrections populations.

Figure 13. Percent of HCV reports among persons born 1945-1965, by sex, 2008-2017

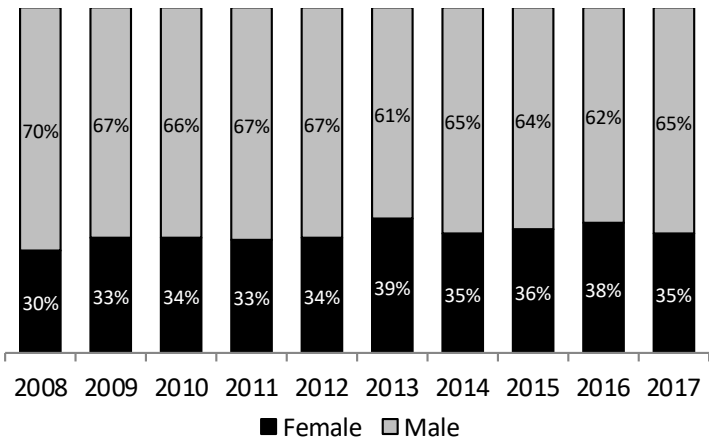


Figure 14. Percent of HCV reports among persons born 1945-1965, by race/ethnicity, 2017

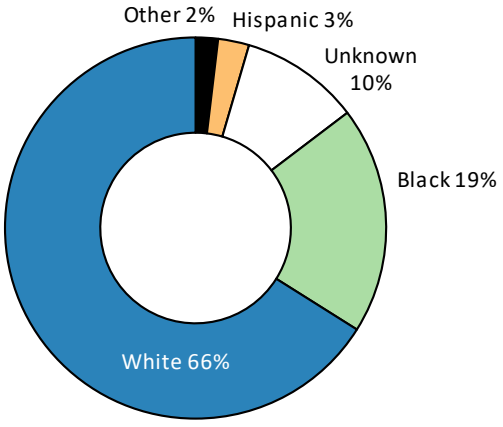


Table 13. Number, rate, and percent of newly reported HCV among persons born 1945–1965, by county of residence

County of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate† per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Adams	3	7	9	10	9	--	1	0
Ashland	5	7	3	7	1	--	0	-4
Barron	11	12	14	13	8	--	1	-2
Bayfield	2	3	9	2	4	--	0	2
Brown	54	44	67	53	27	42.1	2	-17
Buffalo	2	1	1	2	1	--	0	-1
Burnett	4	9	17	7	6	--	0	4
Calumet	3	11	6	8	4	--	0	-1
Chippewa	11	9	5	25	16	89.6	1	-1
Clark	8	6	4	8	8	--	1	4
Columbia	7	13	20	23	13	79.0	1	3
Crawford	1	2	5	3	3	--	0	1
Dane	89	113	129	211	103	83.6	8	18
Dodge	8	6	15	11	21	84.4	2	13
Door	2	4	6	4	7	--	1	4
Douglas	11	18	14	4	10	--	1	6
Dunn	8	8	10	8	5	--	0	-1
Eau Claire	13	12	23	38	12	49.0	1	2
Florence	1	1	1	5	0	--	0	-3
Fond du Lac	18	17	25	17	9	--	1	-4
Forest	2	2	1	3	2	--	0	2
Grant	5	7	5	11	20	148.1	2	2
Green	4	4	10	8	5	--	0	-2
Green Lake	3	4	2	10	5	--	0	-1
Iowa	2	3	3	9	3	--	0	0
Iron	1	0	1	2	1	--	0	0
Jackson	3	2	4	9	6	--	0	3
Jefferson	13	17	24	34	21	93.6	2	-1
Juneau	6	6	5	12	11	--	1	1
Kenosha	45	51	58	43	55	133.2	5	6
Kewaunee	4	1	2	2	3	--	0	1
La Crosse	19	19	33	32	26	87.9	2	4
Lafayette	1	7	2	1	5	--	0	2
Langlade	3	3	5	5	3	--	0	-1
Lincoln	6	6	7	6	12	128.4	1	5
Manitowoc	16	17	16	18	12	48.8	1	-4
Marathon	16	13	14	18	13	35.8	1	4
Marinette	6	13	11	14	10	--	1	3
Marquette	0	6	1	8	9	152.9	1	4
Menominee	0	2	5	3	0	--	0	
Milwaukee	290	402	464	348	306	143.6	25	-36
Monroe	5	17	15	7	17	132.7	1	10

County of Residence	2013 Number	2014 Number	2015 Number	2016 Number	2017 Number	2017 Rate† per 100,000	Percent of Reports in 2017	Change in number of confirmed cases 2016 to 2017
Oconto	6	4	3	5	5	--	0	⇧ 4
Oneida	9	4	8	4	4	--	0	⇧ 1
Outagamie	19	24	52	58	24	51.4	2	-6
Ozaukee	11	7	11	9	6	--	0	-1
Pepin	0	2	0	1	1	--	0	
Pierce	6	5	17	12	10	--	1	0
Polk	6	15	8	9	12	△ 89.4	1	⇧ 3
Portage	2	7	18	8	5	--	0	-1
Price	1	3	1	6	0	--	0	-2
Racine	65	59	81	73	44	△ 82.7	4	-8
Richland	2	6	3	2	1	--	0	0
Rock	53	60	41	51	41	△ 99.6	3	⇧ 3
Rusk	3	4	3	4	2	--	0	-1
St. Croix	13	12	21	21	11	--	1	-2
Sauk	14	8	12	34	8	--	1	-8
Sawyer	9	12	8	7	6	--	0	-1
Shawano	5	4	17	21	12	△ 95.6	1	-1
Sheboygan	12	12	20	17	10	--	1	0
Taylor	2	1	0	2	0	--	0	-1
Trempealeau	3	6	4	7	3	--	0	0
Vernon	3	2	9	5	8	--	1	⇧ 2
Vilas	5	3	3	8	6	--	0	0
Walworth	16	18	27	27	23	△ 81.6	2	⇧ 2
Washburn	5	8	5	3	3	--	0	0
Washington	12	12	13	7	21	54.9	2	⇧ 17
Waukesha	35	38	45	46	46	39.5	4	⇧ 10
Waupaca	7	22	26	23	8	--	1	⇧ 1
Waushara	2	3	4	12	5	--	0	-5
Winnebago	25	33	49	49	24	55.0	2	⇧ 1
Wood	8	14	12	6	12	54.6	1	⇧ 5
Unknown	0	2	0	2	0	--	0	-1
Federal Corrections	0	2	0	0	0	--	0	
State Corrections	51	61	32	82	41	--	3	-12
Total	**1,121**	**1,378**	**1,624**	**1,683**	**1,214**	**78.6**	**100**	⇧ **24**

†Rates based on counts less than 12 have been suppressed because they are statistically unreliable. Rates are not available for Corrections populations. △ Indicates the rate in 2016 is higher than the statewide rate among people born during 1945-1965. ⇧ Indicates the number of confirmed cases of HCV increased from 2016 to 2017. Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C.

Hepatitis C Virus Reports from Wisconsin Department of Corrections

Rates of HCV in correctional institutions are much higher than the general U.S. population. One reason for this is that some populations affected by incarceration, such as people who inject drugs, are also more likely to have HCV infection. The Wisconsin Department of Corrections (DOC) offers HCV testing to people who enter prison with a risk factor for HCV and, beginning in 2015, those who were born during 1945–1965. Typically, reports from DOC account for 7%–10% of all HCV reports in Wisconsin annually. In 2017 alone, DOC reported 313 HCV cases. The median age of HCV cases was 32 years; 14% were female and 73% were non-Hispanic White.

Table 14. History of HCV reports from the Wisconsin Department of Corrections, 2008-2017

Year	Number Past/Present or Chronic or Acute†	Percent of Statewide Reports
2008	178	8
2009	171	7
2010	173	7
2011	222	9
2012	232	9
2013	257	10
2014	314	10
2015	253	7
2016‡	372	9
2017±	313	10

†Acute cases were reported in 2010 (1 case), 2014 (1 case), 2016 (2 cases) and 2017 (4 cases). ‡Starting in 2016, the case definitions for chronic hepatitis C and acute hepatitis C changed. ±Starting in 2017, negative RNA results were reportable to DPH, which reduced the number of reports classified as probable chronic hepatitis C. Rates are not available for Corrections populations.

Figure 15. Since 2010, the number of HCV reports from DOC has increased in two birth cohorts, including among people born during 1966–1986 and people born after 1986

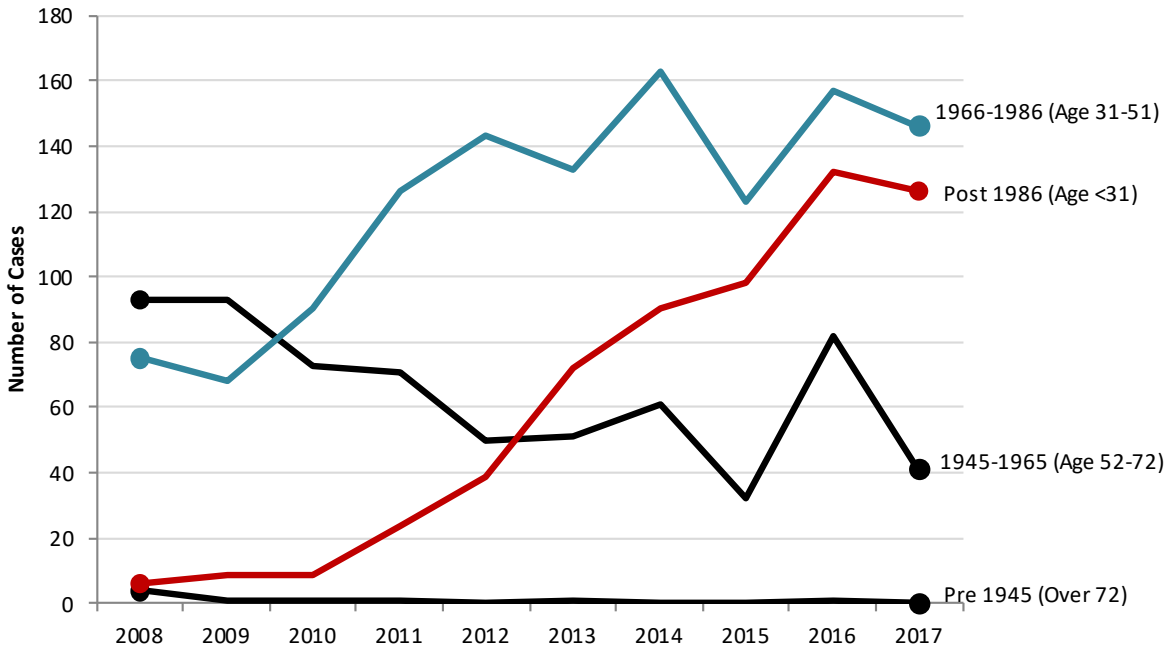


Figure 16. In the 1945–1965 birth cohort, a larger percentage of HCV reports indicated black and unknown race/ethnicity compared to other birth cohorts

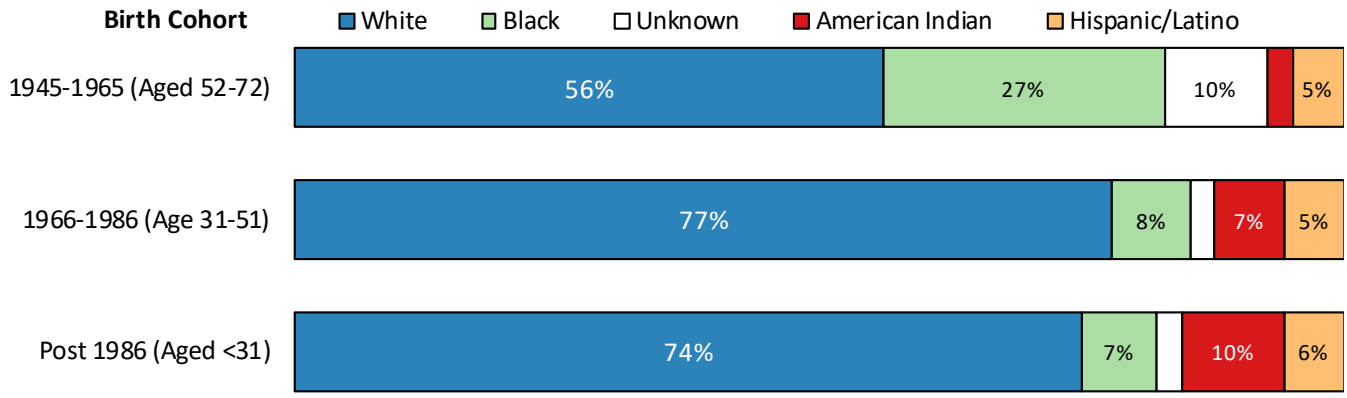


Figure 17. Percent of HCV reports from DOC, by sex, 2008-2017

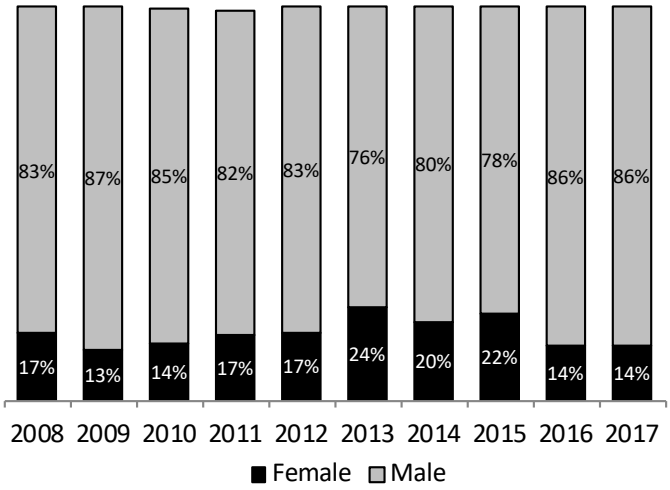
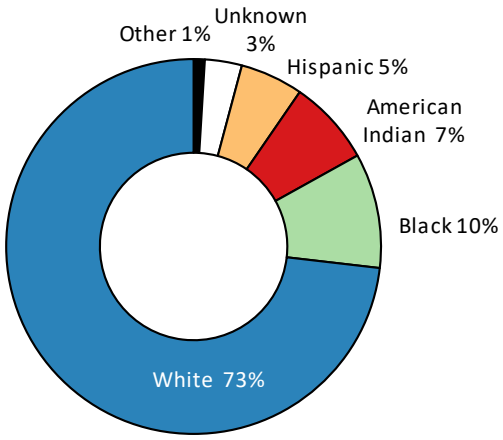


Figure 18. Percent of HCV reports from DOC, by race/ethnicity, 2017



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Technical Notes

1. This report was compiled by the Wisconsin Viral Hepatitis Program and is based on reports of hepatitis C virus (HCV) infection submitted by laboratories and local health departments (LHDs). Per Wis. Admin. Code ch. DHS 145, HCV is a reportable communicable disease. When cases are reported, LHDs contact persons with HCV infection to provide health education, risk reduction counseling, hepatitis A and B vaccine, and medical referral as needed.
2. Many cases of HCV infection are reported by laboratories. Since laboratories do not generally report demographic data such as region, race, or age, surveillance summary data by demographic characteristics are often incomplete.
3. Most reported cases of HCV infection represent chronic disease in persons who were infected years ago. Persons with acute infection are often unaware of their infection because it presents with few if any symptoms.
4. Changes in number and rates in a county or region may be due to an increase in new HCV infections, changes in provider HCV screening practices from year to year, differences in the amount of resources each jurisdiction has dedicated to HCV surveillance, or differences in reporting of positive and negative HCV test results to WEDSS.
5. This report is based on HCV surveillance data from WEDSS as of April 9, 2018. HCV case numbers used in other reports or individual county reports may vary depending on the date data are accessed, as WEDSS is not a static database and cases can be updated daily.
6. Rates for 2017 are expressed as the number per 100,000 population in Wisconsin in 2016.
7. Reports of HCV in persons deceased as of December 2017 were identified by a match of WEDSS to the Wisconsin Vital Records registry of deaths of Wisconsin residents through 2017. The number of people with HCV who have moved out of Wisconsin or have a resolved or cured infection is unknown and has not been subtracted from all reported cases.

For more information

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Additional resources

Wisconsin Department of Health Services:
www.dhs.wisconsin.gov/viral-hepatitis/hcv-program.htm
Centers for Disease Control and Prevention:
www.cdc.gov/hepatitis/HCV/index.htm
National Notifiable Diseases Surveillance System:
wwwn.cdc.gov/NNDSS/script/casedefDefault.aspx