



# **Communicable Disease in Montana: 2016 Annual Report**

**Prepared by the Communicable Disease  
Epidemiology Section**

Public Health and Safety Division  
Montana Department of Public Health and Human  
Services

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This report was prepared by the Communicable Disease Epidemiology Section (CDEpi) at the Montana Department of Public Health and Human Services (DPHHS). It summarizes communicable diseases reported by the state of Montana in 2016. These reportable conditions met the 2016 case definitions provided by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE).<sup>1</sup> Communicable diseases that must be reported by diagnostic laboratories and health care professionals to public health authorities are specified by the Administrative Rules of Montana ([ARM 37.114.203](#)). Communicable disease data are maintained in the Montana Infectious Disease Information System (MIDIS) and HIV data are maintained in the enhanced HIV/AIDS Reporting System (eHARS). Population data<sup>2</sup> as well as reportable communicable disease statistics are found in Appendix I. Small numbers of reported cases may result in unstable rates and should be interpreted with caution. Please contact CDEpi at 406-444-0273 or [hhsepi@mt.gov](mailto:hhsepi@mt.gov) with questions or comments.

## **Preface**

The *Communicable Disease Annual Report – Montana, 2016* contains data for notifiable diseases and conditions reported to DPHHS in 2016. Data are collected from local public health jurisdictions (LHJ), laboratories, healthcare providers, hospitals and other healthcare facilities as described by ARM [37.114.201](#) (reporters). Montana DPHHS tracks more than XX communicable diseases annually. Each reported case is investigated by LHJ, including contact investigations and application of control measures to prevent further spread of disease.

The Notable Events section presents information on noteworthy reports from 2016 for selected diseases that were above expected values. Incidence data, describing new cases of reportable conditions in 2016, historical five-year median, and rates are presented in Appendix I. In addition, a summary of case counts by county of residence are presented in Appendix II and the Montana Demographic Profile in Appendix III. Cases are counted by the week and year in which they occurred as determined by the *Morbidity and Mortality Weekly Report* (MMWR) assigned by the CDC.

## **Notable Events of 2016**

### **Mumps Outbreaks**

Two localized outbreaks of mumps occurred in Montana during the spring and summer months of 2016. Both were linked to out of country travel. A total of twenty-seven cases were reported from both of the outbreaks; a significant increase from Montana's average of less than 1 case per year. However, this trend was similar to that of the United States in 2016 when 6,366 cases of mumps were reported, a 379% increase from 2015. Unlike the U.S. cases that affected college aged population with multiple outbreaks on college campuses, Montana cases occurred among middle school aged students (median: 12 years). Of cases where immunization status was documented (N=21), 38% were vaccinated appropriately for age.

### **Increase in incidence of syphilis**

Syphilis cases diagnosed in the primary and secondary state are infectious and of great concern to public health. After 15 years of ten or fewer reported annual cases, syphilis cases increased from 9 cases in 2014 to 14 in 2016. This mirrors nationwide trends in the increase of syphilis. In 2016, the United States experienced the highest number and rate of reported primary and secondary syphilis cases in more than 20 years.

The majority of cases of syphilis in Montana is male (13 cases) with an average age of 39 (range 23 to 62 years). More than half of the cases diagnosed in 2016 reported have sex with men (MSM) and 15% of cases involved sex for drugs or while intoxicated or high. Five percent of the cases were co-infected with HIV. The population centers of Yellowstone and Missoula represented the majority of cases.

CDC finds that while rates have increased among both men and women, men account for more than 90 percent of primary and secondary syphilis cases. Of those, MSM are at highest risk. CDC states that improvement in access to and effectiveness of HIV treatment have resulted in changes in sexual behavior and social norms that may reduce the risk of HIV but have little impact on syphilis risk reduction, such as treatment as prevention, pre-exposure prophylaxis (PrEP), and reduced reliance on condoms. CDC is working with other federal agencies and national partners to reverse increasing trends of both congenital syphilis and syphilis among MSM. In response to these trends, local agencies in Montana are using rapid syphilis tests to offer non-clinic based testing among target populations.

## Foodborne Outbreaks

A large Shiga-toxin *E.coli* O157:H7 outbreak was reported in the summer of 2016, and social media played a significant role in the identification and investigation of cases. The first report of illness was days after a community event in Dawson County. Extensive investigations included food exposure interviews, leftover food testing, and environmental investigation with event staff who prepared the likely contaminated dishes. The outbreak sickened at least 38 people, including 26 from Montana and 12 from nine additional states.

In July, a *Salmonella* outbreak was reported at a Montana detention facility. A multi-departmental investigation was launched to identify the source. Kitchen staff reportedly became ill first, but epidemiological information suggested that further spread of the disease occurred via person-to-person contact. Multiple control measures were taken to limit the outbreak and the last person to report illness onset was less than two weeks after the first person became ill. A total of 24 inmates were sickened by *Salmonella* during this outbreak.

## Foodborne and Diarrheal Diseases

Enteric illnesses are more commonly reported during spring and summer months; in 2016, more than 46% of all reportable enteric conditions were reported to public health between May and August. In 2016, 871 notifiable enteric conditions were reported in Montana. Per the CSTE case definition, 772 were classified as confirmed and 99 as probable cases. One of the most significant increase in overall rates was for Shiga-toxin *E.coli* (Table 1). The increase is partially due to outbreak related Shiga-toxin *E.coli* cases, as well as increased use of molecular laboratory diagnostic tools able to identify non-O157:H7 STEC serotypes. Cryptosporidiosis was below average in 2015 but rebounded to expected numbers in 2016.

**Table 1. Enteric illnesses — Montana, 2016**

Condition	Cases	Rate (per 100,000)	5 Year Median
Campylobacteriosis	372	35.6	233
Salmonellosis	177	16.9	120
Shiga toxin producing <i>E. coli</i> (STEC)	132	12.7	44
Giardiasis	119	11.5	89
Cryptosporidiosis	62	5.9	69
Shigellosis	8	0.8	44

### Campylobacteriosis

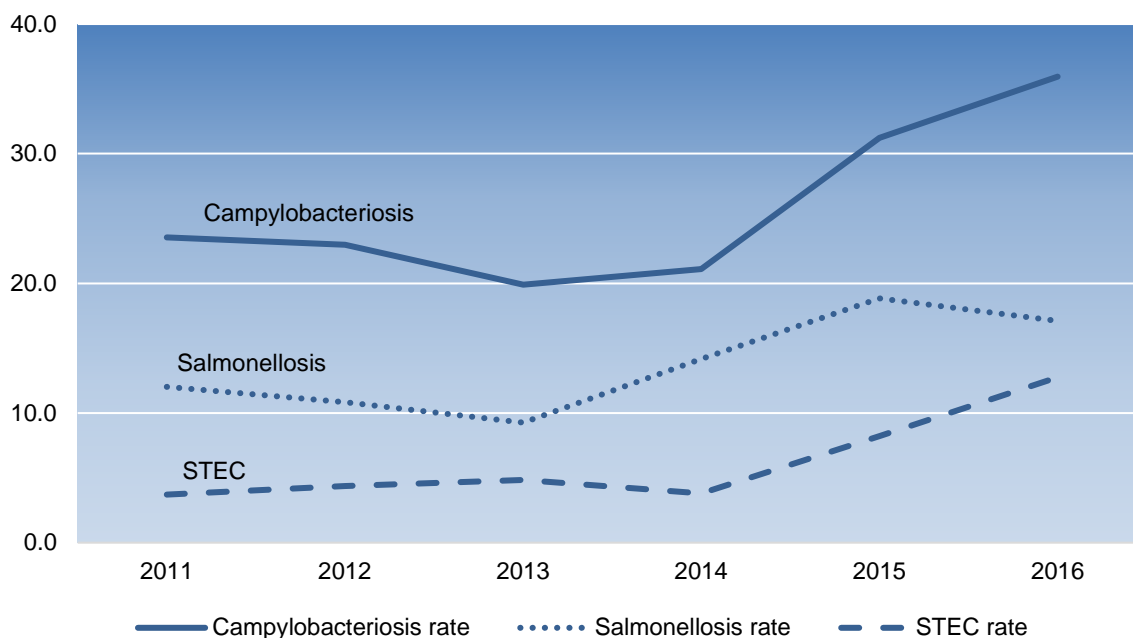
Campylobacteriosis is a diarrheal disease caused by *Campylobacter* species and is one of the most common enteric illness in the U.S. *Campylobacter* carries the greatest burden of reportable enteric illnesses in Montana as well, with an incidence rate of 35.6 cases per 100,000 population (Figure 1). Nearly 20% of campylobacteriosis cases are not confirmed by culture dependent methods. Laboratory confirmed case rates for 2016 were at 29.0 cases per 100,000, which is still higher than previous years

and continues to surpass the national average (13.5 cases per 100,000 population). Campylobacteriosis is often associated with farming and ranching, as cattle and poultry are the most common reservoirs for the bacteria, and was the case for 20% of 371 cases reported in 2016. Other likely sources of transmission can include undercooked foods, unpasteurized milk, and non-chlorinated water. Pets can be likely sources of infection as well, even when they show no signs of illness. Serious complications of campylobacteriosis can include Guillain-Barre Syndrome. In 2016, 14% (N=52) of Montana campylobacter cases were hospitalized.

### Salmonellosis

Salmonellosis is an enteric disease characterized by diarrhea, fever, and abdominal cramps and is estimated to cause one million foodborne illnesses in the U.S. In 2016, 177 cases of salmonellosis were reported in Montana. Of these, 159 were laboratory confirmed and 22% (N= 35) were hospitalized. The overall case rate of salmonellosis was 16.9 cases per 100,000 population in 2016, a decrease from 2015. Multiple salmonellosis outbreaks occurred in 2016, accounting for 25% of these cases. However, the rate of laboratory confirmed salmonellosis (15.3) is comparable to the most recently available U.S. rate of 15.1 per 100,000. Salmonellosis is most commonly acquired through ingestion of contaminated foods and contact to live poultry, which was likely the case for most outbreak related cases in 2016. Reptiles are another common reservoir of the organism.

**Figure 1. Select enteric illness rates over time — Montana, 2011–2016**



### Shiga-toxin producing *E. coli* (STEC)

STEC is an enteric illness most commonly associated with cattle, and can cause severe illness in humans. Cases of STEC in Montana are often linked to consumption of undercooked beef, other contaminated foods, and direct animal contact. 2016 was a record year for STEC reported in Montana. Of the 132 cases reported, 26 were associated with a community event in Dawson County and another two cases were linked to a multi-state STEC O121 outbreak associated with flour products. STEC cases are comprised of one of many serotypes typically classified as O157:H7 and non O157:H7 categories. The majority of STEC cases in Montana are classified as non-O157:H7 serotypes and the most predominant serotypes reported are: O26 (26%), O121 (23%), O103 (9%) and all others [nontypeable]

(20%). Approximately 22% of isolates are serotyped as O157:H7. Incidence of hemolytic uremic syndrome (HUS), a type of kidney failure that is often the result of STEC infection and can be fatal, remained low at 0.1 per 100,000 population in 2016 (N=1), well below the average in the U.S. (2014: 0.79/100,000). Twenty-two percent of Montana STEC cases (N=9) were hospitalized and one developed HUS.

### **Cryptosporidiosis and Giardiasis**

Cryptosporidiosis and Giardiasis, caused by the parasites *Cryptosporidium* and *Giardia*, respectively, are diarrheal diseases often associated with waterborne exposures including recreational waters and untreated natural waters. Both protozoan organisms are highly resistant to chlorine, allowing them to survive for extended periods of time in swimming pools even after routine chemical treatment has been applied. The reservoirs for these organisms are usually humans, but cattle and other animals can serve as reservoirs as well. A 29% increase from 2015 was noted for giardiasis in 2016, with 89 cases reported (11.5 per 100,000). A significant increase in incidence of cryptosporidiosis was also noted in 2016. Sixty-nine cases (5.9 per 100,000 population) were reported; a 59% increase from the previous year, but was on par with the five-year median for Montana.

### **Shigellosis**

Shigellosis is caused by *Shigella* and is found only in humans. The organism has a very low infectious dose and is highly communicable. Outbreaks occur sporadically and often affect school-aged children and their families. In 2016, eight cases of shigellosis were reported (0.8 per 100,000), which is about average for a non-outbreak year in Montana. The median age of cases was 25 years.

### **Listeriosis**

Listeriosis is a serious infection usually caused by eating food contaminated with *Listeria monocytogenes*. The elderly, pregnant women, and those with weakened immune systems are at a higher risk for disease. *Listeria* is commonly found in soil and water and can contaminate a variety of foods, including raw meat and vegetables, cheeses, milk, and fish, and has been identified as the pathogen in several nationwide foodborne outbreaks. Typically, an average of one case per year is reported in Montana. In 2016, two cases of listeriosis were reported in high risk individuals; both were fatal. Laboratory analysis revealed these two were likely exposed to the same source; however, after an in-depth investigation and environmental sampling a source could not be identified.

### **Vibriosis**

Vibriosis is an enteric illness caused by *Vibrio parahaemolyticus*, non-toxigenic *V. cholerae*, and various other species. Most reported cases are acquired outside of Montana, typically linked to coastal states in the U.S., and many report exposure to recreational water. Others report consumption of undercooked or raw seafood, specifically raw oysters. As laboratory testing improves, more vibriosis cases are being detected and reported. Vibriosis was reintroduced to the list of reportable conditions in Montana in 2013 and two cases were reported in 2016.

### **Botulism**

Botulism is a rare but serious illness caused by a toxin produced by *Clostridium botulinum*. In Montana, 0–1 cases are reported on average each year. In 2016, one case of infant botulism was reported. The child recovered after receiving treatment (Botulism Immune Globulin [BIG]). The case investigation determined that the infant was likely exposed outside of Montana.

## Enteric Outbreaks

Twenty-three Montanans were linked to multi-state enteric outbreaks; most were salmonellosis cases with exposure to live poultry. Other outbreaks involving Montanans were linked to international travel. Two cases of STEC O121 were associated with contaminated flour. Public health investigations are conducted on linked cases identified by pulsed-field gel electrophoresis (PFGE) to support multi-state efforts to identify and control the source of these outbreaks. Montana also participates in Whole Genome Sequence analysis (WGS), which adds another dimension to outbreak investigations.

Montana reported 42 enteric illness outbreaks in 2016 that sickened 911 persons; 22 were hospitalized and one died. Of the 42 enteric outbreaks, 23 (56%) had at least one confirmatory lab specimen. Of the 23 outbreaks with a laboratory confirmed pathogen, 20 (48%) were caused by norovirus. Of the seven norovirus outbreaks where specimens were sequenced, five were caused by the strain GII.4 Sidney, one was GII.3C Rotterdam and the other G1.3B. Four other enteric outbreaks were caused by *Campylobacter*, *Salmonella*, Rotavirus, and STEC (1 each), sickening 94 and hospitalizing seven.

The majority of enteric outbreaks (68%) occurred in long-term care facilities and assisted living centers. Other noteworthy locations included schools and day care centers (17%). Other isolated outbreaks occurred at community events, correctional facilities, animal shelters, and retirement homes. A *Campylobacter* outbreak was linked to an animal shelter after epidemiological evidence connected at least two persons to the setting, where environmental samples from dog kennels and human specimens returned identical PFGE patterns.

CDEpi continues to improve methods for surveillance and outbreak investigation, and reducing the burden of enteric illnesses in Montana continues to be a key focus. The majority (78%) of enteric illness outbreaks were reported within one day to local public health officials, allowing for prompt investigation and follow up.

## Vaccine Preventable Diseases

Some of the most common vaccine-preventable diseases (VPD) tracked by the World Health Organization (WHO) include diphtheria, *Haemophilus influenzae* serotype b, hepatitis B, measles, meningococcal disease, mumps, pertussis, polio, rubella, tetanus, and yellow fever.<sup>3</sup> Many of these conditions are rarely reported in Montana (see Appendix I). On average, VPD comprise approximately 7% of reportable disease cases in Montana. In 2016, the most frequently reported vaccine preventable diseases in Montana were chickenpox and mumps.

### Mumps

Mumps is an acute infection caused by a paramyxovirus and characterized by fever, swelling, and tenderness of the salivary glands (parotitis). Once a common childhood disease, incidence of mumps has steadily declined since the introduction of the measles, mumps and rubella (MMR) vaccine. On average, less than one case is reported per year in Montana and is typically associated with out of country travel. However, in 2016, twenty-seven mumps cases were identified from two separate outbreaks reported in the spring and early summer. The majority of cases (78%) were less than 18 years of age. Of those, 38% were appropriately vaccinated for age with MMR.

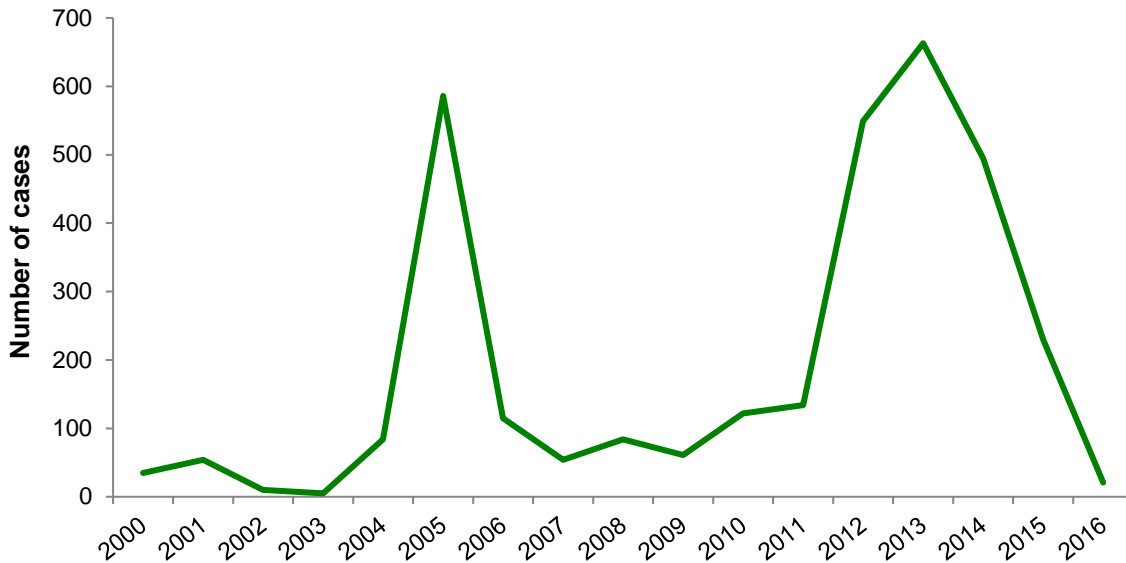
### Pertussis

Pertussis is a highly contagious respiratory disease caused by *Bordetella pertussis*, and is characterized by extended periods of uncontrollable coughing followed by a characteristic inspiratory 'whoop'. The number of reported pertussis cases varies from year to year and peaks in a 3–5 year cycle in the U.S. and Montana (Figure 2). In Montana, peaks occurred in 2005 and 2013, when 586 and 663 pertussis cases were reported, respectively. Following the peak in 2013, the number of reported cases of pertussis



declined to 494 in 2014. This downward trend continued in 2015 when 21 jurisdictions reported 230 cases of pertussis. In 2016, 21 cases (2.0 per 100,000 population) were reported with a median age of 9 years (range: 1 month – 60 years). Of those with documented immunization status (N=18), 50% were considered up to date with vaccination for age.

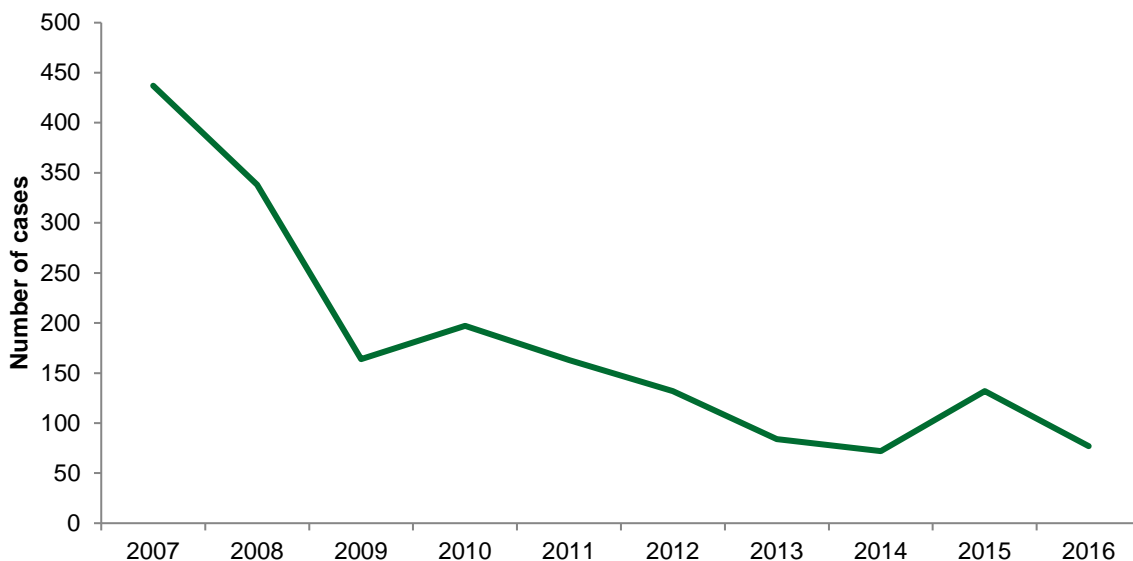
**Figure 2. Reported pertussis cases — Montana, 2000–2016**



**Varicella**

Varicella-zoster virus is the causative agent of chickenpox, which was the most frequently reported vaccine preventable disease in 2016. Over the past ten years, the number of varicella cases reported in Montana varied from a peak of 437 cases in 2007 to a low 72 cases in 2014 (Figure 3). In 2016, 77 cases were reported (7.4 per 100,000 population) with a median age of 7 years (range: 3 months – 54 years). Of the pediatric cases evaluated for immunization status (N=66), 36% were considered to have been vaccinated appropriately for age.

**Figure 3. Reported varicella cases — Montana, 2007–2016**

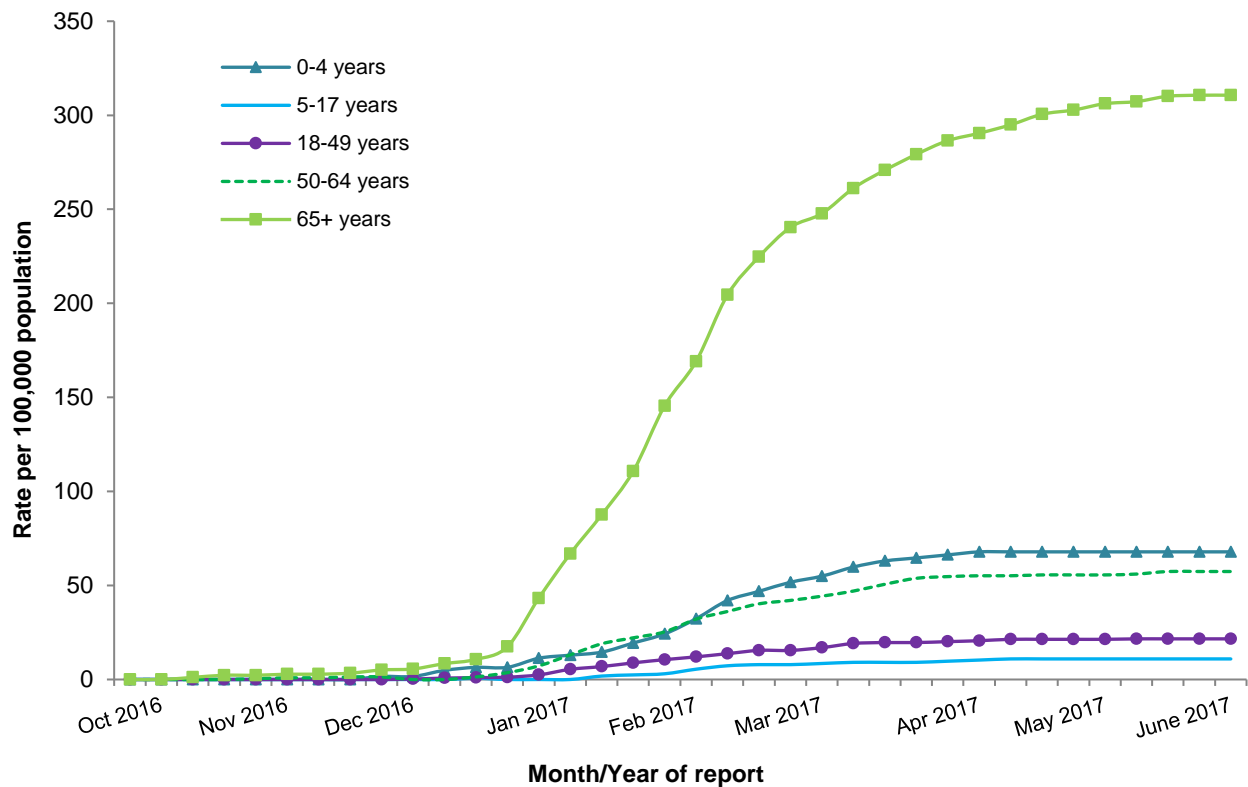


## Influenza

Influenza (flu) is a respiratory illness caused by influenza viruses (types A and B) that can result in serious complications, including hospitalization or death. The flu season typically extends from October through June in Montana. During an average influenza season, the number of reported cases peaks in January. The 2016–2017 influenza season was average with activity reported from mid-December and lasting approximately 20 weeks. Peak activity was recorded at the end of January 2017. Season totals include 7,935 cases, 829 hospitalizations, and 56 deaths attributed to influenza. Twenty outbreaks of influenza were reported during the season.

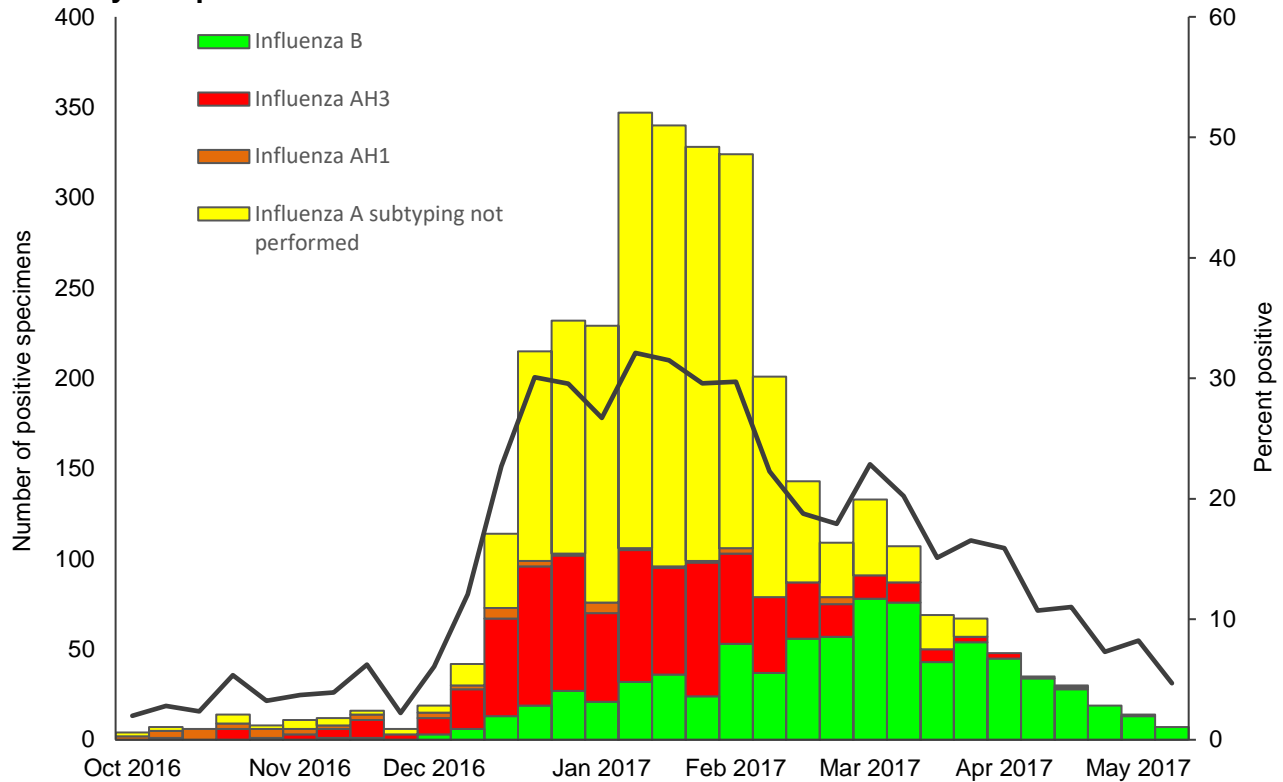
The cumulative influenza-related hospitalization rate in Montana was 80.3 per 100,000 population, with the highest rate of hospitalizations among adults aged 65 years or greater (104 per 100,000 population, Figure 4). The most common comorbidities of individuals hospitalized for influenza were cardiovascular disease, chronic lung conditions, and asthma. Of the 56 influenza-related deaths reported, 10 (18%) occurred among adults aged <65 years. No pediatric (aged 0–17 years) deaths were reported.

**Figure 4. Influenza cumulative hospitalization rates by age group — Montana, 2016–2017 Season**



The Montana Public Health Laboratory (MTPHL) and 19 partner laboratories reported the number of specimens tested for influenza by polymerase chain reaction (PCR) and the number positive by influenza virus type and influenza A virus subtype over the course of the influenza season. The most commonly identified influenza subtype in Montana as well as the United States was influenza A H3N2 (Figure 5).

**Figure 5. Influenza positive tests by type and subtype reported by the Montana Public Health Laboratory and partners — Montana 2016–2017**



## Invasive Diseases

### Meningococcal Disease

Meningococcal disease is caused by the gram-negative bacterium *Neisseria meningitidis*. The bacteria reside primarily in humans on the surface of mucosal membranes such as those found in the respiratory tract. Occasionally, *N. meningitidis* invades the human blood stream, and may cross the blood-brain barrier, causing serious disease including meningitis and septicemia. There are 13 serotypes of *N. meningitidis*; 5 cause the most disease worldwide (A, B, C, W, Y). The most common serotypes isolated in the United States are B, C, and Y. In 2016, two meningococcal disease cases were reported in Montana in a child and an adult; both recovered. Further testing determined that both were serotype C.

### Other Bacterial Invasive Diseases

During 2016, 99 cases (9.5 per 100,000 population) of invasive *Streptococcus pneumoniae* were reported in Montana. The median age of patients was 57 years (range: 18 days – 96 years). Nineteen cases of *Haemophilus influenzae* were reported (1.8 per 100,000 population). Sixteen percent of the *Haemophilus* cases (n=3) were in children aged less than 5 years. Two cases of invasive *H. influenzae* type B, the type that is vaccine preventable, were reported in 2016. Neither case had a history of vaccination. Three cases of streptococcal toxic shock syndrome, caused by invasive group A *Streptococcus*, were reported in 2016. The average age of cases was 36 years.

## Sexually Transmitted Diseases

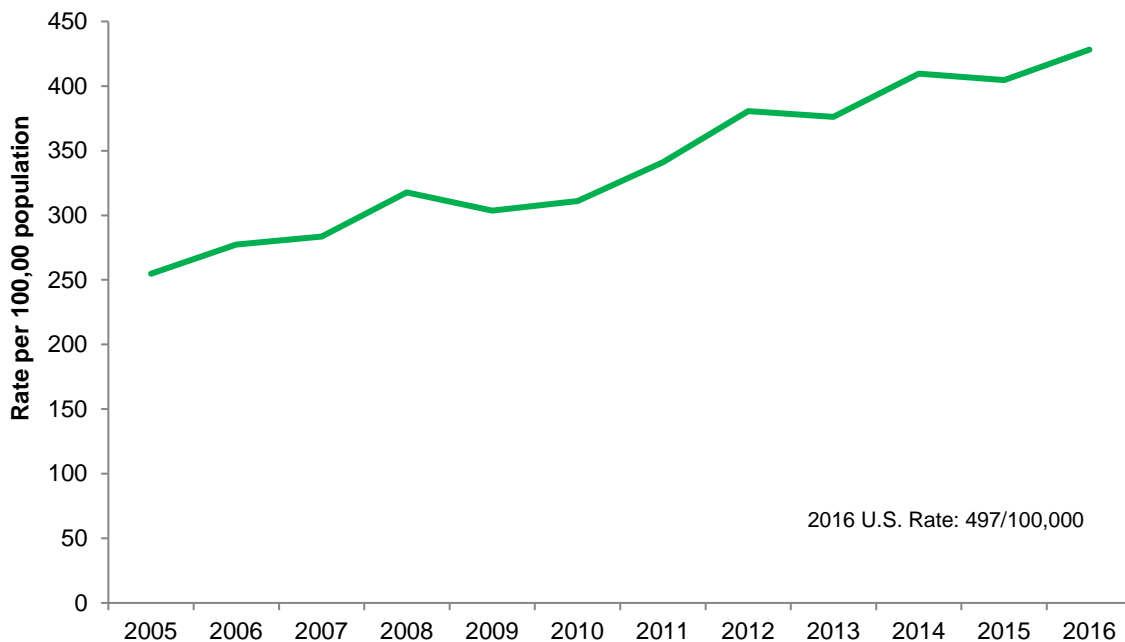
Sexually transmitted diseases (STDs) continue to be the most frequently reported communicable diseases in Montana. Approximately 4,400 cases of chlamydia alone were reported in 2016. All Montana counties reported at least one STD case.

### Chlamydia

Chlamydia is caused by the bacterium *Chlamydia trachomatis* and is the most commonly reported communicable disease in Montana and the United States. Chlamydia infections are usually asymptomatic and may go unnoticed. In women, it can result in pelvic inflammatory disease (PID), a major cause of infertility, ectopic pregnancy, and chronic pelvic pain. Chlamydia infection can also facilitate the transmission of HIV.<sup>4</sup> Pregnant women infected with chlamydia can pass the infection to their infants during delivery, potentially resulting in neonatal ophthalmia or pneumonia. Given the large burden of disease and risks associated with infection, CDC recommends annual chlamydia screening for all sexually active women aged less than 25 years, women 25 years and older with risk factors, and all pregnant women.

Since 2005, case rates have generally increased in Montana (Figure 6). In 2016, 2,972 chlamydia cases (67%) were reported in females. The greater proportion of cases among females may be attributed to screening recommendations for females, resulting in females seeking medical care at greater rates than males, and therefore being tested more often. More chlamydia cases were diagnosed among persons aged 20–24 years (41%) than any other age group (Figure 7).

**Figure 6. Chlamydia case rate — Montana, 2005–2016**



**Figure 7. Chlamydia cases by sex and age — Montana, 2016**

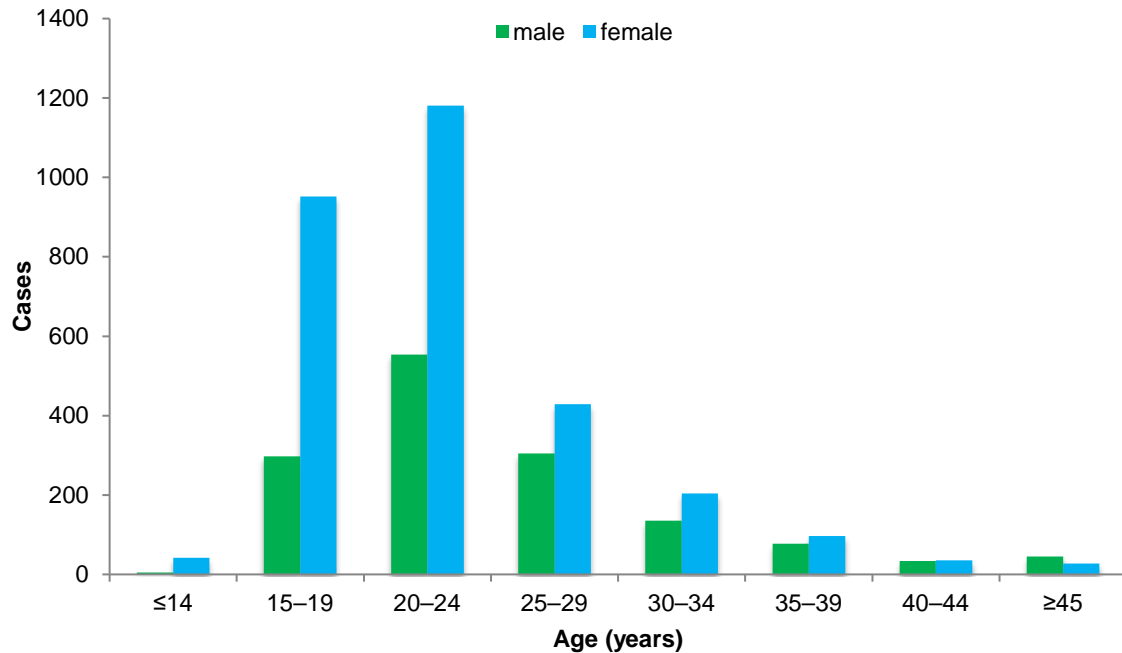


Table 2 outlines the cases of chlamydia reported to DPHHS in 2016 by age, sex, and race. In 2016, the chlamydia incidence rate for persons identified as American Indian was more than four times greater than those reported as white. Broader STD screening efforts among American Indians seeking services at Indian Health Services and tribal clinics may contribute to the higher reported chlamydia incidence rate in this population.

**Table 2. Chlamydia cases by age, sex, and race — Montana, 2016\***

Age (years)	Female					Male					Total
	White	American Indian	Other†	Missing	Total	White	American Indian	Other†	Missing	Total	
0-14	22	17	1	2	42	3	2	0	0	5	47
15-19	710	197	29	16	952	212	69	11	5	297	1249
20-24	920	218	28	15	1181	447	77	26	4	554	1735
25-29	282	132	9	6	429	217	61	22	5	305	734
30-34	123	71	6	4	204	108	23	2	2	135	339
35-39	61	33	1	2	97	54	15	6	2	77	174
≥ 40	38	20	0	4	62	65	7	7	0	79	141
unknown	0	0	0	0	0	3	1	0		4	4
<b>Total</b>	<b>2156</b>	<b>688</b>	<b>74</b>	<b>49</b>	<b>2967</b>	<b>1109</b>	<b>255</b>	<b>74</b>	<b>18</b>	<b>1456</b>	<b>4423</b>

\* Race classification is irrespective of ethnicity (Hispanic or non-Hispanic)

† Other includes persons of more than one race, black, and Asian/Pacific Islander

## Gonorrhea

Gonorrhea is an infection caused by the bacterium *Neisseria gonorrhoeae* and is the second most commonly reported STD in Montana and the United States and incidence rates have been dramatically increasing over the last five years. Gonorrhea infections are a major cause of PID. In addition, epidemiologic and biologic studies provide strong evidence that gonococcal infections facilitate the transmission of HIV.<sup>4</sup>

In 2016, 868 gonorrhea cases from 38 counties were reported. The incidence rate of gonorrhea in Montana was relatively stable until 2012, when the rate increased from 10.7 to 84.9 per 100,000 (Figure 8). In the US, the gonorrhea rate has increased steadily from 2014 to 2016. In 2016, there was a 18.5% increase in gonorrhea cases when compared to 2015.

**Figure 8. Gonorrhea incidence rate — Montana, 2000–2016**

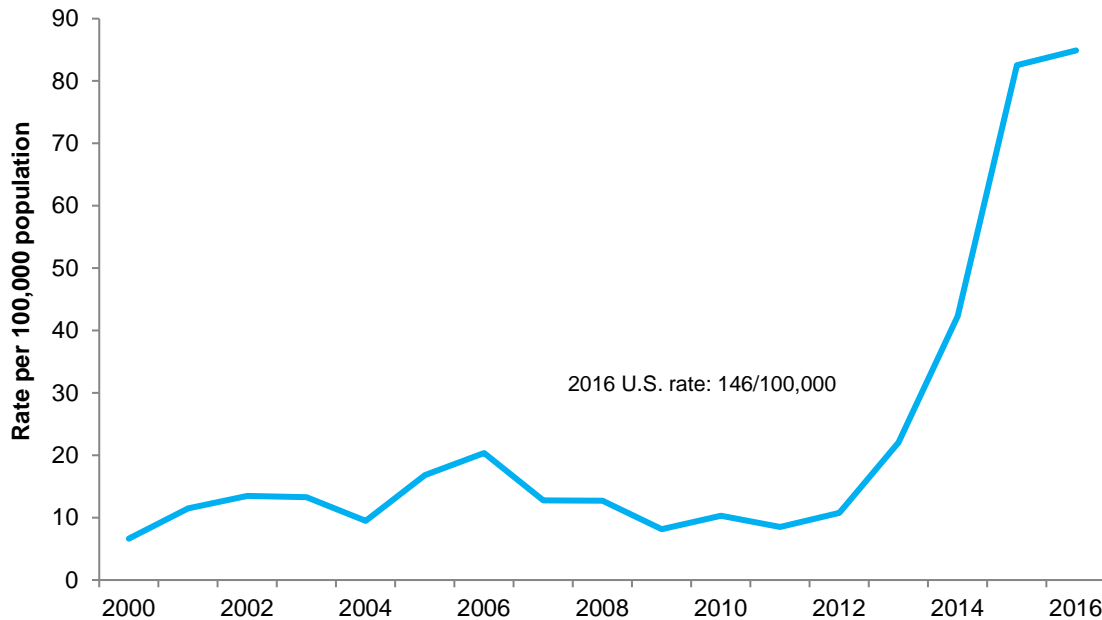
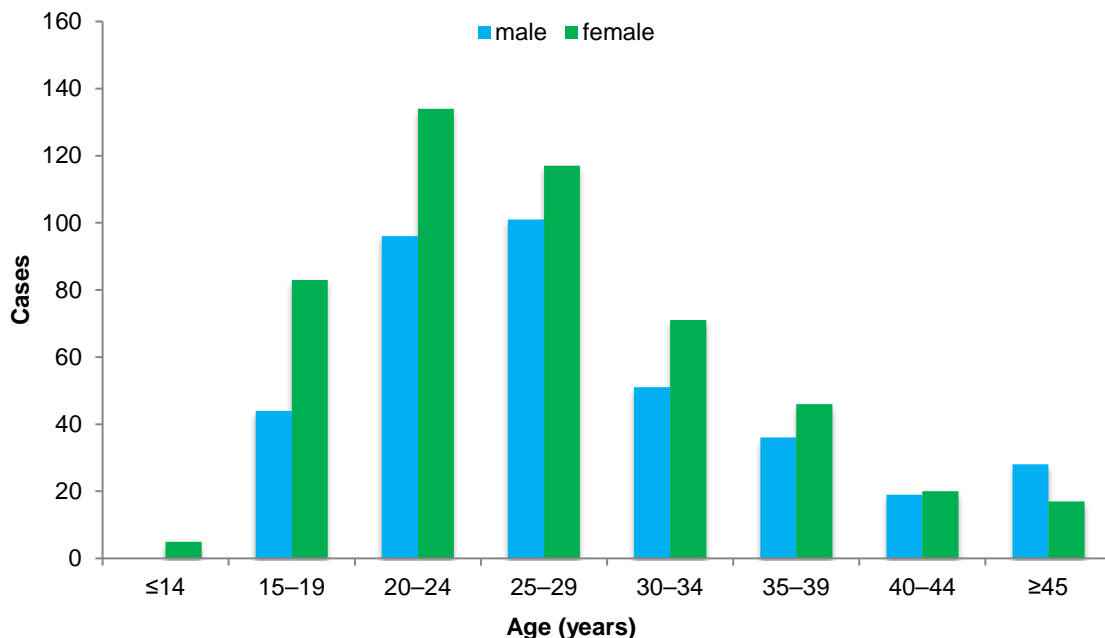


Figure 9 displays the distribution of cases by sex and age group. In Montana, 493 gonorrhea cases (57%) were reported in females. Of the 229 cases of gonorrhea diagnosed in the 20–24 year age group, 133 (58%) occurred among females. As with chlamydia, the higher number of cases this may be related to routine STD screening practices for sexually active women less than 25 years.

**Figure 9. Gonorrhea cases by sex and age — Montana, 2016**



Most cases continue to occur in the 20–24 and 25–29 year age groups, which account for more than 51% of the cases in only 14% of the general population. While there was an increase in cases among all races, American Indians are disproportionately infected by gonorrhea. In 2016, they accounted for 44% of the cases while comprising 6.6 of the Montana population. Broader STD screening efforts among American Indians seeking services at Indian Health Services (IHS) and tribal clinics may contribute to the higher incidence rate in this population. However, the specific magnitude of the contribution has not been measured. Table 3 outlines the demographics of gonorrhea cases in 2016 by age, sex, and race.

**Table 3. Gonorrhea cases by age, sex, and race — Montana, 2016\***

Age (years)	Male					Female					Total
	White	American Indian	Other†	Missing	Total	White	American Indian	Other†	Missing	Total	
0–14	1	4	0	0	5	0	0	0	0	0	5
15–19	41	38	4	0	83	25	16	3	0	44	127
20–24	63	66	4	0	133	52	39	5	0	96	229
25–29	45	70	2	1	118	54	38	8	1	101	219
30–34	38	26	7	0	71	32	16	3	0	51	122
35–39	26	20	0	0	46	22	14	0	0	36	82
≥ 40	18	17	2	0	37	30	14	3	0	47	84
Unknown	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>232</b>	<b>241</b>	<b>19</b>	<b>1</b>	<b>493</b>	<b>215</b>	<b>137</b>	<b>22</b>	<b>1</b>	<b>375</b>	<b>868</b>

\* Race classification is irrespective of ethnicity (Hispanic or non-Hispanic)

† Other includes persons of more than one race, black, and Asian/Pacific Islander

## Syphilis

Syphilis is a genital ulcerative STD caused by the bacterium *Treponema pallidum*. It has often been called "the great imitator" because so many of the signs and symptoms of illness are indistinguishable from those of other diseases. Syphilis is passed from person-to-person through direct contact with a syphilis sore. Infected pregnant women can transmit the disease to the fetus. Without treatment, syphilis infection during can lead to stillbirth, neonatal death, or infant disorders such as deafness, neurologic impairment, and bone deformities.<sup>5</sup>

Syphilis can be divided into stages for the purposes of treatment and follow-up. Patients with early stages of syphilis (primary and secondary) represent recent infection and pose an increased risk of transmission to others. Beginning in 2015, the number of primary and secondary syphilis has been increasing. Seven and fourteen cases were reported in 2015 and 2016, respectively.

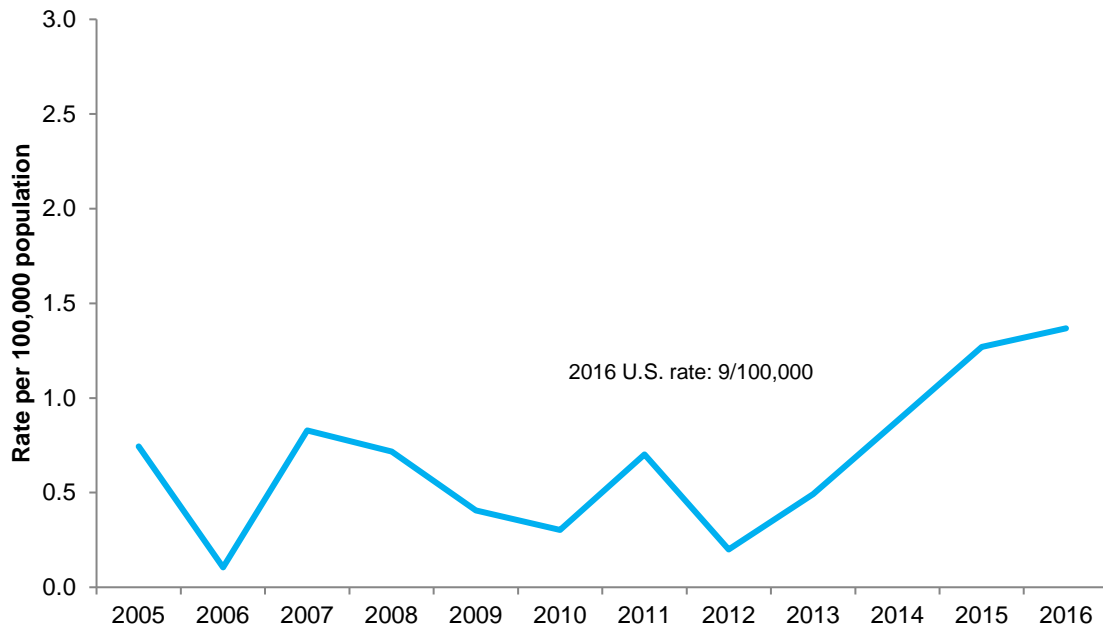
Montana's primary and secondary syphilis rate increased to 1.4 cases per 100,000 population in 2016 from 0.9 in 2014. The U.S. rate has been higher, averaging five cases per 100,000 population in the last five years (2010–2014). Figure 10 displays the fluctuating incidence rate of syphilis in Montana. Demographic and risk information is noted in Table 4.

**Table 4. Newly diagnosed syphilis\* by select characteristics (N=14) — Montana, 2016**

<b>Characteristics</b>	<b>Number</b>
<b>Sex</b>	
Male	13
Female	1
<b>Age at diagnosis (years)</b>	
≤19	0
20–29	7
30–39	3
40–49	3
≥50	0
<b>Ethnicity, race</b>	
Non-Hispanic, white	9
Non-Hispanic, American Indian	3
Non-Hispanic, other	2

\*primary and secondary cases

**Figure 10. Primary and secondary Syphilis case rate — Montana, 2005–2016**



## HIV/AIDS

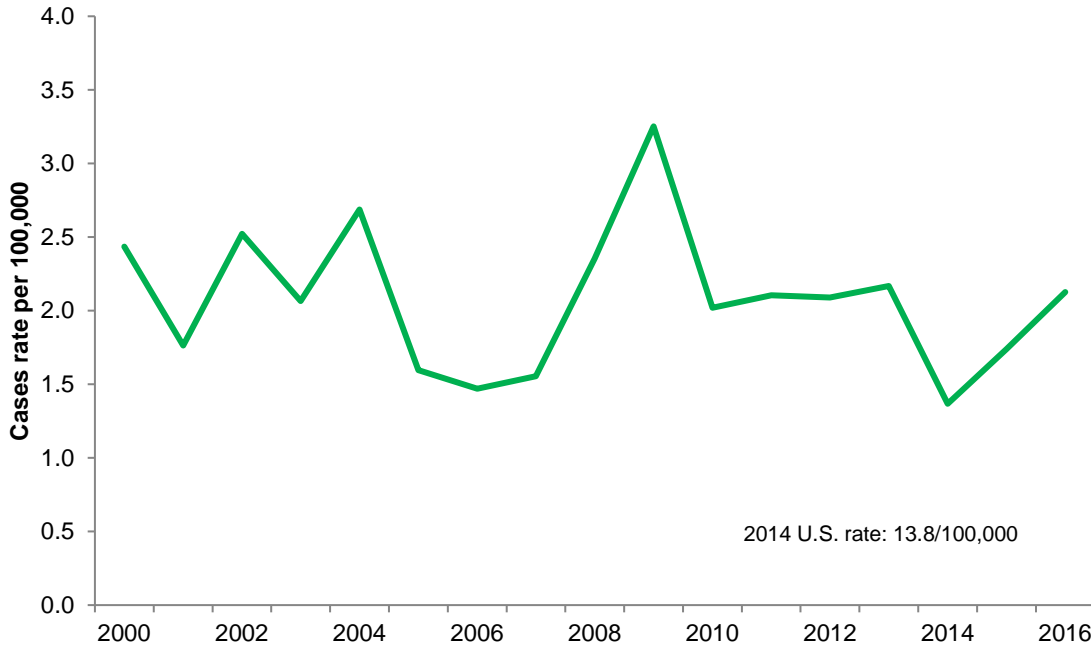
HIV (human immunodeficiency virus) is a virus spread through certain body fluids that affects the immune system. While there is no cure, persons infected with HIV can be treated with antiretroviral therapy (ART), which can reduce viral load and reduce the chances of transmission to others. However, left untreated, HIV can attack and destroy CD4 cells of the immune system and lead to AIDS (acquired immunodeficiency syndrome).<sup>6</sup>

In 2016, 22 newly diagnosed cases of HIV infection were reported, an incidence rate of 2.1 cases per 100,000 population compared with an estimated U.S. incidence rate of 12.3 cases per 100,000 population



in 2014 (Figure 11)<sup>7</sup>. Between 2000–2016, an average of 20 cases of HIV infection have been diagnosed each year, mostly among males (Figure 12). Most HIV infections in Montana continue to be diagnosed among white males, with 18 cases (82%) reported in 2016. Thirteen (68%) of the 19 males diagnosed with HIV infection reported sexual contact with another man (MSM) or injection drug use (IDU) as a risk factor. Two female cases reported IDU as a risk factor. The remaining cases had no risk identified.

**Figure 11. Case rate of newly diagnosed HIV infection — Montana, 2000–2016**



**Figure 12: Newly diagnosed HIV infections by year and sex — Montana, 2000–2016**



**Table 5. Persons newly diagnosed with HIV infection by select characteristics (N=22) — Montana, 2016**

Characteristics	Number
<b>Sex</b>	
Male	19
Female	3
<b>Age at diagnosis (years)</b>	
≤14	1
15-24	1
25-34	10
35-44	4
45-54	5
≥55	1
<b>Ethnicity, race</b>	
Non-Hispanic, white	19
Hispanic, any race	1
Non-Hispanic, other*	2
<b>Transmission category by sex<sup>†</sup></b>	
<b>Male only:</b>	
Male sexual contact w/ another male (MSM)	9
Injection drug use (IDU)	1
MSM & IDU	3
Heterosexual contact <sup>‡</sup>	2
No identified risk	4
<b>Female only:</b>	
Injection drug use (IDU)	2
No identified risk	1

\* Non-Hispanic, other is all other races including multiple races

<sup>†</sup> Transmission category describes the combinations of risk factors by which a person may have acquired HIV

<sup>‡</sup> Heterosexual contact with a person known to have, or to be at high risk for, HIV infection

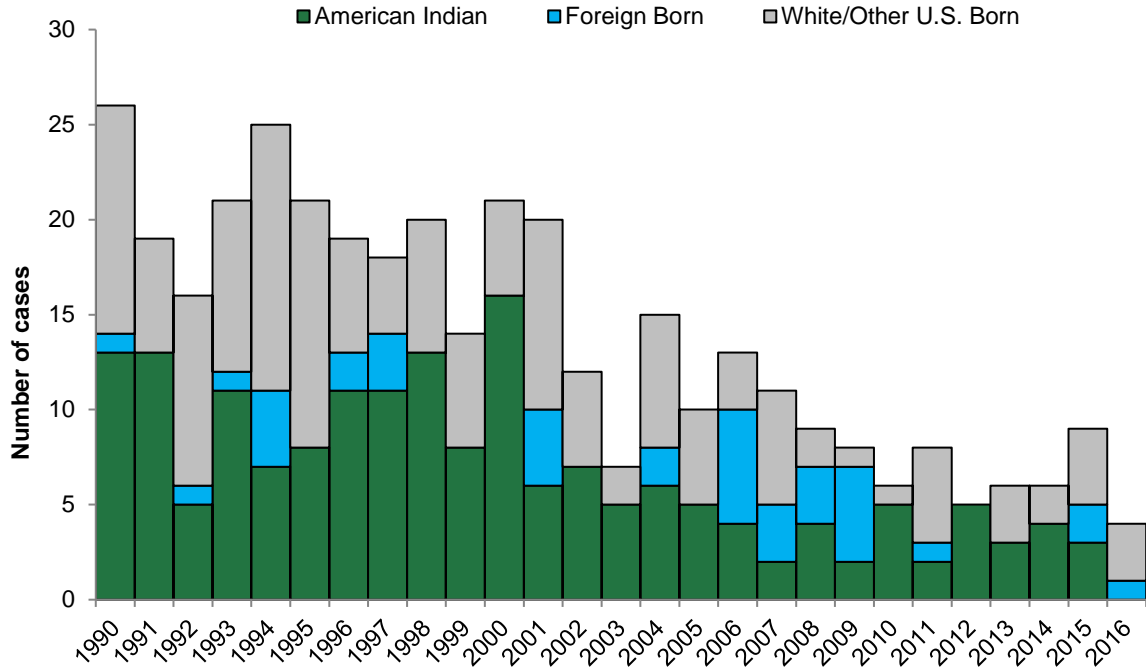
## Tuberculosis

Tuberculosis (TB) is caused by the bacterium *Mycobacterium tuberculosis* and is transmitted person to person through the air when someone with pulmonary TB disease coughs, sneezes, shouts, or sings. Persons who become infected with TB can develop active disease at any time during their lifetime. Without treatment of the infection, about 10% of persons with normal immune systems will develop TB disease. The risk is much higher for persons with immunosuppressive conditions such as HIV, diabetes, chronic renal failure, drug or alcohol abuse, and children five years of age or younger.

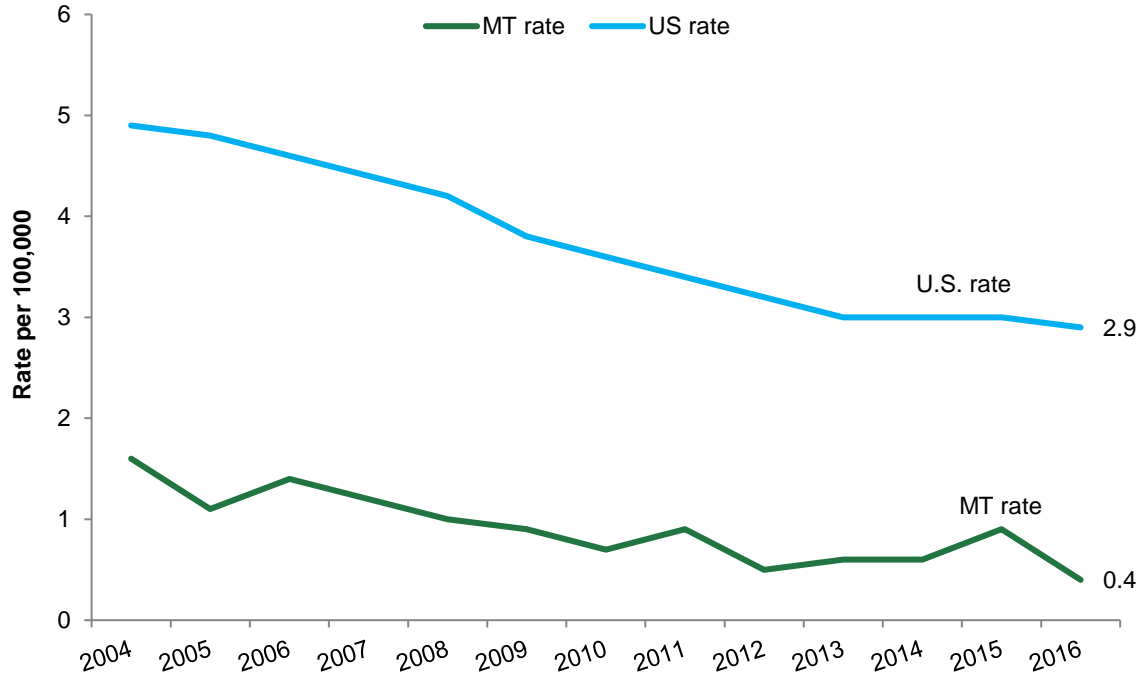
The number of TB cases reported annually in Montana has steadily decreased (Figure 13). During the 1990s, an average of 19.9 cases was reported annually. From 2000–2009, an average of 12.6 cases per year was reported (range: 7–21 cases per year). During 2010–2016, an average of 6.3 cases per year was reported, with a range of 4–9 cases per year. TB cases among American Indians have declined from an average of 10 cases per year in the 1990s to 4.6 cases per year during 2000–2016. There were no TB cases reported among American Indians in 2016. TB among foreign-born persons has increased to an average of 1.6 cases per year during 2000–2016, compared to an average of 1.2 cases per year during the 1990s.

Four cases of active TB were reported in Montana in 2016 (Table 5). Counties of residence included Hill, Gallatin, Flathead, and Lewis and Clark. The 2016 Montana TB incidence rate was 0.4 cases per 100,000 population, significantly lower than the 2016 U.S. case rate of 2.9 per 100,000 (Figure 14).

**Figure 13. Reported active tuberculosis cases — Montana, 1990–2016**



**Figure 14. Tuberculosis incidence rate — Montana and United States, 2000–2016**



**Table 5. Tuberculosis case summary — Montana, 2016**

Characteristics	Number
<b>New TB Cases</b>	4
<b>Incidence Rates</b>	
Montana (total)	0.4/100,000
American Indian	0/100,000
<b>Sex</b>	
Male	3
Female	1
<b>Age at diagnosis (years)</b>	
<5	0
5-14	0
15-24	1
25-44	1
45-64	2
≥65	0
<b>Ethnicity, race</b>	
Non-Hispanic, White	3
Non-Hispanic, American Indian	0
Non-Hispanic, Other	1
<b>Site of Disease</b>	
Pulmonary/Pleural	4
Extrapulmonary only	0
Pulmonary & Extrapulmonary	0
<b>Drug Resistance*</b>	
No resistance	2
Isoniazid resistance	0
Multiple-drug resistance	0
<b>Country of Origin</b>	
U.S.-born	3
Foreign-born	1

\*Two clinical cases had no isolate to test.

Of the 2016 cases, one was foreign-born and was a household contact to an active case in the country of origin. Another case was co-infected with HIV, with reported exposure to TB. Two of the four cases were culture negative, but met the clinical case definition: close contact with an infectious TB case, positive tuberculin skin test, an abnormal chest x-ray, and improvement on TB therapy. Two isolates/specimens were not available for resistance testing; the other two had no drug resistance. Since 2000, 5.3% of the total TB cases reported in Montana had single resistance to Isoniazid (INH) and 1.8% (3 cases) were multidrug resistant tuberculosis (MDR-TB).

Of the four cases reported in 2016, three completed tuberculosis treatment by the end of 2016, and one remains on therapy. All cases were or are being managed using directly observed therapy (DOT). Six pediatric cases (aged <15 years) have been reported since 2000; none were reported in 2016. Pediatric TB cases are considered a sentinel public health event because they provide evidence of recent TB transmission.

Despite the historic low number of TB cases reported in Montana and nationally, a number of challenges remain that slow the progress toward TB elimination. TB persists in specific high-risk populations, including foreign-born persons, racial/ethnic minorities, and homeless persons. Improved diagnostic tools, new drugs that enable shorter, effective treatment of both latent TB infection and active disease, and an effective vaccine are critical for achieving national and global TB elimination.

## **Viral Hepatitis**

Hepatitis refers to an inflammation of the liver. Heavy alcohol use, toxins, some medications, and certain medical conditions can cause hepatitis. However, hepatitis is most often caused by a virus; the most common types are Hepatitis A, B, and C. Symptoms of hepatitis include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, grey-colored stools, joint pain, and jaundice. Symptoms of acute hepatitis appear any time from 2 weeks to 6 months after exposure. Symptoms of chronic viral hepatitis can take decades to develop, and many people with hepatitis are asymptomatic.

### **Hepatitis A**

Hepatitis A virus (HAV) infection is primarily transmitted by the fecal-oral route, either by person-to-person contact or consumption of contaminated food or water. Although viremia occurs early in infection and can persist for several weeks after onset of symptoms, blood borne transmission of HAV is uncommon. In 2016, three cases of HAV infection were reported from three separate counties in Montana. One reported travel outside of the United States prior to onset of symptoms. The source of infection for the other two remains unknown. One person was employed as a food handler and prompted a successful vaccination campaign to protect those who were potentially exposed. No additional cases related to this individual were identified.

### **Hepatitis B**

Hepatitis B virus (HBV) is transmitted through activities that involve percutaneous (puncture through the skin) or mucosal contact with infectious blood or body fluids. Hepatitis B virus infections have decreased significantly over time with increased use of the HBV vaccine. In 2016, 21 chronic HBV infections were reported in Montana. The median age was 47 years and 43% of cases were female. One acute Hepatitis B case was reported in 2016. Case investigations revealed the most commonly reported risk factors for Hepatitis B included contact to a known case and/or IDU.

### **Hepatitis C**

Hepatitis C virus (HCV) is transmitted through contact with the blood of an infected person, primarily through sharing contaminated needles used to inject drugs, needle stick injuries in healthcare settings, and to infants born to HCV-infected mothers. Hepatitis C virus infection sometimes results in an acute illness that typically occurs 6–7 weeks after exposure, but can range from 2 to 24 weeks. However, approximately 70–80% of people with acute Hepatitis C do not have symptoms. Approximately 75–85% of those infected with HCV develop chronic disease that can lead to cirrhosis of the liver and liver cancer.

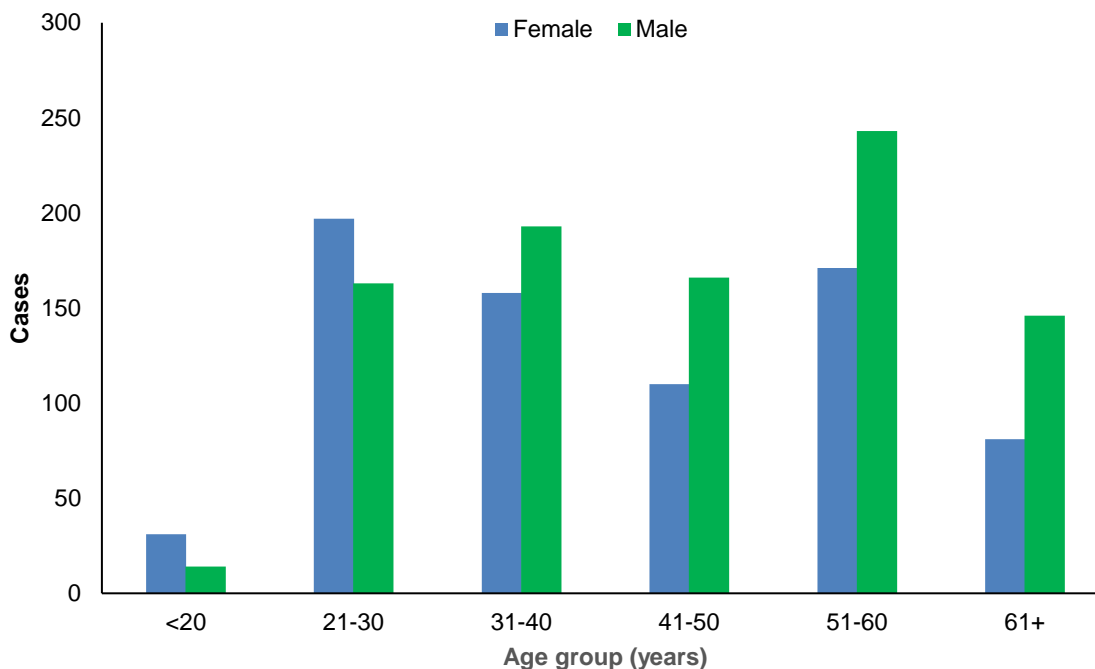
The CDC estimates that in 2014 (the latest data available) there were 30,500 acute hepatitis cases in the United States, and that 2.7–3.9 million persons were living with chronic HCV infection. Prevalence of disease is likely influenced by the CDC screening recommendations for all ‘baby boomers’ (born between 1945-1965).<sup>8</sup>

In 2016, 1,664 chronic HCV cases were reported in Montana. Most of the cases were among whites (67%) followed by persons who identified as American Indian (19%). The median age of chronic HCV cases was 44 years (range: 1–85 years). Twenty-five percent of newly reported cases of HCV infection were in persons aged 51–60 years, the most common age group. Figure 15 shows the distribution of HCV cases by sex and age group. Persons aged 20–39 years accounted for nearly 42% of the cases. About 45% of the reported cases were among men. Due to the fact that nearly 80% of individuals infected develop chronic illness, cases reported in Montana may have become infected at any time during their lifetime and most do not represent recent infections.

Twenty-one acute HCV cases were reported in 2016, an increase of six cases from 2016. Of these, 16 persons identified as white and 6 identified as American Indian. The median age of acute HCV cases

was 32 years (range: 1–64 years). Thirteen of the 21 cases were women. Of the cases where risk factors were identified (N=11), the most common risk factor was IDU.

**Figure 15: Newly reported HCV infections by age and sex — Montana, 2016\***



\* probable and confirmed chronic and acute HCV cases

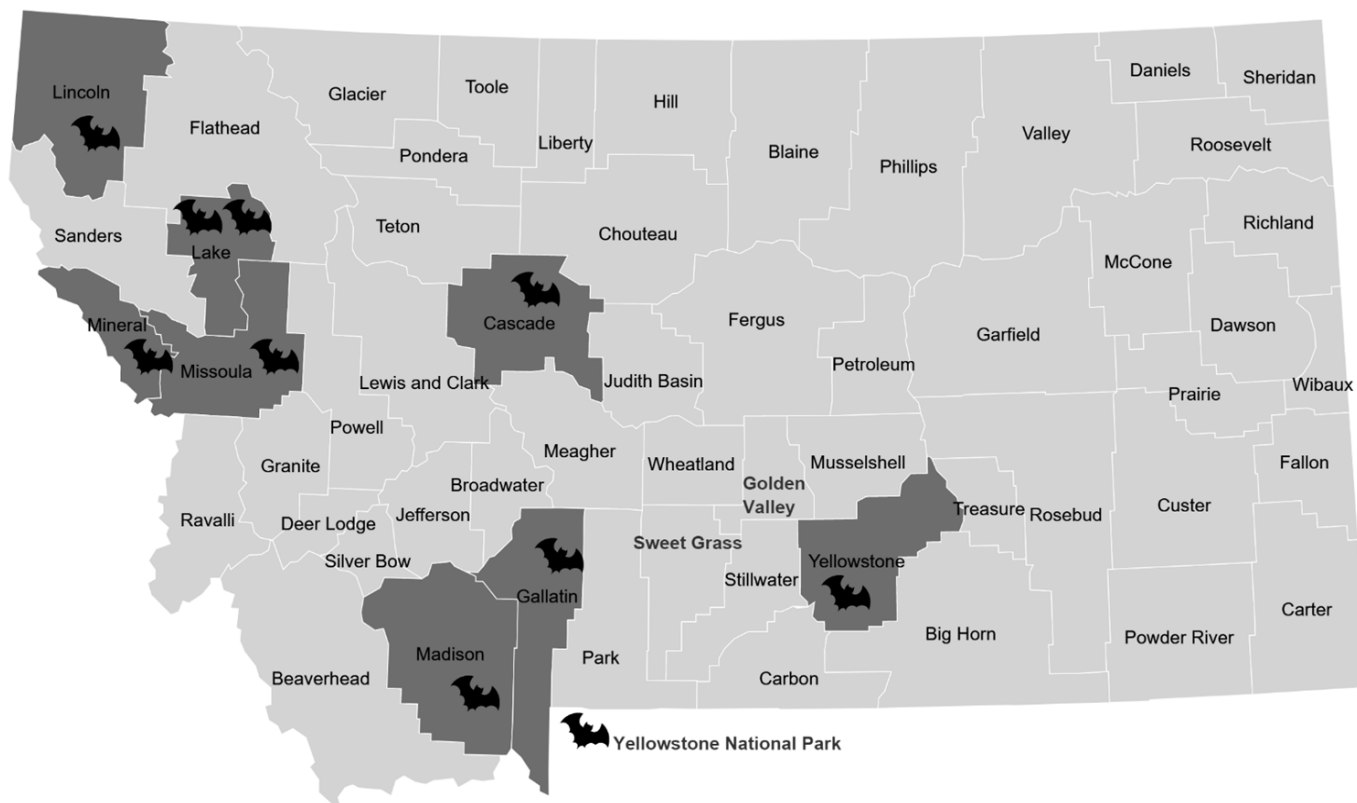
## Zoonotic and Vector-borne Diseases

### Rabies

Rabies is a vaccine-preventable viral disease that is nearly always fatal and is most often transmitted to humans through the bite of a rabid animal. The majority of animal rabies cases reported to DPHHS each year occur among wild animals including skunks and bats. Occasionally domestic animals (e.g., cats, dogs, and horses) are also infected. Human exposure can occur through contact with the saliva or neural tissue of an infected wild or domestic animal. A bite from an infected animal is the most common route of human exposure.

Rabies in humans is preventable through prompt and appropriate medical care and use of post-exposure prophylaxis (PEP). In 2016, 153 individuals received the recommendation to pursue PEP to prevent disease after exposure to an animal that is capable of transmitting rabies. Also in 2016, 10 bats from eight health jurisdictions and Yellowstone National Park in Montana tested positive for the rabies virus (Figure 16). Four of the positive animals had a documented human exposure. The last cases of human rabies in Montana were reported in 1996 and 1997, both of which were fatal.

**Figure 16. Positive animal rabies distribution — Montana 2016**



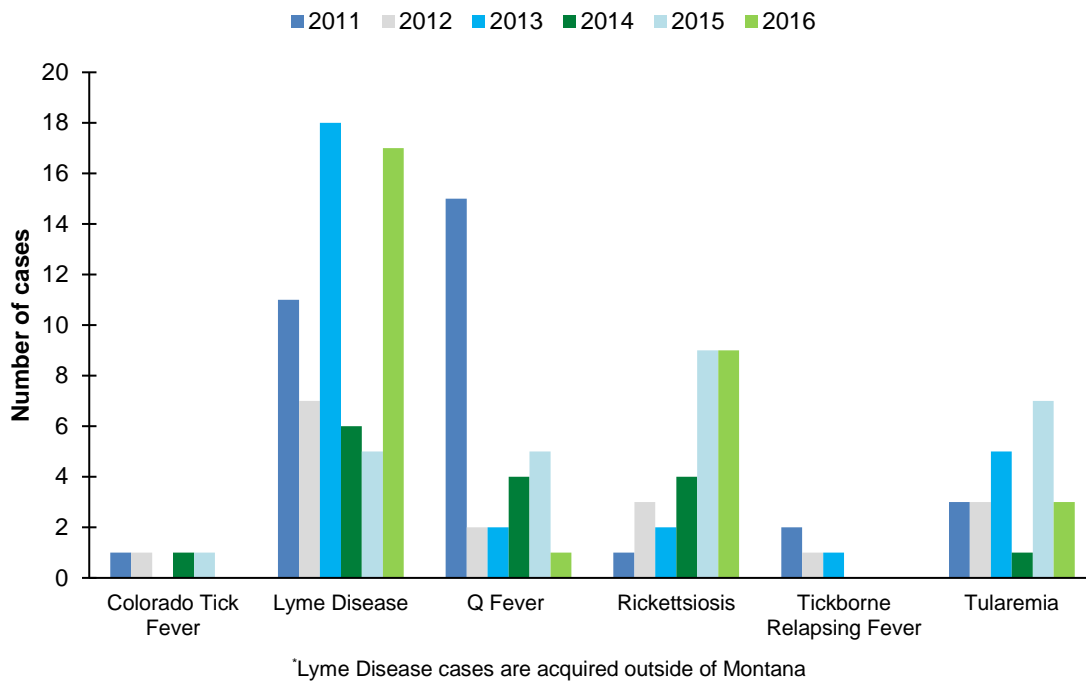
### **Tickborne Diseases**

Vector-borne pathogens present in Montana and transmissible to humans include those that cause Colorado tick fever (*Coltivirus* spp.), Rickettsiosis (*Rickettsia* spp.), tickborne relapsing fever (*Borrelia hermsii*), Q fever (*Coxiella burnetii*), tularemia (*Francisella tularensis*), and plague (*Yersinia pestis*). The number of reported cases from each of the last five years is shown in Figure 17. Nine cases of rickettsiosis were reported in 2016. There were no cases of plague reported.

In addition to vector-borne transmission, tularemia and Q Fever can be acquired through inhalation of contaminated aerosols. Q Fever can also be transmitted through exposure to milk, urine, feces, or birth products from infected farm animals (particularly sheep, cattle, and goats). In 2016, there were three cases of tularemia and one case of chronic Q fever reported in Montana. Precautions should be taken to minimize exposure to ticks, fleas, and deer flies, as well as to provide protection in settings where aerosolization could occur.

While travelling out of state, Montanans acquired diseases caused by a vector-borne pathogen not locally transmitted in Montana. Six cases of Lyme disease, four cases of Malaria, three cases of Dengue fever, one case of Chikungunya virus, and one case of Babesiosis were confirmed in Montana residents in 2016. Before traveling, Montanans should plan to limit exposure to mosquitos and ticks and get appropriate vaccines or prophylaxis to prevent vector-borne diseases.

**Figure 17. Reported cases of tick-borne diseases — Montana, 2012–2016\***



### Zika Virus

Zika virus was first discovered in 1947, and the first human cases were detected in 1952. Zika virus is transmitted by the bite of an infected mosquito that is not present in Montana. Zika can also be transmitted by sexual contact with an infected person. Cases are usually associated with travel to an area with a higher risk of Zika transmission, most commonly Mexico, Central and South America, the Caribbean, central Africa, south Asia, and the Pacific islands. Localized transmission has also been documented in the United States, specifically Florida and Texas. About 80% of infected people do not have symptoms while the remainder usually have a combination of rash, red eyes, fever, and arthralgia. Zika infection during pregnancy can cause a serious birth defect called microcephaly. In 2016, a significant increase in cases was reported in the Americas. Over 5000 cases were reported in the United States, the majority of which were travelers returning from affected areas. Less than one percent of U.S. cases were due to localized transmission in Florida and Texas. Ten cases were reported in Montana, and all were travel-related. None of the cases were pregnant. Montanans are reminded to prevent mosquito bites while traveling to Zika-affected areas through use of mosquito repellent, limited outdoor activity during dawn and dusk, and covering skin with clothing.

### West Nile Virus

West Nile virus (WNV) is an arbovirus that is transmitted by infected mosquitoes throughout the United States. The majority of persons infected with WNV do not exhibit symptoms. Less than 1% of infected persons develop West Nile neuroinvasive disease (WNND), a serious and potentially life-threatening condition. In 2016 seven human cases of WNV were reported in Montana residents. Of those, three were WNND and one was fatal. Cases were reported from Blaine, Dawson, McCone, and Rosebud counties.

Since the introduction of WNV into Montana in 2002, the number of cases in Montana varied from year to year. Ten of the fifteen years of WNV surveillance had fewer than ten annual cases (range 0–7). Three years had between 25 and 38 (2005, 2006, 2013) and two years (2003 and 2007) had over 200.

Nationally, the number of cases has varied almost 14-fold between two consecutive years, 2011 and 2012, when 712 and 9,862 cases respectively were reported. Given the variation of WNV activity in

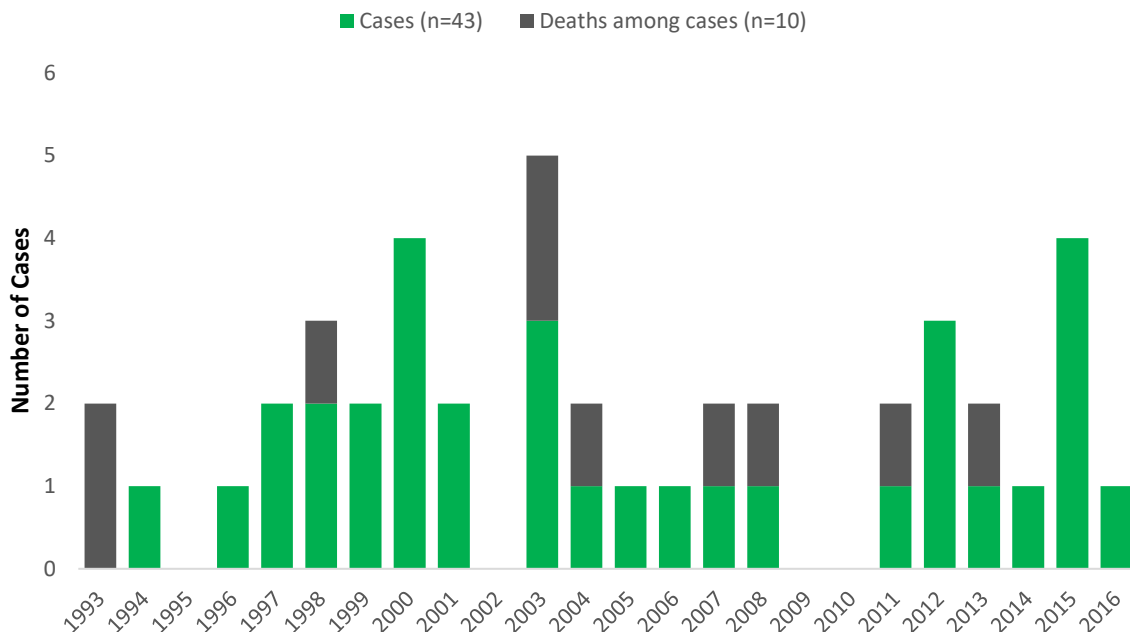


Montana and nationally, and uncertainty of forecasting the disease burden prevention steps must be emphasized. Montanans are reminded to prevent mosquito bites every season through use of mosquito repellent, limited outdoor activity during dawn and dusk, covering skin with clothing, and elimination of breeding pools in vessels around the home.

## Hantavirus

Hantavirus is a rare but serious disease, most often caused by the *Sin Nombre* virus in Montana. It is transmitted to humans through exposure to infected rodent urine, droppings or saliva. The deer mouse is the most common host of the virus, and is widespread in Montana. The majority of Montana hantavirus cases have been reported during spring and summer months. Of Montana’s 56 counties, 43% have reported at least one case of hantavirus. Since 1993, Montana has reported 43 cases of Hantavirus Pulmonary Syndrome, including 10 deaths (Figure 18). One case was reported in Montana in 2016, and was not fatal. Reducing potential exposures to rodents is key to preventing hantavirus. This includes sealing up holes and gaps homes and garages, carefully cleaning areas of mouse infestation.

**Figure 18. Hantavirus cases and outcomes — Montana, 1993–2016**



## Other Diseases

### Coccidioidomycosis (Valley fever)

Coccidioidomycosis, also called valley fever, is an infection caused by the fungus *Coccidioides*. The fungus is found in the soil in the southwestern United States and parts of Mexico and Central and South America. The fungus was also recently found in south central Washington.<sup>9</sup> Individuals are infected by inhalation of fungal spores from the air; however, most do not become ill. Individuals who have compromised immune systems, who have diabetes, or women who are pregnant have a greater risk for becoming severely ill.

Although not endemic in Montana, the number of cases reported among Montana residents has increased slightly during the past three years. Most of these cases were in individuals that previously lived or worked in areas where coccidioidomycosis is endemic. The remainder are Montana residents that spend their winters in endemic areas. In 2016, there were 13 cases of coccidioidomycosis reported with a median age of 67 years. All cases reported previous travel to endemic areas.

### **Creutzfeldt Jakob Disease**

Creutzfeldt Jakob Disease (CJD) is a rare transmissible spongiform encephalopathy causing death in one to two individuals per million nationwide. CJD is classified into three categories: iatrogenic (acquired through infected tissue), familial (individuals who have inherited mutations of the prion protein gene), and sporadic (random mutations of the prion protein gene). Nationwide, approximately 85% of cases are designated as sporadic. In Montana, cases occur at a rate of zero to four cases per year. In 2016, there was one case of sporadic CJD reported.

### **Legionellosis**

Legionellosis is an infection caused by the bacterium, *Legionella*. The disease presents as either a mild febrile illness (Pontiac fever) or pneumonia (Legionnaires Disease) that can become severe. An estimated 5,000 cases are reported in the U.S. each year, and an average of eight cases are reported each year in Montana. *Legionella* is found in the environment, usually in water. The bacteria grow well in warm water and have been isolated from environments such as hot tubs, cooling towers, hot water tanks, large plumbing systems, and decorative fountains. Home oxygen tubing and water supplied by old piping have also been implicated as vehicles for transmission. In 2016, ten cases of legionellosis were reported in Montana, 80% of them were aged 50 years or older. All were hospitalized and one death was reported. It is necessary to ensure that water systems described above are maintained appropriately to prevent infection by *Legionella*.

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## Appendix I: Comparative statistics for reportable communicable diseases — Montana, 2016<sup>\*†</sup>

CONDITION	Reported cases								
	2011	2012	2013	2014	2015	2016	2016 Rate	5 yr median	5 yr Trend
Babesiosis	0	0	0	0	0	1	0.1	0	
Botulism, infant	0	0	0	1	0	1	0.1	0	
Campylobacteriosis	236	233	205	216	323	372	35.6	233	
Chikungunya	NR	NR	NR	0	3	1	0.1	1.5	
Chlamydia	3412	3827	3818	4193	4183	4423	423.4	3827	
Coccidioidomycosis	5	3	3	10	12	13	1.2	5	
Creutzfeldt Jakob disease	4	1	3	3	1	1	0.1	3	
Cryptosporidiosis	77	69	125	66	39	62	5.9	69	
Dengue Fever	0	2	5	2	6	3	0.3	2	
Giardiasis	87	67	91	89	93	120	11.5	89	
Gonorrhea	84	108	224	434	844	868	83.1	224	
Haemophilus influenzae, invasive	3	6	6	14	15	19	1.8	6	
Hantavirus	2	3	2	1	4	1	0.1	2	
Hemolytic uremic syndrome (HUS)	1	1	0	5	2	1	0.1	1	
Hepatitis A	3	6	6	5	2	3	0.3	5	
Hepatitis B, acute	0	2	4	0	7	1	0.1	2	
Hepatitis B, chronic	24	27	21	32	35	21	2.0	27	
Hepatitis C, acute	9	9	16	13	15	21	2.0	13	
Hepatitis C, chronic	1349	1544	1142	1413	1386	1664	159.3	1386	
HIV	21	22	23	14	18	22	2.1	21	
Legionellosis	1	4	10	5	8	10	1.0	5	
Listeriosis	3	1	0	1	1	2	0.2	1	
Lyme disease	11	7	18	6	5	6	0.6	7	
Malaria	3	0	0	2	1	4	0.4	1	
Meningococcal disease	4	10	1	4	1	2	0.2	4	
Mumps	0	1	0	1	1	26	2.5	1	
Pertussis	134	547	663	494	230	21	2.0	494	
Q fever	15	2	2	4	5	1	0.1	4	
Rabies, animal	18	25	36	16	21	10	1.0	21	
Salmonellosis	120	110	94	145	195	177	16.9	120	
Shiga toxin-producing Escherichia coli (STEC)	39	44	49	39	85	133	12.7	44	
Shigellosis	124	12	69	44	14	8	0.8	44	
Spotted Fever Rickettsiosis	1	3	2	4	9	9	0.9	3	
Streptococcal toxic shock syndrome	0	0	0	0	4	3	0.3	0	
Streptococcus pneumoniae, invasive	22	33	31	41	61	99	9.5	33	
Syphilis	9	3	8	9	13	14	1.3	9	
Tuberculosis	8	5	6	6	9	4	0.4	6	
Tularemia	3	3	5	1	7	3	0.3	3	
Varicella	163	133	84	72	132	77	7.4	132	
Vibriosis	NR	NR	3	2	0	2	0.2	2	
West Nile	1	6	38	5	3	7	0.7	5	
Zika virus disease	NR	NR	NR	NR	NR	9	0.9	N/A	

\* Confirmed and probable cases only. † Conditions for which there were zero (0) cases in 2016 are not reflected in this table. NR = Not Reportable

Appendix II: Cases of reportable communicable diseases by jurisdiction — Montana, 2016\*

	Babesiosis	Botulism, Infant	Campylobacteriosis	Chikungunya virus	Chlamydia	Coccidioidomycosis	Cruetzfeldt Jakob Disease	Cryptosporidiosis	Dengue	Ehrlichiosis	Eastern Equine Encephalitis (EEE)	Giardiasis	Gonorrhea	Hemolytic Uremic Syndrome	Haemophilus Influenzae, Invasive	Hantavirus Infection	Hepatitis A	Hepatitis B, Acute	Hepatitis B, Chronic	Hepatitis C, Acute	Hepatitis C, Chronic	HIV	Legionellosis	Listeriosis	Lyme Disease	Malaria	Meningococcal Disease	Mumps	Pertussis	Q Fever	Rabies, Animal	Shiga-toxin producing E. coli (STEC)	Salmonellosis	Shigellosis	Spotted Fever Rickettsiosis	Streptococcal Toxic Shock Syndrome	Streptococcus pneumoniae	Syphilis, Primary	Syphilis, Secondary	Tuberculosis	Tularemia	Varicella	Vibriosis	West Nile Fever	West Nile Virus Neuroinvasive Disease	Zika Virus Disease				
Beaverhead	0	0	14	0	43	0	0	1	0	0	0	2	3	0	0	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0	4	2	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0		
Big Horn/Crow	0	0	13	0	191	0	0	1	0	0	0	0	75	0	1	0	0	0	0	0	13	0	0	0	1	0	0	0	0	0	1	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0		
Blaine/Ft. Belknap	0	0	3	0	26	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0			
Broadwater	0	0	1	0	12	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Carbon	0	0	8	0	13	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0			
Carter	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Cascade	0	0	16	0	415	1	0	3	0	0	0	8	81	0	2	1	0	0	2	1	159	2	1	0	1	0	0	0	1	0	1	14	10	0	1	0	19	0	0	0	0	2	0	0	0	0	0			
Chouteau	0	0	0	0	3	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0			
Custer	0	0	2	0	50	1	0	0	0	1	0	0	4	0	1	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	1	4	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
Daniels	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
Dawson	0	0	1	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	1	0	0	18	2	0	0	0	2	0	0	0	0	1	0	3	1	0	0	0		
Deer Lodge	0	0	5	0	41	0	0	0	1	0	0	3	3	0	0	0	0	0	0	0	23	0	1	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fallon	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		
Fergus	0	0	4	0	22	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	19	0	1	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Flathead	0	0	27	0	299	2	0	8	1	0	0	18	15	0	3	0	0	0	0	0	88	4	2	0	3	2	0	0	0	1	10	6	0	0	2	15	0	0	1	0	10	1	0	0	0	0	2	0		
Gallatin	0	0	40	0	522	0	0	13	1	1	0	33	32	0	2	0	0	1	3	0	68	5	0	0	3	1	0	20	5	0	1	22	12	3	2	1	2	1	3	1	0	4	1	0	0	0	3	0		
Garfield	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Glacier/Blackfeet	0	0	3	0	158	0	0	1	0	0	0	2	54	0	0	0	0	0	0	1	88	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	1	0	0	1	0	0	0	0	0	1	0	
Golden Valley	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Granite	0	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hill/Rocky Boy	0	0	3	0	180	0	0	1	0	0	0	2	24	0	0	0	0	0	0	1	33	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	5	0	0	0	0	0		
Jefferson	0	0	8	0	15	0	0	2	0	0	0	0	2	0	0	0	0	0	0	1	12	0	1	0	0	0	0	0	2	0	0	2	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
Judith Basin	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lake/CSKT	0	0	17	0	164	0	0	2	0	0	1	47	0	0	0	0	0	1	1	63	1	1	0	1	0	1	0	3	0	1	2	2	0	0	0	6	1	0	0	0	2	0	0	0	2	0	0	0	0	
Lewis & Clark	0	0	15	0	255	1	0	7	0	0	0	4	14	0	1	0	1	0	1	0	83	0	1	0	1	0	0	0	0	0	6	24	1	0	0	5	0	0	1	0	6	0	0	0	0	0	0	0	1	0
Liberty	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln	0	0	10	0	60	1	0	2	0	0	0	2	3	0	0	0	0	0	1	0	37	0	0	0	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Madison	0	0	9	0	9	1	0	1	0	0	0	1	2	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
McCone	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Meagher	0	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Mineral	0	0	2	0	15	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Missoula	1	1	34	1	516	1	1	8	0	0	0	9	60	0	0	0	1	0	3	1	120	3	1	0	2	0	1	0	4	0	1	10	17	3	3	0	2	2	0	0	0	4	0	0	0	0	0	0	2	0



	Babesiosis	Botulism, Infant	Campylobacteriosis	Chikungunya virus	Chlamydia	Coccidioidomycosis	Cruetzfeldt Jakob Disease	Cryptosporidiosis	Dengue	Ehrlichiosis	Eastern Equine Encephalitis (EEE)	Giardiasis	Gonorrhea	Hemolytic Uremic Syndrome	Haemophilus Influenzae, Invasive	Hantavirus Infection	Hepatitis A	Hepatitis B, Acute	Hepatitis B, Chronic	Hepatitis C, Acute	Hepatitis C, Chronic	HIV	Legionellosis	Listeriosis	Lyme Disease	Malaria	Meningococcal Disease	Mumps	Pertussis	Q Fever	Rabies, Animal	Shiga-toxin producing E. coli (STEC)	Salmonellosis	Shigellosis	Spotted Fever Rickettsiosis	Streptococcal Toxic Shock Syndrome	Streptococcus pneumoniae	Syphilis, Primary	Syphilis, Secondary	Tuberculosis	Tularemia	Varicella	Vibriosis	West Nile Fever	West Nile Virus Neuroinvasive Disease	Zika Virus Disease						
Musselshell	0	0	3	0	6	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Park	0	0	6	0	30	0	0	4	0	0	0	6	3	0	0	0	0	0	0	0	23	0	0	0	1	0	0	0	0	0	0	3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
Phillips	0	0	3	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Pondera	0	0	7	0	9	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	9	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Powder River	0	0	3	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Powell	0	0	6	0	14	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	67	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Prairie	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Ravalli	0	0	14	0	81	2	0	2	0	0	0	5	5	0	0	0	1	0	1	0	34	0	0	0	0	0	0	0	0	0	0	4	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0		
Richland	0	0	3	0	40	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Roosevelt/Ft. Peck	0	0	0	0	151	0	0	0	0	0	0	1	69	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rosebud/N. Cheyenne	0	0	5	0	124	0	0	0	0	0	0	0	78	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sanders	0	0	4	0	11	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	26	1	1	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sheridan	0	0	1	0	9	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver Bow	0	0	10	0	144	1	0	0	0	0	0	0	16	0	1	0	0	0	6	0	78	0	0	0	0	0	0	0	0	0	0	2	6	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stillwater	0	0	4	0	16	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sweet Grass	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Teton	0	0	1	0	6	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Toole	0	0	1	0	7	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	52	1	0	0	0	0	0	0	0	0	0	0	25	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Treasure	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valley	0	0	1	0	9	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wheatland	0	0	1	0	6	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wibaux	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellowstone	0	0	46	0	694	1	0	2	0	0	1	13	243	0	6	0	0	0	2	12	266	3	0	0	2	1	0	0	1	0	1	14	23	0	0	0	8	3	1	0	1	2	0	0	0	0	0	0	0	0	0	
<b>MONTANA</b>	<b>1</b>	<b>1</b>	<b>372</b>	<b>1</b>	<b>4423</b>	<b>13</b>	<b>1</b>	<b>62</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>120</b>	<b>868</b>	<b>1</b>	<b>19</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>21</b>	<b>21</b>	<b>1663</b>	<b>22</b>	<b>10</b>	<b>2</b>	<b>17</b>	<b>4</b>	<b>2</b>	<b>26</b>	<b>21</b>	<b>1</b>	<b>10</b>	<b>133</b>	<b>177</b>	<b>8</b>	<b>9</b>	<b>3</b>	<b>99</b>	<b>8</b>	<b>6</b>	<b>4</b>	<b>3</b>	<b>77</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>9</b>						

\*Confirmed and probable cases that were newly reported to DPHHS in 2016.

	Babesiosis	Botulism, Infant	Campylobacteriosis	Chikungunya virus	Chlamydia	Coccidioidomycosis	Cruetzfeldt Jakob Disease	Cryptosporidiosis	Dengue	Ehrlichiosis	Eastern Equine Encephalitis (EEE)	Giardiasis	Gonorrhea	Hemolytic Uremic Syndrome	Haemophilus Influenzae, Invasive	Hantavirus Infection	Hepatitis A	Hepatitis B, Acute	Hepatitis B, Chronic	Hepatitis C, Acute
Musselshell	0	0	3	0	6	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Park	0	0	6	0	30	0	0	4	0	0	0	6	3	0	0	0	0	0	0	0
Phillips	0	0	3	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Pondera	0	0	7	0	9	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1
Powder River	0	0	3	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Powell	0	0	6	0	14	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Prairie	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ravalli	0	0	14	0	81	2	0	2	0	0	0	5	5	0	0	0	1	0	1	0
Richland	0	0	3	0	40	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Roosevelt/Ft. Peck	0	0	0	0	151	0	0	0	0	0	0	1	69	0	0	0	0	0	0	0
Rosebud/N. Cheyenne	0	0	5	0	124	0	0	0	0	0	0	0	78	0	0	0	0	0	0	0
Sanders	0	0	4	0	11	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Sheridan	0	0	1	0	9	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Silver Bow	0	0	10	0	144	1	0	0	0	0	0	0	16	0	1	0	0	0	6	0
Stillwater	0	0	4	0	16	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0
Sweet Grass	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teton	0	0	1	0	6	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0
Toole	0	0	1	0	7	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1
Treasure	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valley	0	0	1	0	9	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0
Wheatland	0	0	1	0	6	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0
Wibaux	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellowstone	0	0	46	0	694	1	0	2	0	0	1	13	243	0	6	0	0	0	2	12
<b>MONTANA</b>	<b>1</b>	<b>1</b>	<b>372</b>	<b>1</b>	<b>4423</b>	<b>13</b>	<b>1</b>	<b>62</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>120</b>	<b>868</b>	<b>1</b>	<b>19</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>21</b>	<b>21</b>

<sup>1</sup> Confirmed and probable cases that were newly reported to DPHHS in 2016.

## Appendix IV: Diseases Reportable to Montana DPHHS, 2016

Montana health care providers are required to report cases of the following conditions to their local health department\*. This reporting falls within HIPAA medical privacy exceptions for release of information. Reporting patients with the conditions below does not require patient consent. Reporting enables public health officials to conduct follow-up on cases of significance, and to identify outbreaks or emerging health concerns.

Acquired Immune Deficiency Syndrome (AIDS)	Lyme disease
Anaplasmosis	Lymphogranuloma venereum
Anthrax	Malaria
Arboviral disease (including California serogroup, Eastern equine encephalitis, Powassan, St. Louis encephalitis, West Nile Virus, Western equine encephalitis)	Measles (rubeola)
Babesiosis	Meningococcal disease ( <i>Neisseria meningitidis</i> )
Botulism (including infant botulism)	Mumps
Brucellosis	Pertussis (whooping cough)
Campylobacter	Plague ( <i>Yersinia pestis</i> )
Chancroid	Poliomyelitis
<i>Chlamydia trachomatis</i> infection	Psittacosis
Colorado Tick Fever	Q fever ( <i>Coxiella burnetii</i> )
Cryptosporidiosis	Rabies human and animal (including exposure to a human by a species susceptible to rabies infection)
Coccidioidomycosis	Rickettsiosis
Cyclosporiasis	Rubella (including congenital)
Dengue virus	Salmonellosis
Diphtheria	Severe Acute Respiratory Syndrome-associated coronavirus (SARS)
Ehrlichiosis	Shigellosis
<i>Escherichia coli</i> , shiga-toxin producing (STEC)	Smallpox
Gastroenteritis outbreak	<i>Streptococcus pneumoniae</i> , invasive disease
Giardiasis	Syphilis
Gonococcal infection	Tetanus
<i>Granuloma inguinale</i>	Tick-borne relapsing fever
<i>Haemophilus influenzae</i> , invasive disease	Toxic shock syndrome, non-streptococcal
Hansen's disease (leprosy)	Transmissible Spongiform Encephalopathies
Hantavirus Pulmonary Syndrome/infection	Trichinellosis (Trichinosis)
Hemolytic Uremic Syndrome, post-diarrheal	Tuberculosis
Hepatitis A	Tularemia
Hepatitis B, acute, chronic, perinatal	Typhoid Fever
Hepatitis C, acute, chronic	Varicella
Human Immunodeficiency Virus (HIV)	<i>Vibrio cholerae</i> infection (Cholera)
Influenza (including hospitalizations/deaths)	Vibriosis
Lead poisoning (blood levels $\geq$ than 5 micrograms deciliter for children 13 years of age or younger)	Viral Hemorrhagic fevers
Legionellosis	Yellow Fever
Listeriosis	Any unusual incident of unexplained illness or death in a human or animal with potential human health implications

An up to date list of Reportable Diseases in Montana is maintained on our website. To view the current list, please visit: <http://www.mtrules.org/gateway/RuleNo.asp?RN=37%2E114%2E203>

\*Specific requirements related to reporting, investigation, and control of specific conditions are found in the Administrative Rules of Montana