



# COMMUNICABLE DISEASE IN **MONTANA**

## ANNUAL REPORT **2017**



MONTANA  
COMMUNICABLE  
DISEASE EPIDEMIOLOGY

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 2017. These reportable conditions met the 2017 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 [hhsepi2@mt.gov](mailto:hhsepi2@mt.gov) with questions or comments.



# Message from the State Medical Officer

*The prevention and control of communicable disease is one of the great public health achievements in the United States and is the backbone of public health in Montana.*

*As such, the Montana Department of Public Health and Human Services works closely with local health jurisdictions who are on the front lines of public health to prevent communicable diseases in Montana.*

*These important prevention activities include:*

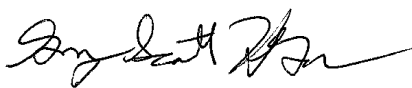
- *Responding to and tracking outbreaks of infectious diseases, such as influenza, foodborne and vectorborne illnesses*
- *Testing for and treating infectious diseases*
- *Preparing communities for disease outbreaks*
- *Providing messages to prevent transmission of disease*

*The unique nature of this work requires staff to be 'on call' for disease reporting, consultation, and outbreak investigation and control to quickly respond to communicable disease urgencies and emergencies.*

*The Montana Communicable Disease Annual Report summarizes and highlights the diseases and outbreaks investigated by the DPHHS Communicable Disease and Epidemiology Section and local health jurisdictions and partners during 2017. Data trends and public health events of importance are described and analyzed in order to more completely understand the impact of specific communicable diseases on the health of people living in Montana.*

*It is our hope that you will find this report useful in your work and research.*

Sincerely,



Greg Holzman, M.D., MPH





# Who We Are & What We Do

*Preventing and controlling the spread of disease is the heart of public health work. In coordination with and support of local health agencies, the Communicable Disease and Epidemiology Section (CDEpi) keeps that mission in mind as we work each day to improve and protect the health of all Montanans. CDEpi encompasses the following areas:*

## **VACCINE PREVENTABLE DISEASES**

*Vaccine Preventable Disease Epidemiology monitors for diseases that are prevented by vaccination, and works to control the spread of these illnesses. This section works with the Immunization Program to promote the benefits of vaccination.*

## **FOOD/WATERBORNE DISEASES AND OUTBREAKS**

*Food/Waterborne Diseases and Outbreak Epidemiology performs surveillance to detect food and waterborne diseases, and investigates those cases to identify and prevent outbreaks of enteric illnesses in Montana. In addition, case surveillance and investigation identify common risk factors which help guide prevention messaging and activities that aim to decrease the incidence of enteric diseases.*

## **HIV AND HEPATITIS C**

*HIV and Hepatitis C Epidemiology works to identify new and existing HIV/AIDS cases and to use the data to identify trends in HIV occurrence and evaluate prevention interventions. As a serious public health concern, Hepatitis C surveillance is also an important function of the CDEpi unit. Surveillance for Hepatitis C is needed to direct and evaluate prevention and control activities.*

## **TUBERCULOSIS CONTROL**

*Tuberculosis (TB) Control Epidemiology helps identify and manage new cases of TB and their contacts to make sure that appropriate testing and control measures are taking place. TB Control also manages the latent tuberculosis infection (LTBI) medication program and assists with refugee health.*

## **VECTORBORNE AND ZOO NOTIC DISEASES**

*Vectorborne Epidemiology monitors and provides assistance with investigating vector borne diseases, such as those caused by ticks, mosquitoes, and animals.*

## **HEALTHCARE-ASSOCIATED INFECTIONS (HAI)**

*Healthcare-Associated Infections Epidemiology manages the healthcare-associated infections program in Montana by monitoring outbreaks of HAI as well as education on prevention. This program also has oversight of antibiotic stewardship programs in the state..*

## **COMMUNICABLE DISEASE NURSE CONSULTANT**

*Communicable Disease Nurse Consultant works with the epidemiologists to bring nursing considerations to reportable disease case investigation and management. The nurse also develops training for local health jurisdictions and assists local health jurisdictions with evaluation and management of potential rabies exposures.*

## **MONTANA INFECTIOUS DISEASE INFORMATION SYSTEM (MIDIS)**

*Montana Infectious Disease Information System (MIDIS) Epidemiology maintains the surveillance database used for reportable communicable conditions in Montana. This database also transmits nationally reportable data to the Centers for Disease Control and Prevention. Epidemiologists use this database daily to investigate cases, monitor trends in diseases, and identify outbreaks.*

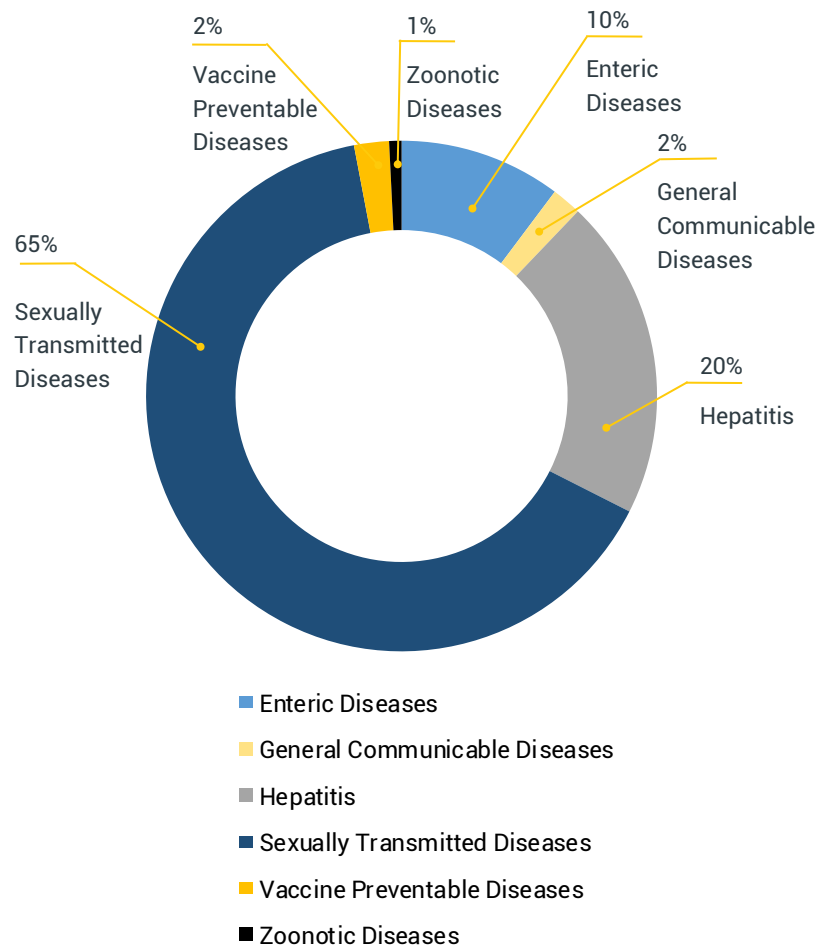


# Preface

The Communicable Disease Annual Report – Montana, 2017 contains data for notifiable diseases and conditions reported to Montana DPHHS in 2017. Data are collected from local public health jurisdictions, laboratories, healthcare providers, hospitals and other healthcare facilities as described by the Administrative Rules of Montana (ARM) 37.114.201 (reporters). Montana DPHHS tracks more than 8,000 communicable disease cases annually. Each reported case is investigated by local health jurisdictions, including contact investigations and application of control measures to prevent further spread of disease. The distribution of reportable disease cases in 2017 is depicted in Figure 1.

The Notable Events section presents information on noteworthy reports from 2017 for selected diseases that were above expected values. Incidence data, describing new cases of reportable conditions in 2017, 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.

**FIGURE 1. REPORTED COMMUNICABLE DISEASES BY CATEGORY, MONTANA 2017**



## Notable Events 2017

### INCREASE IN INCIDENCE OF SYPHILIS

Syphilis cases diagnosed in the primary and secondary stages are infectious and are indicative of recent transmission; therefore they are of great concern to public health. After several years of ten or fewer reported annual cases, syphilis cases increased from nine cases in 2014 to 48 in 2017 (Figure 2). This mirrors nationwide trends as well; in 2016, the United States experienced the highest number and rate of reported primary and secondary syphilis cases in more than 20 years (Figure 3).

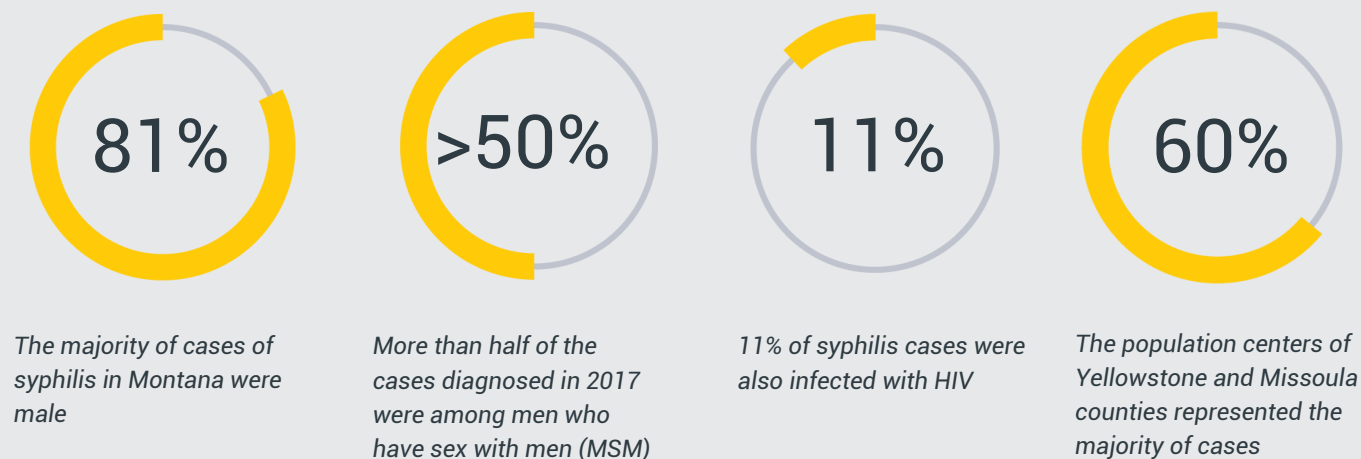
**FIGURE 2. REPORTED PRIMARY AND SECONDARY SYPHILIS CASES – MONTANA, 2009-2017**







**FIGURE 3. CHARACTERISTICS OF REPORTED PRIMARY AND SECONDARY SYPHILIS CASES – MONTANA, 2017**



### CONGENITAL SYPHILIS

One congenital case of syphilis was diagnosed in 2017. Congenital syphilis occurs when a mother infected with syphilis transfers the disease to her unborn child during pregnancy. While up to 40% of infants born to untreated infected mothers can be stillborn, congenital syphilis can be prevented through adequate and timely prenatal care. The case identified in 2017 completed treatment and was recovering.

### LYME DISEASE

Reported cases of Lyme disease are not unusual in Montana; but investigation of cases typically point to an out of state exposure. In May 2017, a suspected case of Lyme disease was reported in Big Horn County. The individual presented with myalgia, headache, neck pain, fever, chills, and recalled a tick bite. However, the case reported no history of travel to an area where Lyme disease is endemic. Upon completing confirmatory testing for Lyme disease, the individual met the criteria for a confirmed case. This is the first case of Lyme disease reported in Montana

without history of travel.

### SEVERITY OF THE 2017–2018 INFLUENZA SEASON

The 2017-2018 influenza season was more severe than average, with the largest number of cases, hospitalizations, and deaths since 2009. Influenza activity indicators this season were notable for the sheer volume and intensity of flu that occurred in Montana as well as the rest of the country at the same time. While the typical influenza season extends from October to May, the period of elevated influenza activity was noted for 22 weeks, which is longer than average (15 weeks). Influenza vaccine efficacy is measured as the odds of influenza infection in individuals who received a vaccine, covering all age groups and all influenza strains. The overall influenza vaccine efficacy for the 2017-2018 season was 40%, which was lower than expected but similar to the 2016-2017 influenza season.<sup>3</sup> The low efficacy was partly attributed to an artifact of the vaccine production process.



# Foodborne and Diarrheal Diseases

*Enteric illnesses are most often reported during spring and summer months. In 2017, 44% of the 865 enteric diseases reported to Montana DPHHS were reported between May and August. Of the total notifiable enteric conditions reported in Montana, 726 were classified as confirmed and 139 were classified as probable, which reflects the different testing methodology (culture based vs. non culture-based). Of note, incidence of campylobacteriosis increased for the fourth year in a row. Shiga-toxin producing *E. coli* cases were higher than average in 2017, but lower than the 2016 incidence (Table 1, Figure 4).*

**TABLE 1. ENTERIC ILLNESSES IN MONTANA, 2017**

Condition	Cases	2017 Incidence (per 100,000)	2012-2016 Incidence (per 100,000)
Campylobacteriosis	406	38.6	26.2
Salmonellosis	140	13.3	14.0
Giardiasis	125	11.9	9.0
Shiga-toxin producing <i>E. coli</i> (STEC)	97	9.2	6.8
Cryptosporidiosis	70	6.7	7.1
Shigellosis	10	1.0	2.9

## CAMPYLOBACTERIOSIS

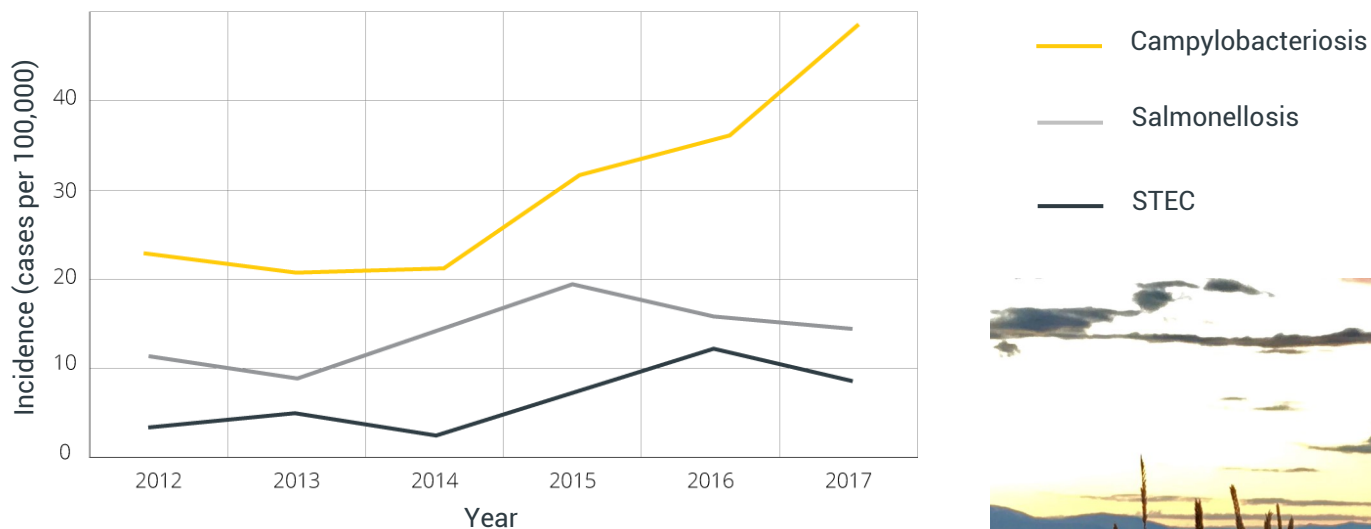
Campylobacteriosis is a diarrheal illness caused by the bacteria *Campylobacter*. The incidence of campylobacteriosis in Montana was 38.6 cases per 100,000 population in 2017, which is 2.3 times higher than the national average of 17.1 cases per 100,000 population. Campylobacteriosis is often caused by exposure to cattle and live poultry, which are common in Montana since they are often associated with farming and ranching. In 2017, 26% of 400 cases in Montana had known exposure to cattle and/or live poultry. Other common sources of transmission are consumption of raw milk, undercooked foods such as chicken, and untreated water.

## SALMONELLOSIS

Salmonellosis is an enteric disease caused by the bacteria *Salmonella*, and is characterized by a sudden onset of diarrhea, abdominal pain, fever, and nausea. In 2017, 140 cases of salmonellosis were reported in Montana. The incidence rate of *Salmonella* cases in 2017 was 13.3 per 100,000 population, which is a decrease for the second year in a row and is lower than the five-year average of 14.0 salmonellosis cases per 100,000 population between 2012 and 2016. Common risk factors for *Salmonella* infection include exposure to live poultry, and ingestion of contaminated food. In 2017, 19 (13.6%) of Montana's salmonellosis cases were linked to a multi-state outbreak of cases linked to contact with live poultry.



FIGURE 4. SELECT ENTERIC ILLNESS RATES OVER TIME – MONTANA, 2012-2017



### SHIGA-TOXIN PRODUCING *E. COLI* (STEC)

STEC is an enteric disease characterized by abdominal pain and diarrhea that is often bloody; it can cause severe illness in humans. In Montana there were 97 cases of STEC reported in 2017. Cattle are a common reservoir for STEC bacteria, and are a primary source of infection in Montana. In 2017, 10.3% (n=10) of STEC cases had exposure to cattle before their illness onset. Consumption of undercooked beef and other contaminated foods are also risk factors for illness. There are many different serogroups of STEC cases; in Montana, the most predominant non-O157:H7 serogroups are O26 (30%), O121 (20%), O103 (7%), and all others, including nontypeable (26%) [Figure 5]. Approximately 17% of isolates are serogrouped as O157:H7, which is more likely to cause severe illness than non-O157 serogroups. Twenty-one (21.6%) of all STEC cases in 2017 were hospitalized. Incidence of hemolytic uremic syndrome (HUS), a rare but serious kidney disease that is often the result of a STEC infection, was 0.2 cases per 100,000 population (n=2) in 2017.

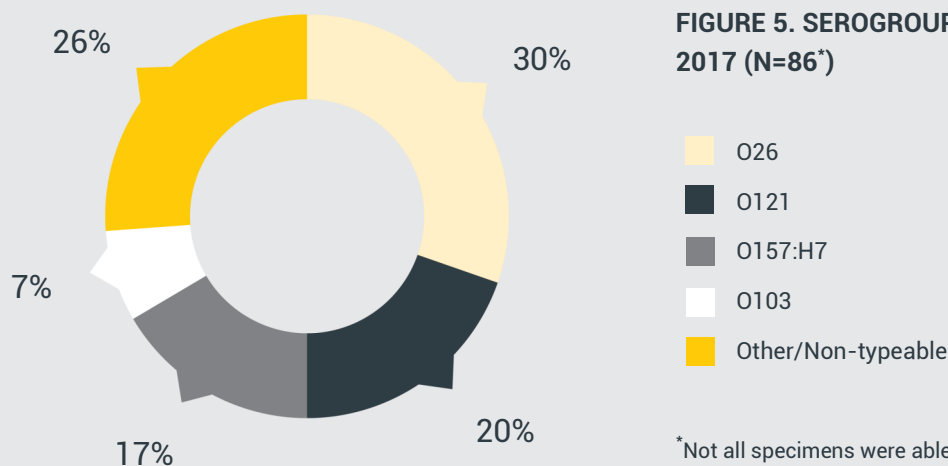


FIGURE 5. SEROGROUP OF STEC CASES IN MONTANA, 2017 (N=86\*)

\*Not all specimens were able to be serogrouped.

## CRYPTOSPORIDIOSIS AND GIARDIASIS

*Giardia* and *Cryptosporidium* are parasites that cause giardiasis and cryptosporidiosis infections, respectively, and are often associated with waterborne exposures including recreational waters and ingestion of untreated drinking water. In 2017, there were 125 cases of giardiasis and 70 cases of cryptosporidiosis reported in Montana. Of those, 18% drank untreated water and nearly 28% had recreational water exposure prior to illness onset. The incidence rate of giardiasis has increased since 2012, and the 2017 incidence rate of 11.9 cases per 100,000 population is higher than the five-year average incidence of 9.0 cases per 100,000 population. The incidence rate of cryptosporidiosis has fluctuated over the past five years, and the 2017 incidence of 6.7 cases per 100,000 population is lower than the five-year average of 7.1 cases per 100,000 population.

## SHIGELLOSIS

Shigellosis is a bacterial illness caused by *Shigella*, and the only significant reservoir is humans. In 2017, 10 cases of shigellosis were reported (1.0 per 100,000), which is about average for a non-outbreak year in Montana. This pathogen is transmitted via the fecal-oral route, and those most at risk of infection are young children, travelers to developing countries, men who have sex with men, and

individuals with weakened immune systems.

## LISTERIOSIS

Listeriosis is a serious bacterial infection often caused by eating food contaminated with *Listeria monocytogenes*. Pregnant women and their newborns, adults aged 65 and older, and people with weakened immune systems are most likely to develop illness. In Montana, an average of one case per year is reported. There were two cases of listeriosis reported in 2017, both in individuals who were at high risk of illness. One fatality (miscarriage) was reported.

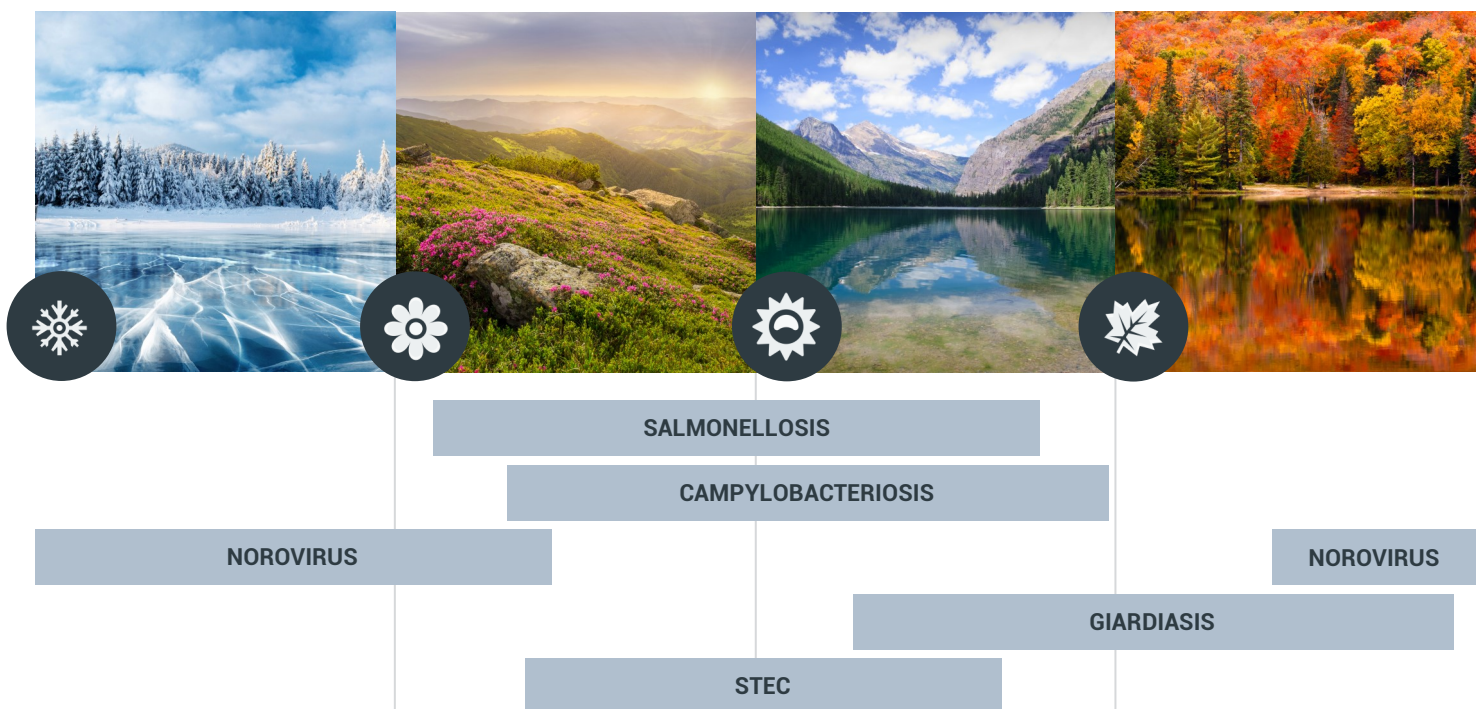
## VIBRIOSIS

Vibriosis is an enteric illness caused by many different species of *Vibrio*, most often *Vibrio parahaemolyticus*, and non-toxigenic *V. cholerae*. Vibriosis infections occur after consuming raw or undercooked seafood (specifically oysters), or exposing a wound to seawater (in Montana, this occurs when cases travel to coastal areas). Most infections occur from May through October when water temperatures rise and *Vibrio* species thrive. There were eight cases of vibriosis reported in Montana in 2017, compared to two in 2016. Of the 2017 cases, three ate raw oysters and four travelled outside of Montana and swam in coastal waters, either in the US or internationally.

## BOTULISM

Botulism is a rare but serious illness caused by a toxin produced by *Clostridium botulinum*. The toxin attacks the

Figure 6: Some enteric diseases are more common during certain months of the year







body's nerves and causes difficulty breathing, muscle paralysis, and sometimes death. There are several presentation of botulism: foodborne, wound, and infant. In Montana, an average of less than one case is reported each year. In 2017, two cases of infant botulism were reported (0.2 cases per 100,000). Both cases recovered after receiving treatment (Botulism Immune Globulin [BIG]).

## ENTERIC OUTBREAKS

Montana reported 36 enteric illness outbreaks in 2017 that sickened 720 people. Of those, there were six hospitalizations and no deaths. Of the 36 enteric outbreaks, 24 (67%) had at least one confirmatory laboratory specimen submitted for testing. Of the 24 outbreaks with a confirmed specimen, 22 (92%) were caused by norovirus. Norovirus is the most common pathogen in enteric outbreaks. While it is not reportable in Montana on an individual case level, outbreaks of norovirus are. The remaining two enteric outbreaks were caused by *Salmonella* and *Cryptosporidium*.

In addition to the outbreaks reported with exposures in

Montana, 19 Montanans were linked to a multi-state outbreak of salmonellosis with exposure to live poultry. Those cases were linked to cases from other states using pulsed-field gel electrophoresis (PFGE), and public health investigations linked them to live poultry exposure.

The majority of enteric outbreaks (64%) occurred at assisted living and long-term care facilities. Other noteworthy settings include schools (14%), child care (5.5%), workplaces (5.5%), and other (11%). Other settings included community events and a hospital.

CDEpi continues to improve methods for surveillance and outbreak investigation, and reducing the burden of enteric illnesses in Montana continues to be a key area of focus. The majority (86%) 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>4</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 2017, the most frequently reported vaccine preventable diseases in Montana were pertussis and chickenpox.

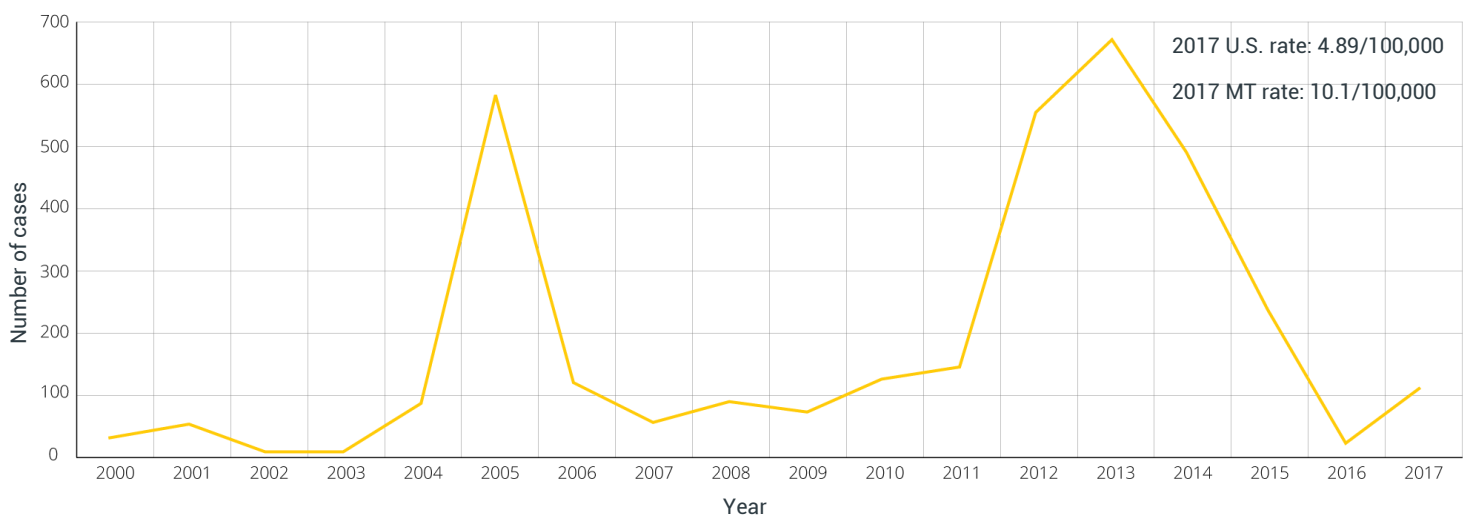


## PERTUSSIS

Pertussis, also known as whooping cough, 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 (Figure 7). 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 steadily declined through 2016. However, an increase of

cases was reported in 2017; 106 cases (10.1 per 100,000 population) were identified due to localized outbreaks. The median age of cases was 9 years (range: 3 months – 66 years). Of those with documented immunization status (n=97), 38% were appropriately vaccinated for age.

**FIGURE 7 . REPORTED PERTUSSIS CASES – MONTANA, 2000-2017**





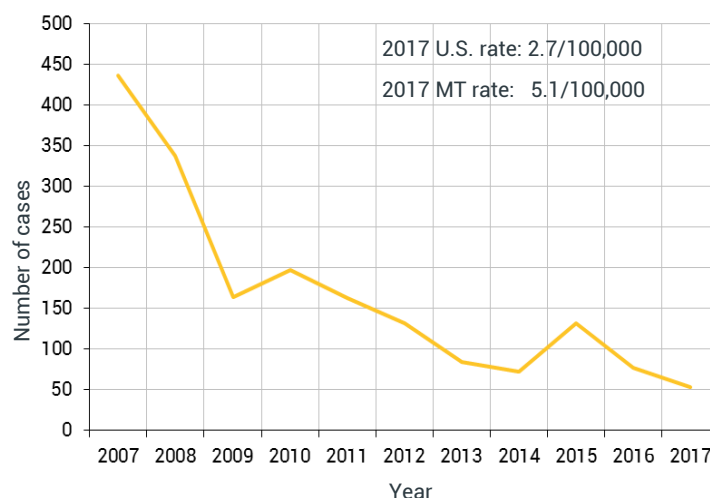
## VARICELLA

Varicella-zoster virus is the causative agent of chickenpox. Over the past ten years, the number of varicella cases reported in Montana has declined from a peak of 437 cases in 2007 to 54 cases in 2017 (Figure 8). Of these, 15% were children less than one year of age. The median age of cases was 5 years (range: 5 months – 45 years). Of the pediatric cases eligible for vaccine who were evaluated for immunization status (n=37), 57% were considered to have been vaccinated appropriately for age.

## 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 international travel. However, in 2016, twenty-seven mumps cases were identified from two separate outbreaks reported in the spring and early summer. In 2017, six cases of mumps were reported from four counties. The median age of cases was 9 years. Risk factors included out of country travel and having contact to a known case. Half of the mumps cases reported in 2017 were up to date with MMR vaccination.

**FIGURE 8 . REPORTED VARICELLA CASES – MONTANA, 2007–2017**



## INFLUENZA

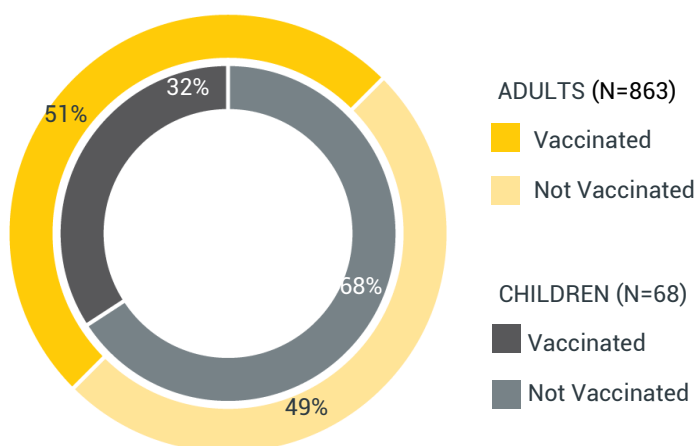
Influenza (flu) is a respiratory illness caused by influenza viruses (types A and B) that can result in serious complications, including hospitalization or death. The flu season typically extends from October through June in Montana. During an average influenza season, the number of reported cases peaks in January. Reports of influenza activity began in September 2017. By November, activity had increased to concerning levels across the state as well as nationwide. Peak activity occurred during late January/early February. Season totals include 10,431 cases, 979 hospitalizations, and 79 deaths attributed to influenza. Thirty-three influenza outbreaks were reported; long-term care facilities were the most common setting. Cases were reported from all counties in Montana, and only three counties reported fewer than five influenza cases for the entire season (range: 2–1,250).

Influenza type A was the predominant virus identified in individuals hospitalized for influenza (70%). The cumulative influenza-related hospitalization rate in Montana (frequency of cases during the influenza season) was 93.9 per 100,000 population (Figure 10). The majority of Montanans who were hospitalized due to influenza were aged  $\geq 65$  years with a median age of 70 years. The most common comorbidities of individuals hospitalized for influenza were age  $<5$  years or  $\geq 65$

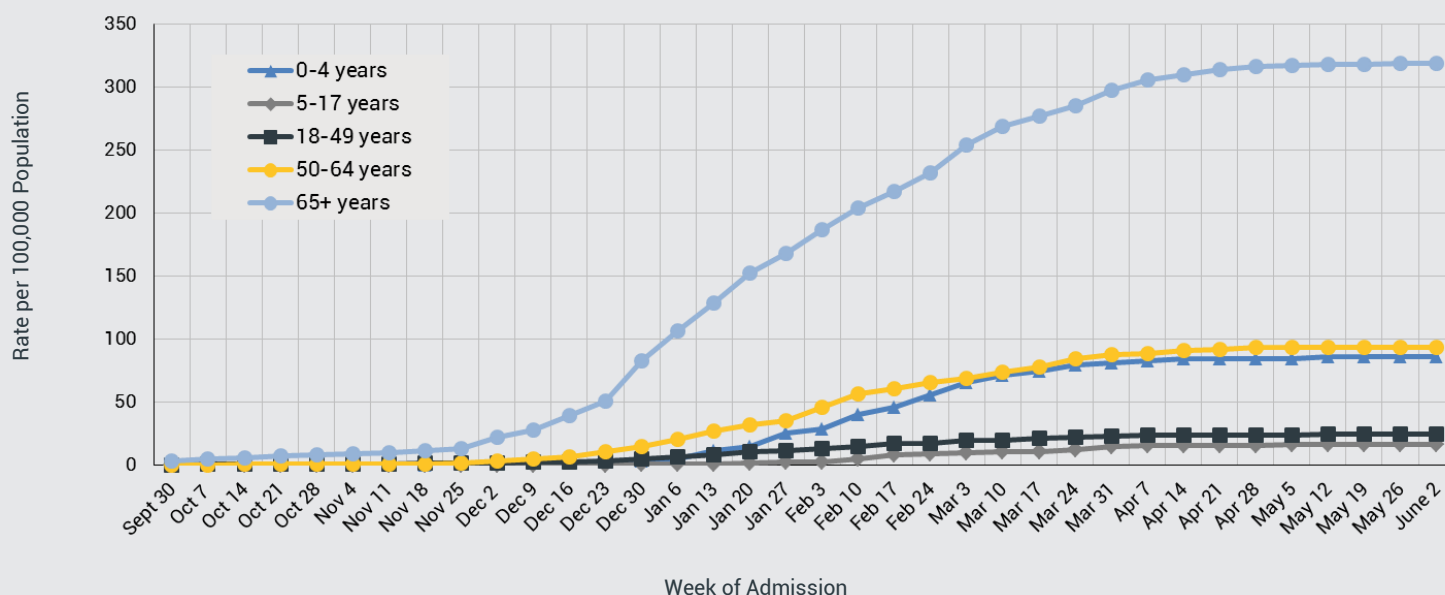
years, cardiovascular disease, chronic lung conditions, and metabolic conditions such as diabetes. Of the 79 influenza-related deaths reported, 11 (14%) occurred among adults aged  $<65$  years. One pediatric death (aged 0–17 years) was reported during the 2017–2018 season.

Of those hospitalized for influenza with documented immunization status ( $n=881$ ), 46% had not received seasonal influenza vaccine. However, only a third of children and half of adults with at least one identified underlying risk factor did not receive a vaccine (Figure 9).

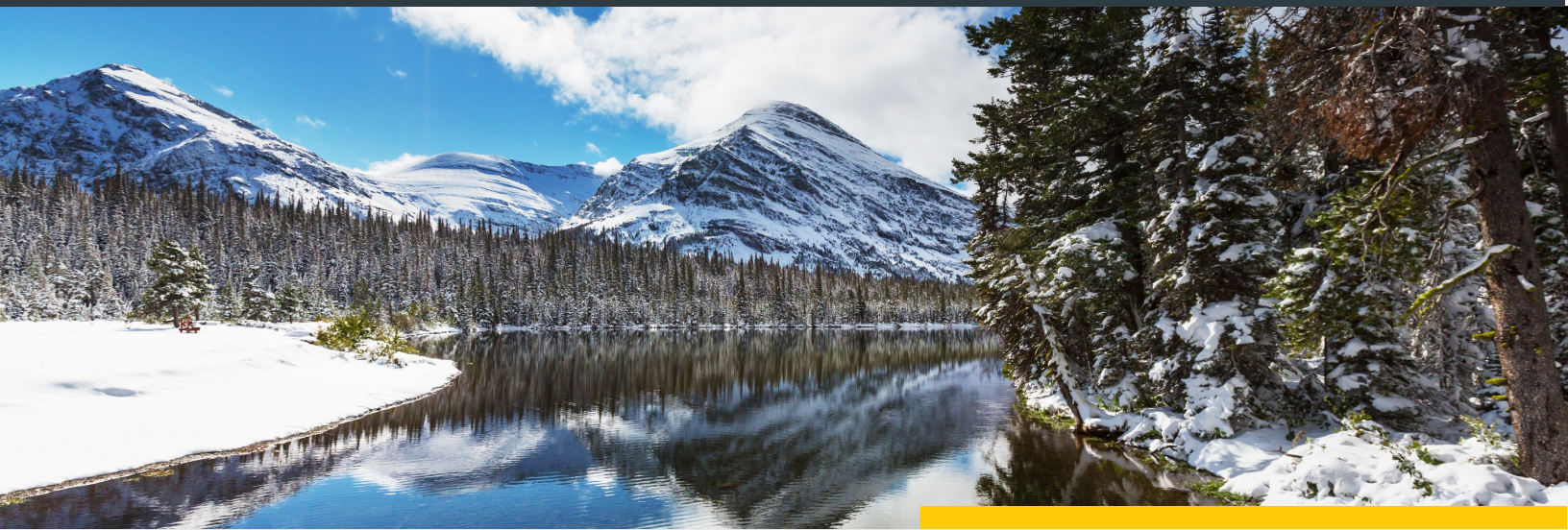
**FIGURE 9. INFLUENZA VACCINATION STATUS OF HOSPITALIZED CHILDREN AND ADULTS WITH AT LEAST ONE RISK FACTOR – MONTANA, 2017-2018 SEASON**



**FIGURE 10. INFLUENZA CUMULATIVE HOSPITALIZATION RATES BY AGE GROUP – MONTANA, 2017-2018 SEASON**







# Selected Bacterial Invasive Diseases

*Invasive diseases occur when bacteria invade parts of the body that are considered normally sterile sites (e.g., blood, cerebral spinal fluid). For example, pneumococcal bacteria can invade the bloodstream, causing bacteremia, and the tissues and fluids covering the brain and spinal cord, causing meningitis. When this happens, disease is usually very severe, requiring treatment in a hospital and in some cases, death. Many invasive diseases are preventable by vaccination.*

## 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 bloodstream, 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 2017, one meningococcal disease case was reported in Montana in an adult. The individual had not received a meningococcal vaccine. Serotyping was not able to be performed for this case.

## HAEMOPHILUS INFLUENZAE

Nineteen cases of *Haemophilus influenzae* were reported (1.8 per 100,000 population) in 2017. Sixteen percent of cases (n=3) were in children aged less than 5

years. In addition, two cases of invasive *H. influenzae* type B, the type that is vaccine preventable, were reported. One had a history of vaccination appropriate for age.

## STREPTOCOCCUS PNEUMONIAE

Pneumococcal disease is an infection caused by *Streptococcus pneumoniae* bacteria. In 2017, 112 cases (10.7 per 100,000 population) of invasive *Streptococcus pneumoniae* were reported in Montana. The median age of patients was 59 years (range: 4 days – 98 years).

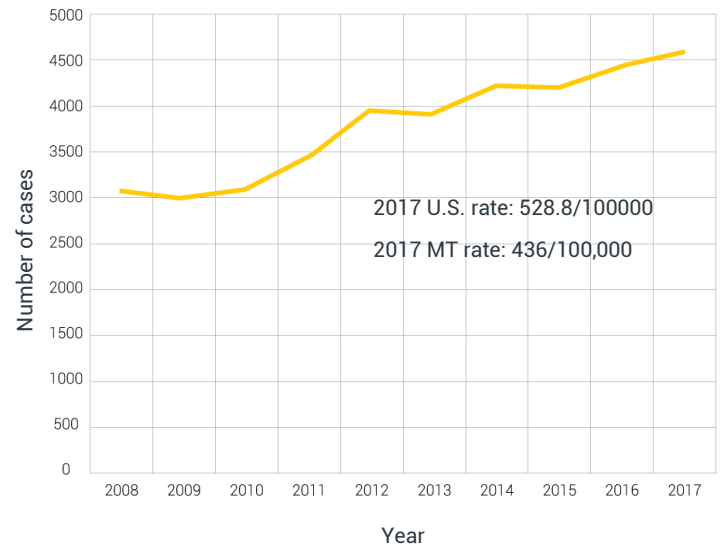
## OTHER INVASIVE DISEASES

Three cases of streptococcal toxic shock syndrome, caused by invasive group A *Streptococcus*, were reported in 2017. The median age of cases was 35 years.

# Sexually Transmitted Diseases

*Sexually transmitted diseases (STDs) continue to be the most frequently reported communicable diseases in Montana. Approximately 4,564 cases of chlamydia alone were reported in 2017. All Montana counties reported at least one STD case.*

FIGURE 11. CHLAMYDIA CASES — MONTANA, 2008-2017



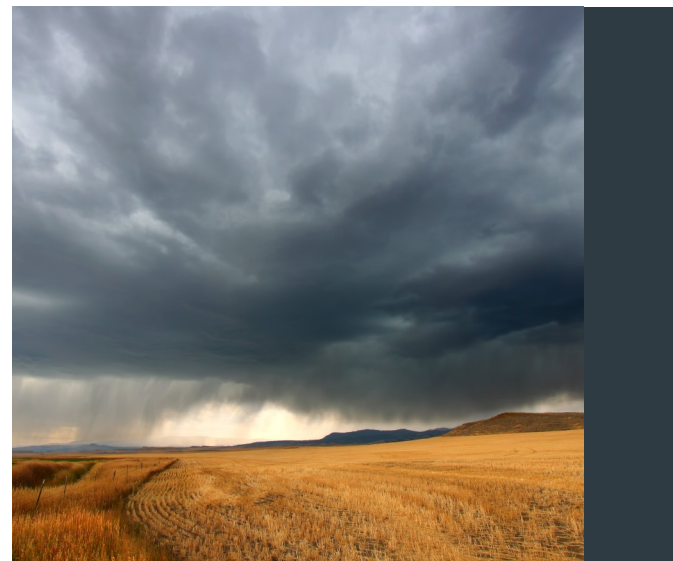
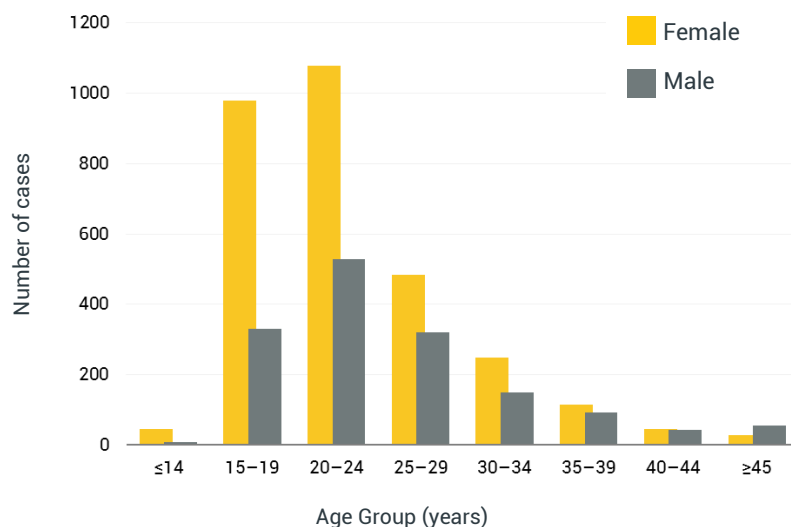
## CHLAMYDIA

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>5</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 2008, case rates have generally increased in Montana (Figure 11). In 2017, 3,032 chlamydia cases (66%) 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 (35%) than any other age group (Figure 12).

FIGURE 12. CHLAMYDIA CASES BY SEX AND AGE — MONTANA 2017

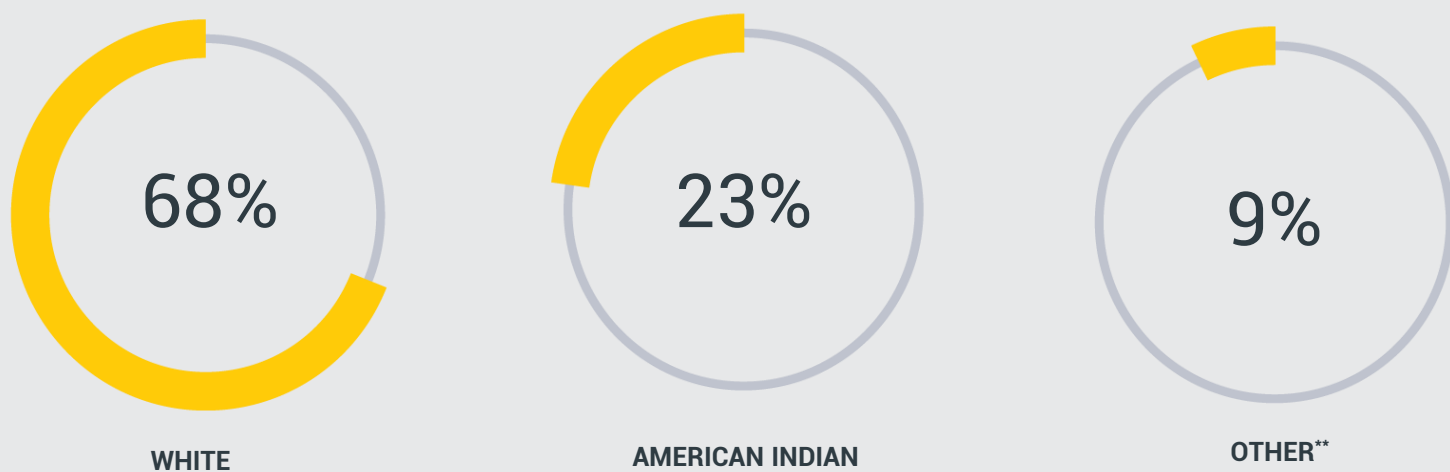






In 2017, the chlamydia incidence rate for persons identified as American Indian was more than four times greater than those reported as white (Figure 13). Broader STD screening efforts among American Indians seeking services at Indian Health Services and tribal clinics may contribute to the higher reported chlamydia incidence rate in this population.

**FIGURE 13. CHLAMYDIA CASES BY RACE\* – MONTANA, 2017**



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

\*\* Other includes persons of more than one race, black, and Asian/Pacific Islander, or unknown



## GONORRHEA

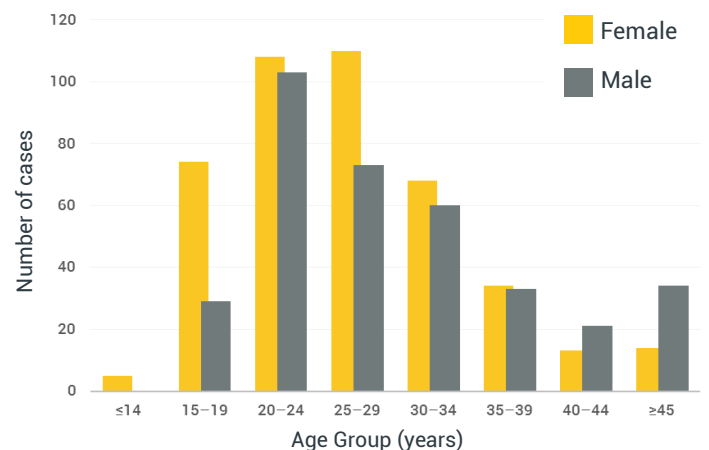
Gonorrhea is an infection caused by the bacterium *Neisseria gonorrhoeae* are the second most commonly reported STD in Montana and the United States. Incidence rates have been dramatically increasing over the last five years. Gonorrhea infections are a major cause of pelvic inflammatory disease (PID).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

In 2017, 782 gonorrhea cases were reported to DPHHS. 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 14). Since 2015, the increase in incidence rates has leveled off with a decrease in 2017.

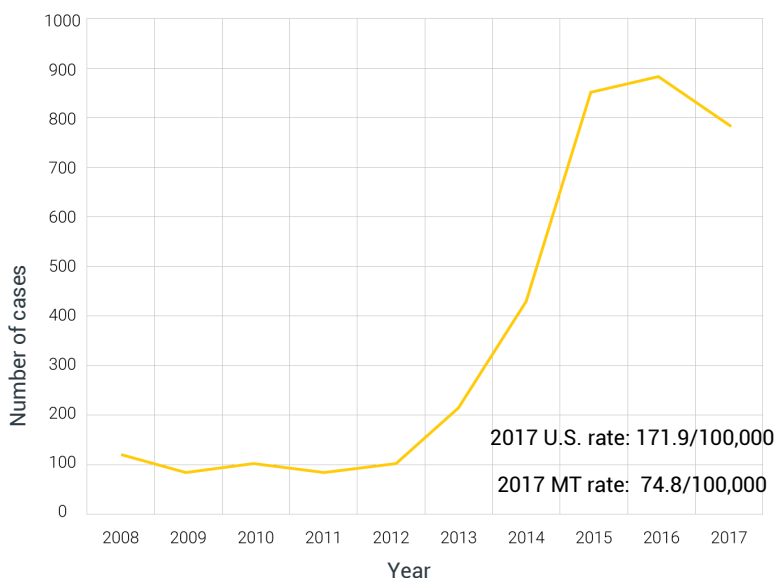
Figure 15 displays the distribution of cases by sex and age group. In Montana, 427 gonorrhea cases (55%) were

reported in females. Of the 211 cases of gonorrhea diagnosed in the 20–24 year age group, 108 (51%) occurred among females. The majority of gonorrhea cases continue to occur in the 20–24 and 25–29 year age groups, which account for more than 50% of the cases.

**FIGURE 15. GONORRHEA CASES BY SEX AND AGE – MONTANA, 2008-2017**



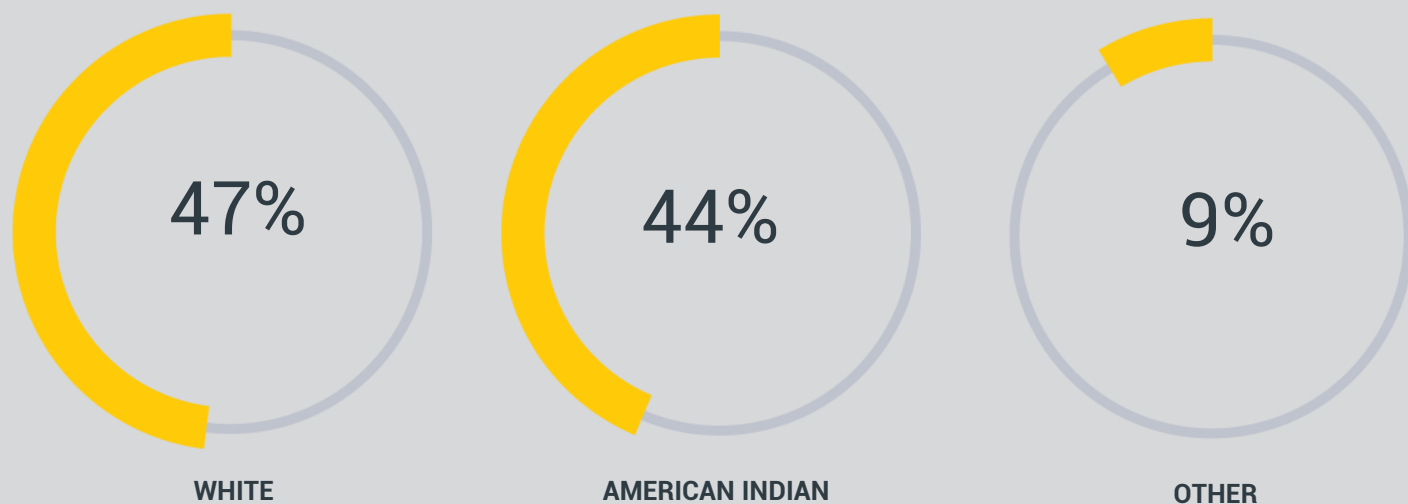
**FIGURE 14. GONORRHEA CASES – MONTANA, 2008-2017**





American Indians are disproportionately impacted by gonorrhea. In 2017, they accounted for 44% of the cases while comprising 6.6% of the Montana population (Figure 16). 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 is difficult to determine. In addition, increased screening and efforts to identify and test contacts can lead to increased case finding.

**FIGURE 16. GONORRHEA CASES BY RACE\* – MONTANA, 2017**



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

\*\* Other includes persons of more than one race, black, and Asian/Pacific Islander, or unknown



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 pregnancy can lead to stillbirth, neonatal death, or infant disorders such as deafness, neurologic impairment, and bone deformities. About 25 to 40 percent of adult who remain untreated for syphilis can develop late disease affecting the heart, bones, internal organs, skin, and the

central nervous system.

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 started increasing. In 2017, the number of cases dramatically increased with 48 new cases reported to DPHHS.

Montana's primary and secondary syphilis rate increased to 4.7 cases per 100,000 population in 2017 from 0.9 in 2014 (Figure 17). Demographic and risk information is noted in Table 2.

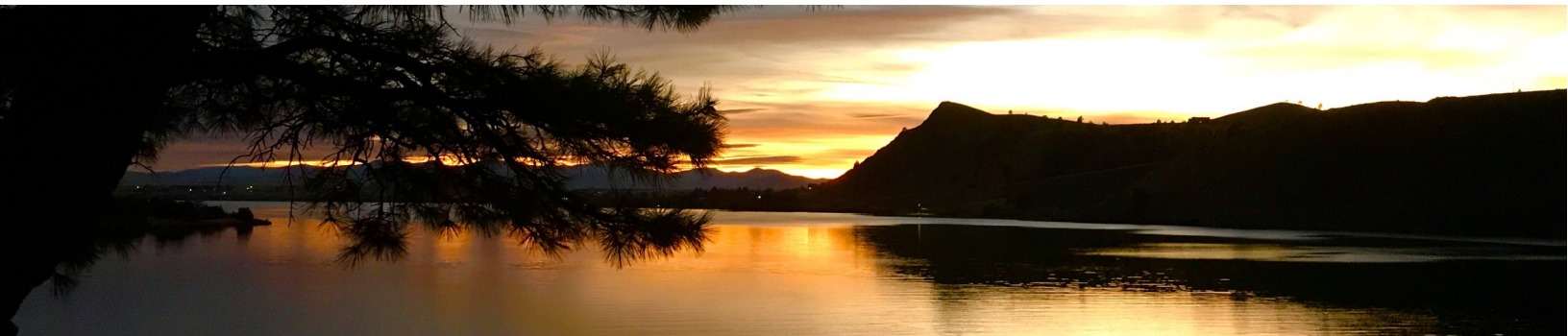


FIGURE 17. PRIMARY AND SECONDARY SYPHILIS CASE RATE — MONTANA, 2008–2017

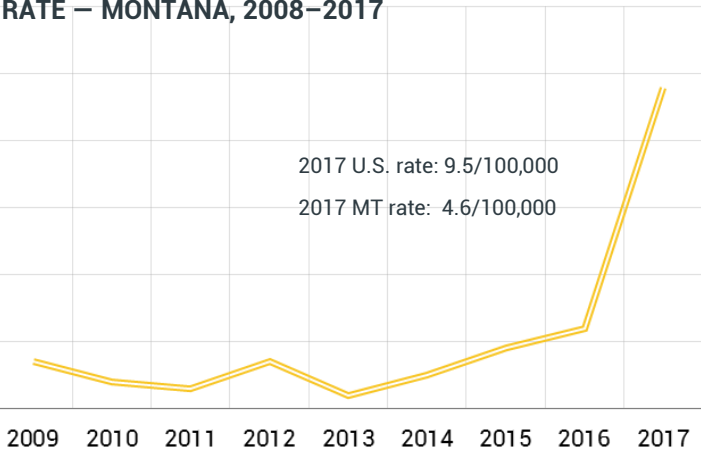


TABLE 2. NEWLY DIAGNOSED SYPHILIS\* BY SELECT CHARACTERISTICS (N=48) — MONTANA, 2017

Characteristics	Number
Sex	
Male	39
Female	9
Age at diagnosis (years)	
≤19	0
20–24	6
25–29	13
30–34	9
35–39	8
40–45	3
45+	9
Ethnicity, race	
Non-Hispanic, white	47
Unknown	1
Non-Hispanic, other	--

\*primary and secondary cases

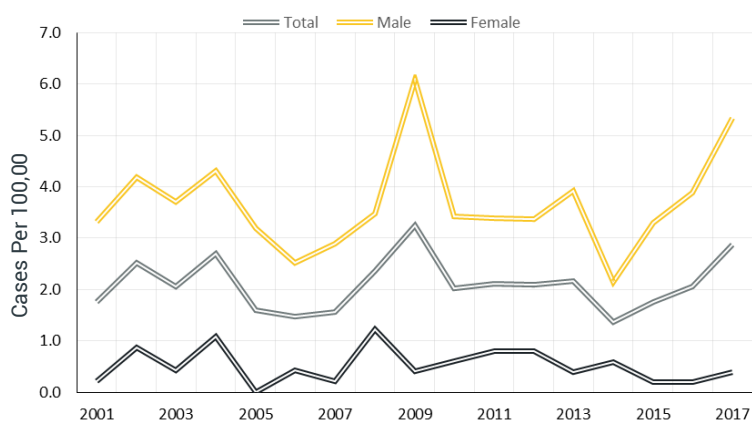


# HIV/AIDS

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, opportunistic infections or cancers take advantage of a very weak immune system and signal that the person has Acquired Immune Deficiency Syndrome (AIDS).

In 2017, 31 newly diagnosed HIV cases were reported in Montana. Nine of these were diagnosed with AIDS at the same time, indicating that there remains a need for recognition of risk factors and early testing. Since 2001, 14-32 new cases have been reported each year (Figure 18). The majority of HIV infections reported in Montana continue to be among non-Hispanic, white males. The leading transmission categories among men are male-to-male sexual contact (MSM) and injection drug use (IDU). Among women, high-risk heterosexual contact (HRH), sexual contact, and IDU are the leading transmission categories (Table 3).

**FIGURE 18. REPORTED NEWLY DIAGNOSED HIV CASES PER 100,000 – MONTANA, 2001–2017**



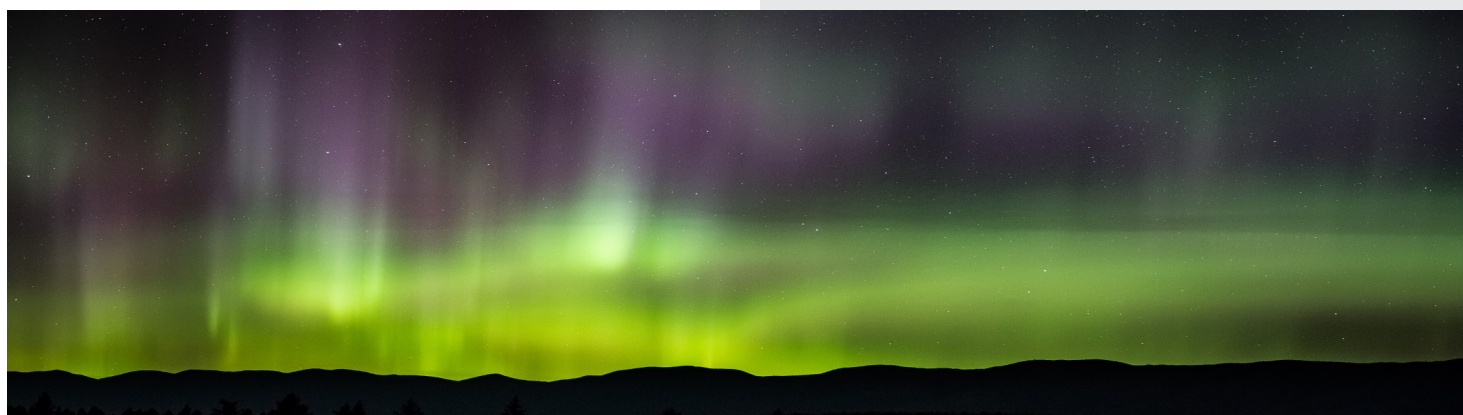
**TABLE 3. PERSONS NEWLY DIAGNOSED WITH HIV BY SELECT CHARACTERISTICS (N=31) – MONTANA, 2017**

Characteristics	Number
<b>Sex</b>	
Male	29
Female	2
<b>Age at diagnosis (years)</b>	
≤14	0
15-24	3
25-34	12
35-44	8
45-54	2
≥55	6
<b>Ethnicity, race</b>	
Non-Hispanic, white	9
Non-Hispanic, American Indian	3
Non-Hispanic, other	2
<b>Transmission category by sex†</b>	
<b>Male Only</b>	
Male sexual contact w/ another male (MSM)	9
Injection drug use (IDU)	1
MSM & IDU	3
Heterosexual contact‡	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

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

‡ 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*. The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain. Not everyone infected with TB bacteria becomes sick. The disease is transmitted person to person, and those 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.*

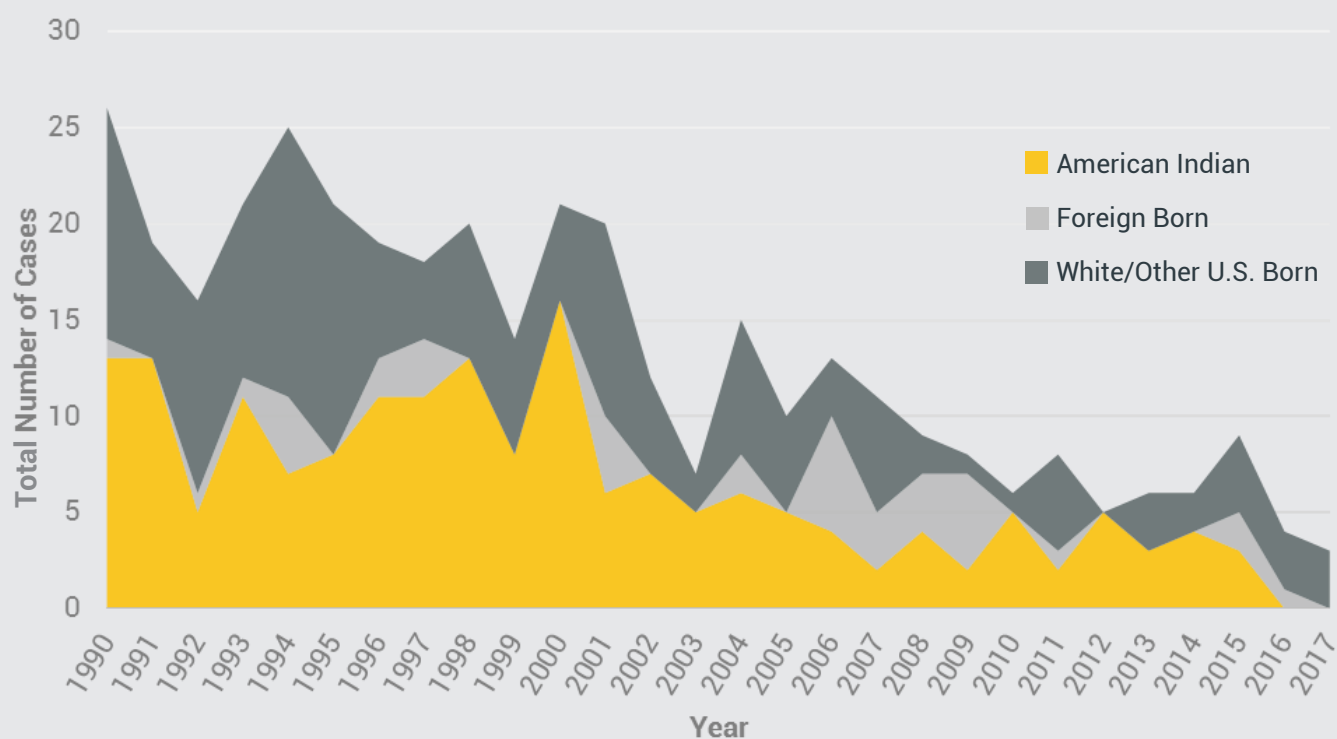
The number of TB cases reported annually in Montana has steadily decreased over the past two decades. Figure 19 depicts the trend in TB rates over time, as well as differences in rates by race/ethnicity. Overall, TB rates have steadily declined from 26 cases in 1990 to three in 2017.

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 2010–2017, an average of 5.9 cases per year was reported, with a range of 3–9 cases per year. TB cases among American Indians have declined from an average of 10 cases per year in the 1990s, to an average of 5.7 cases per year in the 2000s, to an average of 2.7 since 2010. There were no TB cases

reported among American Indians in 2016 or 2017. TB among foreign-born persons has decreased remarkably from an average of 2.3 during 2000–2009 to 0.5 during 2010–2017.

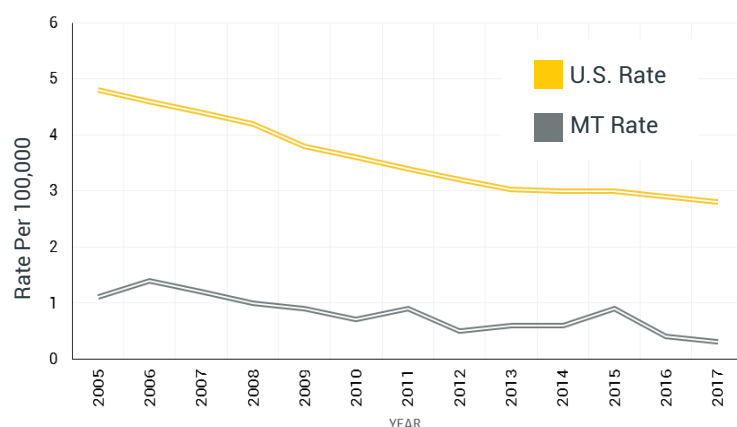
Three cases of active TB were reported in Montana in 2017 (Table 4). Counties of residence included Fergus, Cascade, and Liberty. The 2017 Montana TB incidence rate was 0.3 cases per 100,000 population, significantly lower than the 2017 U.S. case rate of 2.8 per 100,000 (Figure 20).

**FIGURE 19. REPORTED ACTIVE TUBERCULOSIS CASES BY RACE – MONTANA, 1990–2017**





**FIGURE 20. TUBERCULOSIS INCIDENCE RATE – MONTANA AND UNITED STATES, 2005–2017**



All three cases reported in 2017 were U.S. born. All cases had pulmonary/pleural disease. Risk factors of note for these cases included: taking immunosuppressive treatment, history of military service overseas, and contact with an infectious TB infected individual.

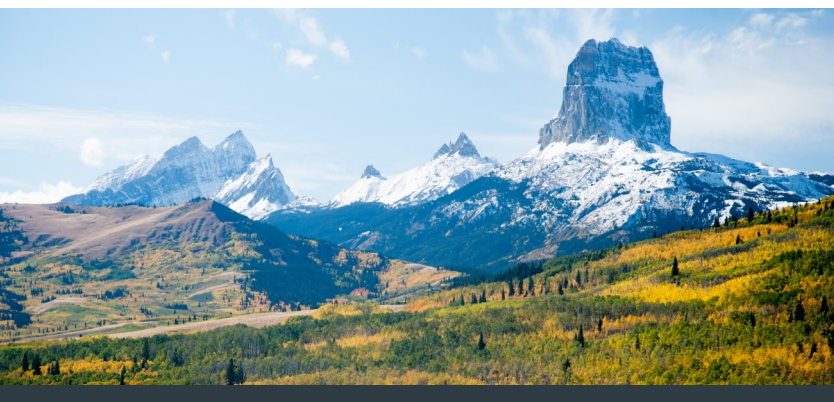
None of the cases had drug-resistant TB. Since 2000, 8.1% of the total TB cases reported in Montana had single resistance to Isoniazid (INH) and 1.7% (3 cases) were multidrug resistant tuberculosis (MDR-TB).

All the cases reported in 2017 completed tuberculosis treatment by the end of 2017. All cases were managed using directly observed therapy (DOT).

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.

**TABLE 4. TUBERCULOSIS CASE SUMMARY—MONTANA, 2017**

Characteristics	
New TB Cases	3
Incidence Rates (per 100,000)	
Montana	0.3
Sex	
Male	2
Female	1
Age at diagnosis (years)	
<5	0
5-14	0
15-24	0
25-44	0
45-64	1
≥65	2
Ethnicity, race	
Non-Hispanic, White	3
Non-Hispanic, American Indian	0
Non-Hispanic, Other	0
Site of Disease	
Pulmonary/Pleural	3
Extrapulmonary only	0
Pulmonary & Extrapulmonary	0
Drug Resistance	
No resistance	3
Isoniazid resistance	0
Multiple-drug resistance	0
Country of Origin	
U.S. born	3
Foreign born	0



# 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 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 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, bloodborne transmission of HAV is uncommon. Newly acquired cases are identified by signs and symptoms with supportive laboratory evidence. There is no chronic phase of HAV. There is an effective vaccine against HAV.

In 2017, three cases of HAV infection were reported from two counties in Montana, with no known epidemiological linkages among them. The source of infection for all three cases remains unknown.

## HEPATITIS B

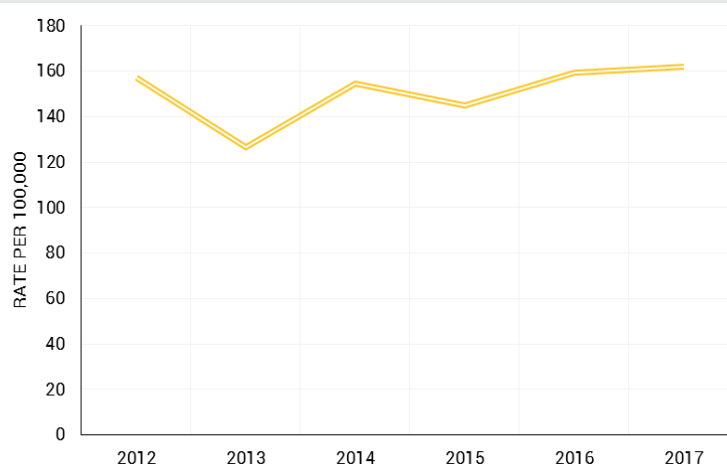
Hepatitis B virus (HBV) is transmitted through activities that involve percutaneous (puncture through the skin) or mucosal contact with infectious blood or body fluids. HBV infections have decreased significantly over time with increased use of an effective vaccine. Hepatitis B can be either "acute" or "chronic." In 2017, 35 chronic HBV infections were reported in Montana. Some of these may have had the disease for years but were only recently identified. The median age was 41 years and 33% of cases were female. Three acute HBV cases, indicating recent infection, were reported in 2017 with a median age of 48 years. Case investigations revealed the most commonly reported risk factor for acute HBV was injection drug use (IDU).

## HEPATITIS C

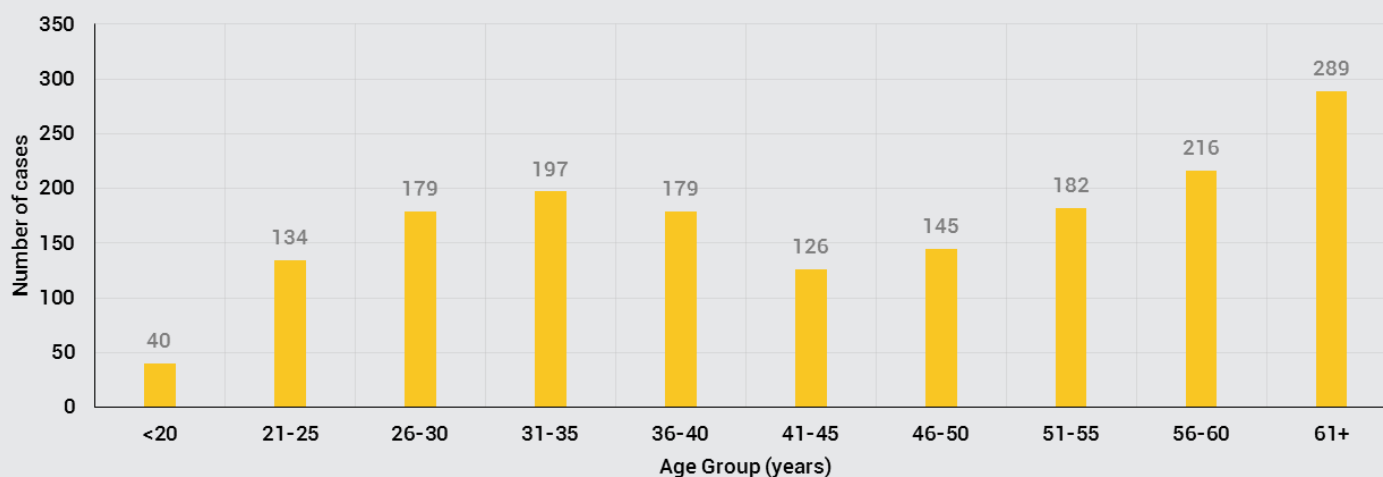
Hepatitis C is a contagious liver disease that ranges in severity from a mild illness lasting a few weeks to a serious, lifelong illness. It results from infection with the Hepatitis C virus (HCV), which is spread primarily through contact with the blood of an infected person. Hepatitis C can be either "acute" or "chronic." Chronic Hepatitis C virus infection is a long-term illness that occurs when the Hepatitis C virus remains in a person's body. Hepatitis C virus infection can last a lifetime and lead to serious liver problems, including cirrhosis (scarring of the liver) or liver cancer.

In 2017, 1,687 cases of chronic Hepatitis C were reported to DPHHS (Table 5). Not all cases were newly acquired; some may have been infected years ago. The incidence rate of chronic HCV infections in Montana between 2012 and 2017 is shown in Figure 21.

**FIGURE 21. INCIDENCE RATE OF CHRONIC HEPATITIS C INFECTIONS – MONTANA, 2012-2017**



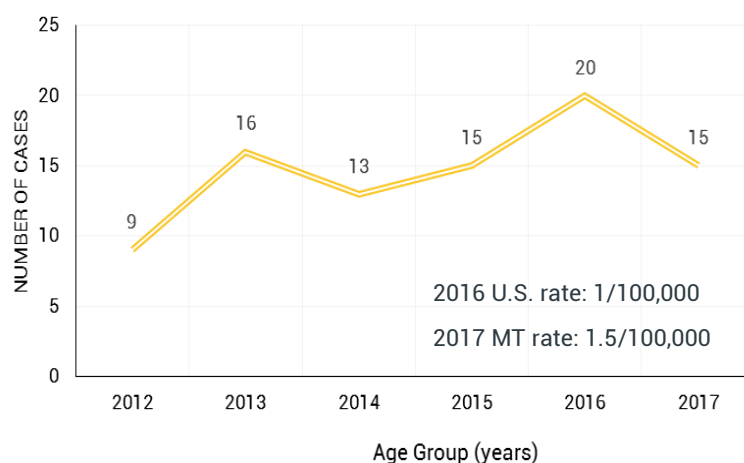


**FIGURE 22. NEWLY REPORTED CHRONIC HEPATITIS C INFECTIONS BY AGE GROUP – MONTANA, 2017****TABLE 5. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH CHRONIC HEPATITIS C – MONTANA, 2017**

GENDER			RACE		
Male	996	59%	White	1100	65%
Female	685	41%	American Indian	382	23%
Unknown	6	<1%	Other/Unknown	205	12%

Acute hepatitis C is a short-term viral infection caused by the hepatitis C virus. People with acute hepatitis C carry the infection for a small window of time, often just several months. Most people with the acute form of hepatitis C will experience illness and mild symptoms such as fatigue and vomiting within the first six months after exposure. Because of its short time span and the fact that in many cases, the disease causes no symptoms, cases of acute hepatitis C are often not detected. It leads to chronic infection in 75 to 80% of cases.

An average of 16 cases of acute HCV cases are reported to DPHHS each year (Figure 23). Fifteen cases were reported in 2017 (Table 6).

**FIGURE 23. ACUTE HEPATITIS C INFECTIONS – MONTANA, 2012-2017****TABLE 6. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH ACUTE HCV, MONTANA 2017 (N=15)**

GENDER			RACE		
Male	6	40%	White	10	67%
Female	9	60%	American Indian	4	27%
Unknown	--	--	Other/Unknown	1	6%

# Zoonotic & Vectorborne Diseases

## RABIES

Rabies is a vaccine-preventable viral disease that is almost universally 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 2017, 199 individuals received the recommendation to pursue PEP to prevent disease after exposure to an animal that is capable of transmitting rabies (Figure 24). Also in 2017, 13 bats from nine jurisdictions in Montana tested positive for the rabies virus (Figure 25) out of 510 animals tested at the Montana Veterinary Diagnostic Laboratory. Five of the positive animals had a documented human exposure, and eight people received PEP in relation to these exposures. The last cases of human rabies in Montana were reported in 1996 and 1997, both of which were associated with bat exposures.



**FIGURE 24. TYPES OF EXPOSURES THAT LED TO PEP RECOMMENDATIONS -- MONTANA, 2017**

 45%

Bat exposures, most were potentially exposed to bats in the home during sleep.

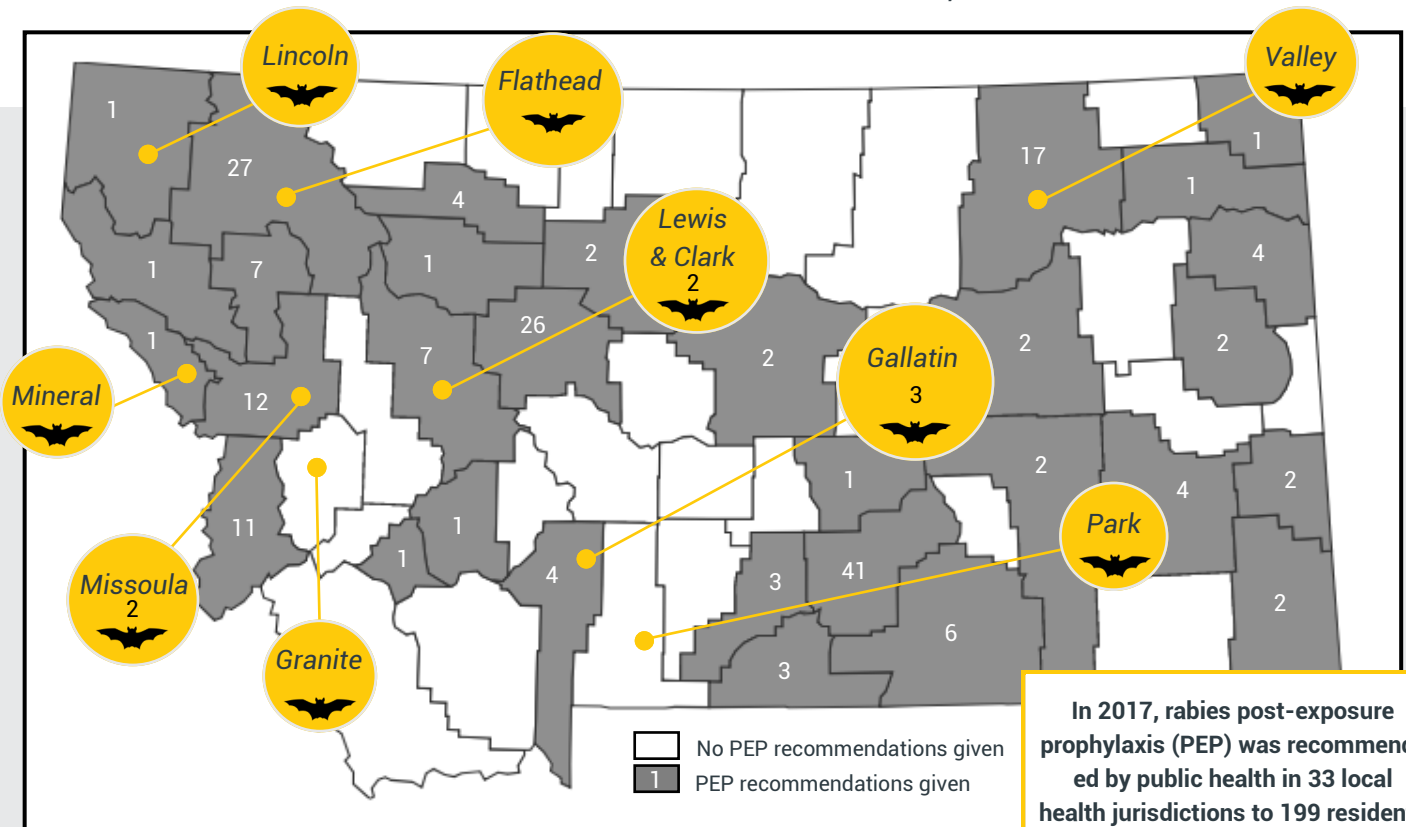
 36%

Dog exposures, most were bites and the dog could not be found for observation.

 13%

Cat exposures, most were bites and the cat could not be found for observation.

**FIGURE 25. ANIMALS THAT TESTED POSITIVE FOR RABIES VIRUS – MONTANA, 2017**



This map reflects positive animals based on what was found and tested across the state, rather than a systematic survey. It is assumed that the potential for rabid bats exists all over Montana.

**In 2017, rabies post-exposure prophylaxis (PEP) was recommended by public health in 33 local health jurisdictions to 199 residents and 17 out-of-state travelers.**

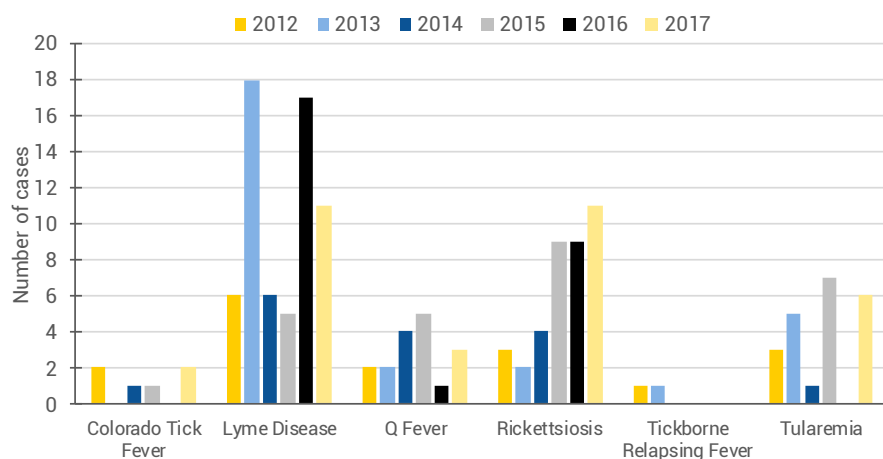




## TICKBORNE DISEASES

Pathogens present in Montana and that be transmitted to humans by ticks include those that cause Colorado tick fever (*Coltivirus spp.*), Rickettsiosis (*Rickettsia spp.*), tickborne relapsing fever (*Borrelia hermsii*), Q Fever (*Coxiella burnetii*), and tularemia (*Francisella tularensis*). The number of reported cases from each of the last six years is shown in Figure 26. The most commonly reported tickborne disease in Montana is Lyme disease, with all but one case acquired outside of Montana. Spotted Fever Rickettsiosis is the second most reported tickborne disease in Montana.

**FIGURE 26. REPORTED CASES OF TICK-BORNE DISEASES — MONTANA, 2012–2017**



In addition to vectorborne 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 2017, there were six cases of tularemia and three cases of Q fever (2 acute; 1 chronic) 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.

## OTHER VECTORBORNE DISEASES

A vectorborne disease is a disease transmitted to hosts via an infected arthropod, usually an insect. There were several travel-associated vectorborne diseases reported in Montana in 2017. These diseases include: Anaplasmosis (4), Dengue (1), Leishmaniosis (2), Malaria (4), and Zika (1). The single Zika case reported in Montana in 2017 was travel-associated and the individual was not pregnant.

Before traveling, Montanans should plan to limit exposure to mosquitos and ticks and get appropriate vaccines or prophylaxis to prevent vectorborne diseases.

## 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 2017, 11 human cases of WNV were reported in Montana residents, plus two viremic blood donors. Of those, three were WNND and three were hospitalized. No deaths were reported in 2017. Cases were reported from Big Horn, Gallatin, Lake, Lewis and Clark, Madison, McCone, Richland, Stillwater, Toole, and Yellowstone Counties. The two viremic blood donors were reported from Carbon and Hill Counties. Forty-six percent (6) of the cases were in individuals aged 60-69 years of age. Other age groups affected included those 20-29 (1), 30-39 (3), 50-59 (2), and 70-79 (1) years of age.

Since the introduction of WNV into Montana in 2002, the number of cases in Montana varied from year to year. Eleven of the sixteen years of WNV surveillance had fewer than twenty annual cases (range 0-11). Three years had between 26 and 38 (2005, 2006, 2013) and two years had over 200 (2003 and 2007).

Nationally, the number of cases increased 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. WNV season usually runs from July until October, with the majority of cases being reported in September. Each year, testing data is reported to Montana DPHHS. This year, there were 26 counties who submitted mosquitoes for testing, of which, nine had positive specimens reported.





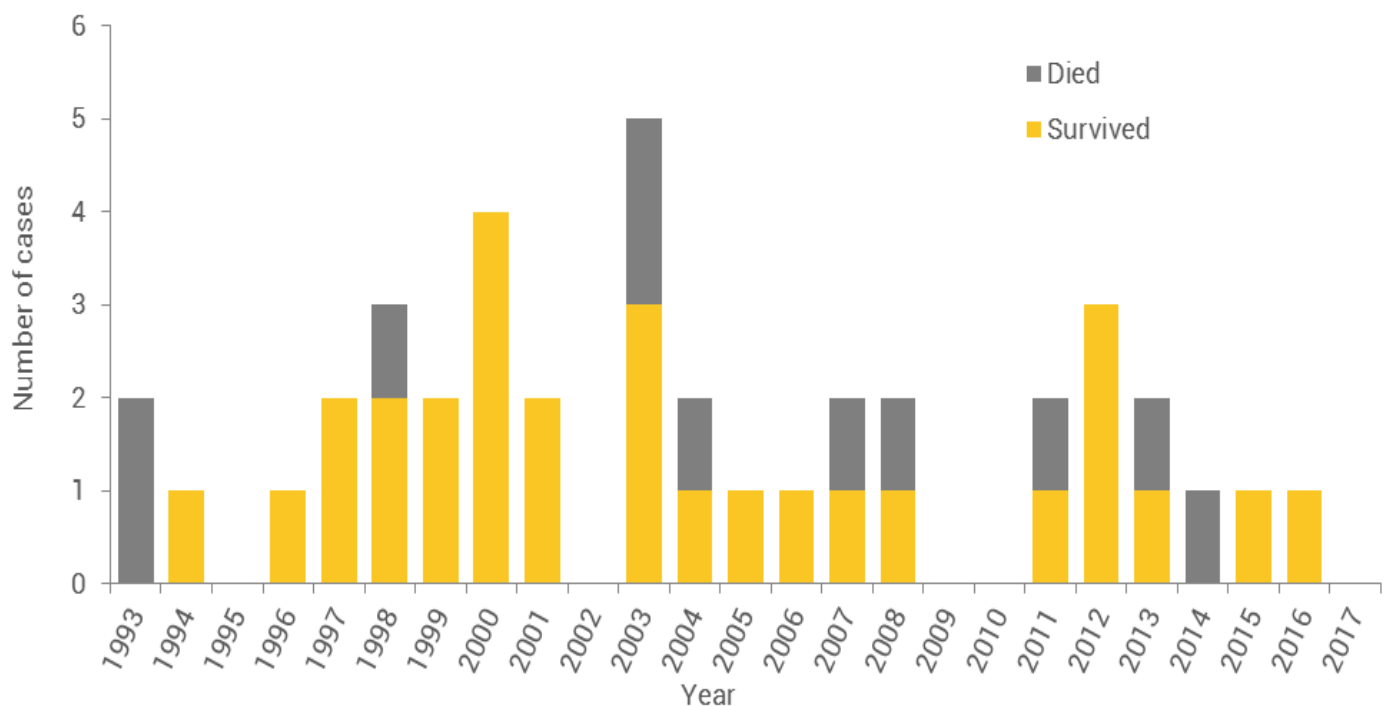


## HANTAVIRUS

Hantavirus is a serious disease first recognized in 1993, and is 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 (77%). Of Montana's 56 counties, 43% have reported at least one case of hantavirus. Since 1993, Montana has reported 43 cases of Hantavirus Pulmonary

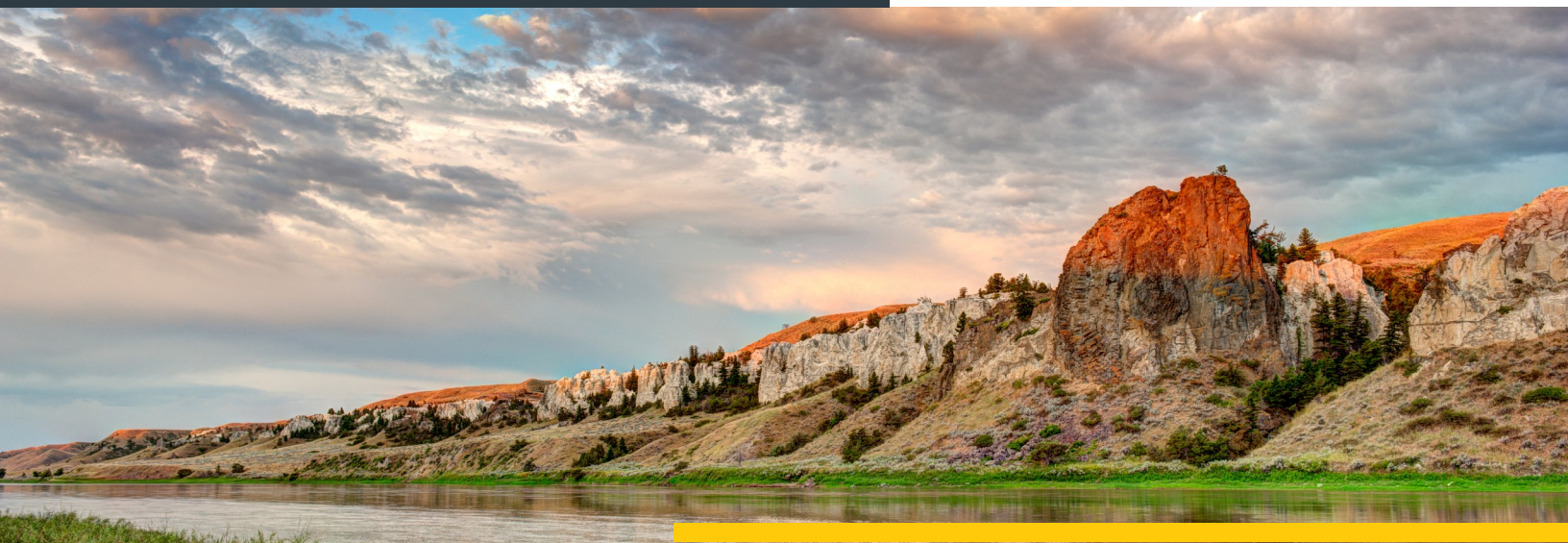
Syndrome, including 11 deaths (Figure 27). No cases were reported in Montana in 2017. Reducing potential exposures to rodents is key to preventing hantavirus. This includes sealing up holes and gaps in homes and garages, and carefully cleaning areas of mouse infestation.

FIGURE 27. HANTAVIRUS CASES AND OUTCOMES – MONTANA, 2017





# 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. People become ill after breathing in dust that contains fungal spores. Coccidioidomycosis is most common in adults aged 60 and older.

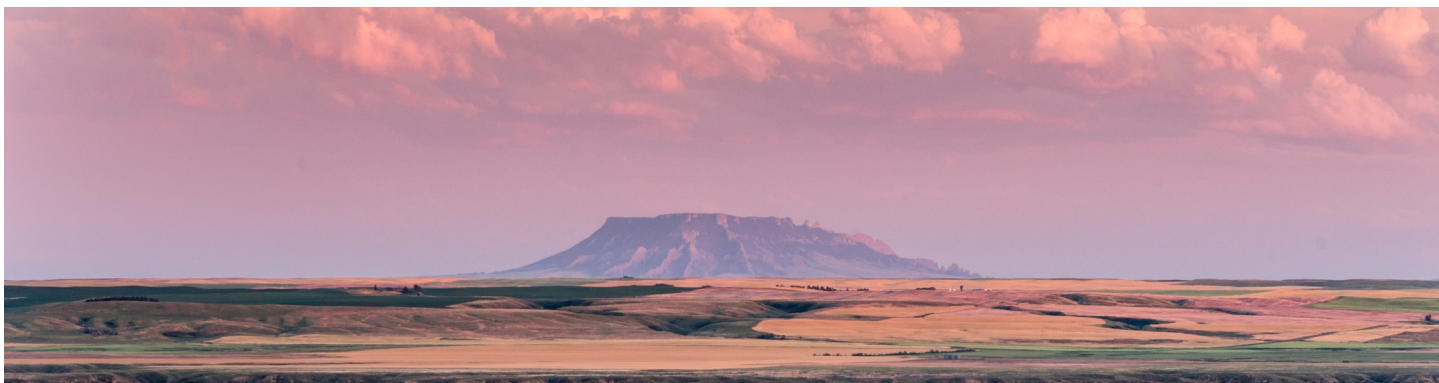
Coccidioidomycosis is not endemic in Montana, and most of Montana's cases are in individuals that previously lived or worked in areas where coccidioidomycosis is endemic. The remainder are Montana residents that spend their winters in endemic areas. In 2017, there were 18 cases of coccidioidomycosis reported, 67% of whom were aged 60 years and older. All cases reported previous travel to endemic areas.

## CREUTZFELDT JAKOB DISEASE

Creutzfeldt Jakob Disease (CJD) is a rare transmissible spongiform encephalopathy that causes 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 range between zero to four per year. In 2017, two cases of CJD were reported; one lab-confirmed sporadic and one probable case that met clinical criteria but was not laboratory confirmed.



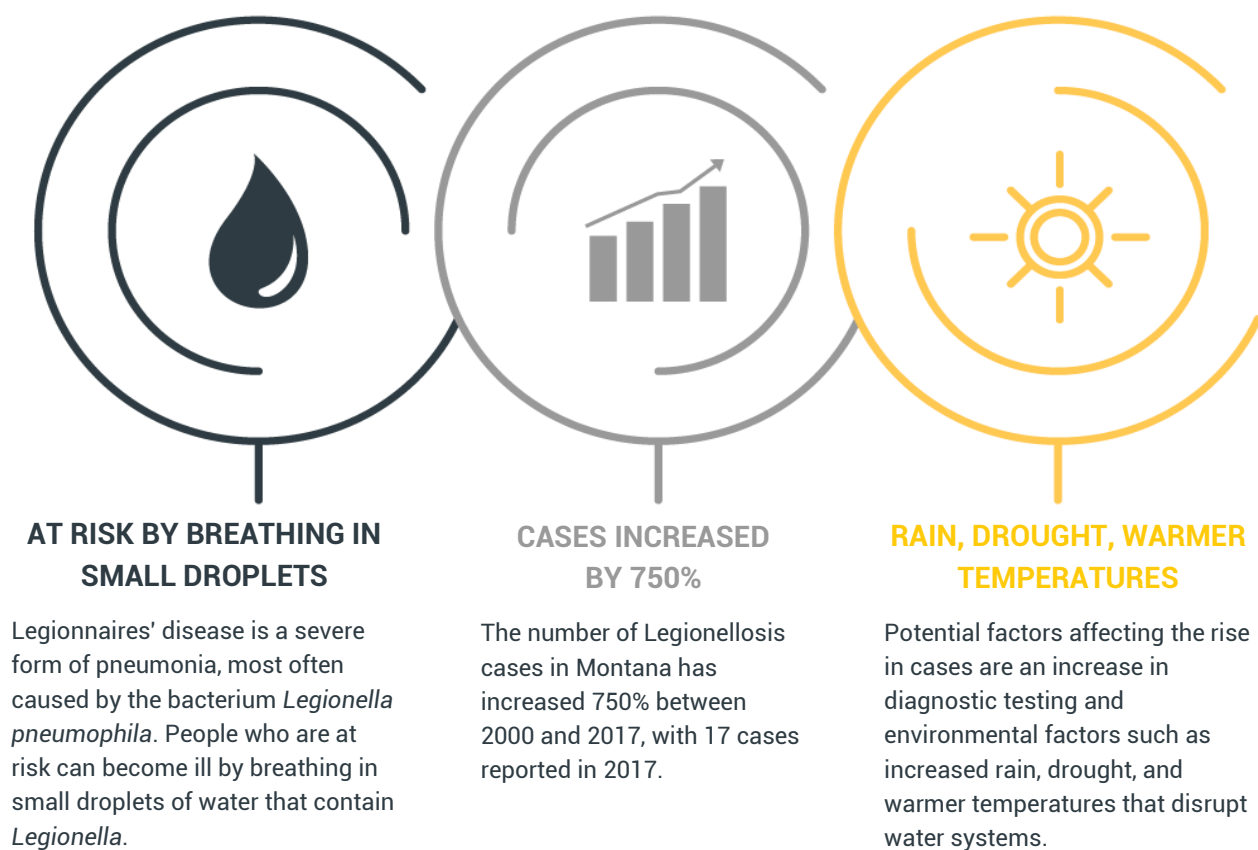




## LEGIONELLOSIS

Legionellosis is an infection caused by the bacterium *Legionella*. The disease presents as either a mild febrile illness (Pontiac fever), or a form of pneumonia called Legionnaires' disease that can become severe. The case fatality rate of Legionnaires' disease is about 10%, and those who are over the age of 50, are smokers, and have chronic diseases are most at risk for infection. *Legionella* bacteria are found naturally in the environment, and become a problem when they infiltrate and grow in settings like building water systems, hot tubs, pools, and decorative fountains that are not well maintained. People become infected when they breathe in the aerosolized bacteria. Montana has an average of 8 cases reported a year, and case counts of Legionnaires' disease are increasing both in Montana and the United States. This is likely due to an increase in awareness and diagnostic testing, and possibly by changing environmental factors. There were 17 reported cases of Legionnaires' disease in Montana in 2017, and 94% were aged 50 years or older. Of the 17 cases, 15 were hospitalized and there were two deaths. In institutional settings, water management programs are essential to preventing the spread of *Legionella*. In other settings, proper maintenance of pools, hot tubs, and water features is necessary to prevent transmission.

FIGURE 28. CHARACTERISTICS OF *LEGIONELLA* – MONTANA, 2017



# Acknowledgements

- We thank our local public health jurisdictions for their dedication to public health.
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- The Montana Department of Commerce for beautiful photos of Montana.

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# Appendix I: Comparative Statistics for Reportable Communicable Diseases—Montana, 2017<sup>±</sup>

CONDITION	Reported cases								5 year median
	2011	2012	2013	2014	2015	2016	2017	2017 Rate <sup>†</sup>	
Anaplasmosis	0	0	0	0	1	0	4	0.4	0
Botulism, infant	0	0	0	1	0	1	2	0.2	1
Campylobacteriosis	236	233	205	216	323	372	406	38.6	323
Chlamydia	3412	3827	3818	4193	4183	4423	4552	433.3	4193
Coccidioidomycosis	5	3	3	10	12	13	18	1.7	12
Colorado Tick Fever	1	1	0	1	1	0	2	0.2	1
Creutzfeldt Jakob Disease	4	1	3	3	1	1	2	0.2	2
Cryptosporidiosis	77	69	125	66	39	62	70	6.7	66
Cyclosporiasis	0	0	0	2	3	0	3	0.3	2
Dengue Fever	0	2	5	1	6	3	1	0.1	3
Giardiasis	87	67	91	89	93	120	125	11.9	93
Gonorrhea	84	108	224	434	844	868	781	74.3	781
<i>Haemophilus influenzae</i> , invasive	3	6	6	14	15	19	19	1.8	15
Hemolytic Uremic Syndrome (HUS)	1	1	0	5	2	1	2	0.2	2
Hepatitis A,	3	6	6	5	2	3	3	0.3	3
Hepatitis B, acute	0	2	4	0	7	1	3	0.3	3
Hepatitis B, chronic	24	27	21	32	35	21	35	3.3	32
Hepatitis C, acute	9	9	16	13	15	21	15	1.4	15
Hepatitis C, chronic	1349	1544	1142	1413	1386	1664	1665	158.5	1413
HIV	21	22	23	14	18	22	30	2.9	22
Legionellosis	1	4	10	5	8	10	17	1.6	10
Leishmaniasis	0	0	1	0	0	0	2	0.2	0
Listeriosis	3	1	0	1	1	2	2	0.2	1
Lyme disease	11	6	18	6	5	17	11	1.0	11
Malaria	2	0	0	2	1	5	3	0.3	2
Meningococcal disease	4	10	1	4	1	2	1	0.1	1
Mumps	0	1	0	1	1	26	6	0.6	1
Pertussis	134	547	663	494	230	21	106	10.1	230
Q fever	15	2	2	4	5	1	3	0.3	3
Rabies, animal	18	25	36	16	21	10	13	1.2	16
Salmonellosis	120	110	94	145	195	177	140	13.3	145
Shiga toxin-producing <i>Escherichia coli</i> (STEC)	39	44	49	39	85	133	97	9.2	85
Shigellosis	124	12	69	44	14	8	10	1.0	14
Spotted Fever Rickettsiosis	1	3	2	4	9	9	11	1.0	9
Streptococcal toxic shock syndrome	0	0	0	0	4	3	3	0.3	3
<i>Streptococcus pneumoniae</i> , invasive	22	33	31	41	61	99	112	10.7	61
Syphilis	9	3	8	9	13	14	48	4.6	13
Tetanus	1	1	0	0	0	0	1	0.1	0
Toxic shock syndrome, non-streptococcal	1	1	0	0	0	0	1	0.1	0
Tuberculosis	8	5	6	6	9	4	3	0.3	6
Tularemia	3	3	5	1	7	3	6	0.6	5
Varicella	163	133	84	72	132	77	54	5.1	77
Vibriosis	NR	NR	3	2	0	2	8	0.8	2
West Nile	1	6	38	5	3	7	11	1.0	7
Yersiniosis	4	3	0	0	0	0	1	0.1	0
Zika virus disease	NR	NR	NR	NR	NR	9	1	0.1	N/A

\*Confirmed and probable cases only. <sup>†</sup>Conditions for which there were zero (0) cases in 2017 are not reflected in this table. <sup>‡</sup>Rate = per 100,000. NR = Not Reportable. N/A = Not Applicable.

Appendix II: Cases of reportable communicable diseases by jurisdiction – Montana, 2017<sup>1</sup>

COUNTY	ANAPLASMOSIS	BOTULISM, INFANT	CAMPYLOBACTERIOSIS	CHLAMYDIA	COCCIDIOIDOMYCOSIS	COLORADO TICK FEVER	CREUTZFELDT JAKOB DISEASE	CRYPTOSPORIDIOSIS	CYCLOSPORIASIS	DENGUE	GIARDIASIS	GONORRHEA	HAEMOPHILUS INFLUENZAE, INVASIVE	HEMOLYTIC UREMIC SYNDROME (HUS) <sup>2</sup>	HEPATITIS A	HEPATITIS B, ACUTE	HEPATITIS B, CHRONIC	HEPATITIS C, ACUTE	HEPATITIS C, CHRONIC	HIV/AIDS	LEGIONELLOSIS	LEISHMANIASIS	LISTERIOSIS	LYME DISEASE	MALARIA	MUMPS	MENINGOCOCCAL DISEASE	PERTUSSIS	Q FEVER	RABIES, ANIMAL	SALMONELLOSIS	SHIGA TOXIN-PRODUCING ESCHERICHIA COLI (STEC)	SHIGELLOSIS	SPOTTED FEVER RICKETTSIOSIS	STREPTOCOCCAL TOXIC-SHOCK SYNDROME	STREPTOCOCCUS PNEUMONIAE INVASIVE	SYPHILIS <sup>3</sup>	TETANUS	TOXIC-SHOCK SYNDROME, NON-STREPTOCOCCAL	TUBERCULOSIS	TULAREMIA	VARICELLA (CHICKENPOX)	VIBRIOSIS	WEST NILE	YERSINIOSIS	ZIKA VIRUS DISEASE
BEAVERHEAD	--	--	15	49	--	--	--	--	--	--	1	3	--	--	--	--	--	--	7	1	--	--	--	--	--	--	--	--	--	--	1	2	--	--	--	--	--	--	--	--	1	--	--	--	--	
BIG HORN/CROW	--	--	7	194	--	--	--	1	--	--	2	44	1	--	--	--	--	--	24	--	--	--	--	1	--	--	--	--	--	--	4	--	1	--	--	8	--	--	--	--	1	2	1	1	--	--
BLAINE/FT. BELKNAP	--	--	2	54	--	--	--	1	--	--	1	12	--	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	
BROADWATER	--	--	2	8	1	--	--	--	--	--	1	1	--	--	--	--	--	--	2	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	
CARBON	--	--	8	25	--	--	--	1	--	--	--	4	--	--	--	--	1	--	11	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	2	1	--	--	--	--	--	--	--	
CARTER	--	--	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--	--	
CASCADE	--	--	19	442	1	--	--	2	--	--	8	60	1	--	--	--	2	--	158	6	1	--	--	--	--	--	--	--	1	--	7	10	1	--	--	11	2	--	--	1	--	4	--	--	1	--
CHOUTEAU	--	--	3	7	--	--	--	--	--	--	--	1	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	
CUSTER	--	--	6	38	1	--	--	1	--	--	2	5	--	--	--	--	--	--	18	2	--	--	--	--	--	--	--	--	--	--	--	--	2	--	1	--	1	--	--	--	--	--	--	--	--	--
DANIELS	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	
DAWSON	--	--	--	8	--	--	--	--	--	--	--	3	1	--	--	--	--	1	9	1	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2	--	--	--	--	1	--	--	--	--
DEER LODGE	--	--	12	22	--	--	--	--	--	--	2	4	--	--	--	1	--	--	23	--	1	--	--	--	--	--	--	--	--	--	--	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--
FALLON	--	--	1	6	--	--	--	--	--	--	--	--	--	--	--	--	--	1	2	--	--	--	--	1	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--
FERGUS	--	--	11	29	--	--	--	8	--	--	--	2	--	--	--	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--	--	4	1	--	--	--	--	2	--	--	1	--	2	--	--	--
FLATHEAD	1	--	35	280	3	--	--	8	1	--	21	13	3	--	--	--	2	1	87	1	--	--	--	3	1	2	--	--	--	1	15	16	3	--	--	15	2	1	1	--	--	5	3	--	--	--
GALLATIN	--	--	44	542	3	--	1	13	1	--	24	29	--	--	2	--	3	1	48	2	1	1	1	2	2	2	--	1	--	3	20	11	1	--	3	5	3	--	--	--	1	6	1	1	--	--
GARFIELD	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GLACIER/BLACKFEET	--	--	6	164	--	--	--	--	--	--	4	36	1	--	--	--	--	--	127	1	1	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	1	--	--	--	--	--	--	--	--	--
GOLDEN VALLEY	--	--	1	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
GRANITE	1	--	--	3	--	--	--	--	--	--	--	3	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
HILL/ROCKY BOY	--	--	3	157	--	--	--	1	--	--	3	6	1	--	--	--	--	--	39	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--
JEFFERSON	--	--	3	24	--	--	--	--	--	--	--	1	--	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	1	--	--	--	--	2	--	--	--	--
JUDITH BASIN	--	--	2	1	--	--	--	2	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LAKE/CSKT	--	--	16	176	--	--	--	1	1	--	1	62	1	--	--	--	--	--	56	2	1	--	--	--	--	--	--	1	--	--	--	6	3	--	--	--	4	--	--	--	--	1	--	1	--	--
LEWIS AND CLARK	--	--	15	255	--	--	--	3	--	--	6	23	1	--	--	--	2	--	54	2	5	--	--	--	--	--	--	31	1	2	7	7	--	4	--	8	3	--	--	--	--	5	1	1	--	--
LIBERTY	--	--	2	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--
LINCOLN	--	--	4	42	--	--	--	1	--	--	1	1	--	--	--	--	1	--	30	--	--	--	--	--	--	--	1	--	10	--	1	3	--	--	--	--	1	--	--	--	--	2	--	--	--	--



Appendix II: Cases of reportable communicable diseases by jurisdiction – Montana, 2017<sup>1</sup>

COUNTY	ANAPLASMOSIS	BOTULISM, INFANT	CAMPYLOBACTERIOSIS	CHLAMYDIA	COCCIDIOIDOMYCOSIS	COLORADO TICK FEVER	CREUTZFELDT JAKOB DISEASE	CRYPTOSPORIDIOSIS	CYCLOSPORIASIS	DENGUE	GIARDIASIS	GONORRHEA	HAEMOPHILUS INFLUENZAE, INVASIVE	HEMOLYTIC UREMIC SYNDROME (HUS) <sup>2</sup>	HEPATITIS A	HEPATITIS B, ACUTE	HEPATITIS B, CHRONIC	HEPATITIS C, ACUTE	HEPATITIS C, CHRONIC	HIV/AIDS	LEGIONELLOSIS	LEISHMANIASIS	LISTERIOSIS	LYME DISEASE	MALARIA	MUMPS	MENINGOCOCCAL DISEASE	PERTUSSIS	Q FEVER	RABIES, ANIMAL	SALMONELLOSIS	SHIGA TOXIN-PRODUCING ESCHERICHIA COLI (STEC)	SHIGELLOSIS	SPOTTED FEVER RICKETTSIOSIS	STREPTOCOCCAL TOXIC-SHOCK SYNDROME	STREPTOCOCCUS PNEUMONIAE INVASIVE	SYPHILIS <sup>3</sup>	TETANUS	TOXIC-SHOCK SYNDROME, NON-STREPTOCOCCAL	TUBERCULOSIS	TULAREMIA	VARICELLA (CHICKENPOX)	VIBRIOSIS	WEST NILE	YERSINIOSIS	ZIKA VIRUS DISEASE	
MADISON	--	--	4	6	--	--	--	3	--	--	--	--	--	--	--	--	--	--	6	--	--	--	--	1	--	--	--	--	--	--	1	2	--	--	--	--	--	--	--	--	--	--	1	--	--		
MCCONE	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	
MEAGHER	--	--	3	2	--	--	--	2	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MINERAL	--	--	4	11	1	--	--	--	--	1	1	--	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	1	2	2	--	--	--	--	--	--	--	--	2	--	--	--	1	
MISSOULA	--	1	48	557	3	--	--	4	--	--	16	74	--	--	--	2	7	--	150	3	3	1	--	2	--	--	--	--	1	2	8	7	--	1	--	2	8	--	--	--	1	7	1	--	--	--	
MUSSELSHELL	--	--	2	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	7	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	
PARK	--	--	4	34	1	1	--	3	--	--	4	4	2	--	--	--	--	1	20	1	--	--	--	--	--	--	--	--	1	--	1	4	3	--	1	--	--	2	--	--	--	--	3	--	--	--	--
PHILLIPS	1	--	1	6	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PONDERA	--	--	1	8	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	2	4	--	--	--	--	--	--	--	--	1	--	--	--	--	
POWDER RIVER	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
POWELL	--	--	4	14	--	--	--	1	--	--	--	2	--	--	--	--	--	1	77	--	--	--	--	--	--	--	--	--	2	--	--	2	2	1	1	--	--	--	--	--	--	--	--	--	--	--	--
PRAIRIE	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RAVALLI	--	--	19	73	2	--	--	1	--	--	7	5	--	--	--	--	2	--	44	--	1	--	--	--	--	--	--	--	24	--	--	8	3	1	--	--	5	1	--	--	--	--	1	--	--	--	--
RICHLAND	--	--	4	29	--	--	--	1	--	--	--	5	2	--	--	--	1	--	10	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2	--	--	--	--	--	--	1	--	--	
ROOSEVELT/FT. PECK	--	--	2	183	--	--	--	--	--	--	--	79	--	--	--	--	--	1	107	2	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	6	--	--	--	--	--	1	--	--	--	--
ROSEBUD/N. CHEYENNE	--	--	10	153	--	--	--	2	--	--	--	70	--	--	--	--	--	--	45	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--
SANDERS	--	--	6	16	--	--	--	1	--	--	3	2	--	--	--	--	--	--	21	--	--	--	--	1	--	1	--	2	--	--	6	2	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
SHERIDAN	--	--	--	3	--	--	--	--	--	--	--	1	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER BOW	--	--	17	127	1	1	--	1	--	--	--	21	1	--	--	--	2	--	99	--	--	--	--	--	--	--	--	--	--	--	--	4	--	1	--	--	6	--	--	--	--	--	--	--	--	--	--
STILLWATER	--	--	8	19	--	--	--	--	--	--	--	2	--	--	--	--	--	--	5	--	1	--	--	--	--	--	--	--	--	--	--	1	3	--	--	--	2	2	--	--	--	--	--	--	1	--	--
SWEET GRASS	--	--	1	--	--	--	--	2	--	--	1	2	--	--	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--
TETON	--	--	2	3	--	--	--	--	--	--	1	--	--	--	--	--	--	--	4	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--
TOOLE	--	--	1	6	--	--	--	1	--	--	--	--	--	--	--	--	--	--	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	1	--	--
TREASURE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
VALLEY	--	--	1	15	--	--	--	--	--	--	1	--	--	--	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	1	2	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--
WHEATLAND	--	--	5	3	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WIBAUX	--	--	1	1	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
YELLOWSTONE	1	1	39	745	1	--	1	3	--	--	11	199	3	--	1	--	11	7	262	5	1	--	1	--	--	--	--	10	--	--	18	7	--	--	--	20	21	--	--	--	1	5	--	1	--	--	
MONTANA	4	2	406	4552	18	2	2	70	3	1	125	781	19	2	3	3	35	15	1665	30	17	2	2	11	4	6	1	106	3	13	140	97	10	11	3	112	48	1	1	3	6	54	8	11	1	1	

<sup>1</sup>Confirmed and probable cases that were newly reported to DPHHS in 2017; <sup>2</sup>HUS cases are those associated with STEC infection. <sup>3</sup>Primary and secondary cases.

## Appendix III: Montana Demographic Profile, 2017

Montana is a geographically large state with a small population. It is the fourth largest state by area in the United States with just over one million residents. There are 58 public health jurisdictions within the state that include 50 individual counties, one health district composed of six rural counties, as well as seven tribal health departments. Over one quarter of the population resides in areas where the population density is categorized as "frontier." Nearly 60% of all case reports of reportable diseases for Montana were submitted from six counties, all with populations  $\geq 60,000$  residents.\*<sup>‡</sup>

CHARACTERISTIC	POPULATION	PERCENT <sup>‡</sup>
	1,050,493	100
<b>GEOGRAPHIC CLASSIFICATION</b>		
Urban	158,980	15.1
Rural	603,113	57.4
Frontier	288,400	27.5
<b>SEX</b>		
Male	528,956	50.4
Female	521,537	49.6
<b>AGE GROUP (YEARS)</b>		
<1	12,538	1.2
1-4	50,753	4.8
5-14	127,781	12.2
15-24	136,163	13
25-39	200,759	19.1
40-64	331,976	31.6
65+	190,523	18.1
<b>RACE</b>		
White	952,702	90.7
American Indian	76,587	7.3
African American	10,081	1.0
Asian	11,123	1.1
<b>ETHNICITY</b>		
Non-Hispanic	1,010,860	96.2
Hispanic	39,633	3.8

\*The Montana Infectious Disease Information System (MIDIS) generated report of 2010-2017 data. The six counties are Yellowstone, Missoula, Gallatin, Flathead, Cascade, and Lewis and Clark.

<sup>‡</sup>Based on 2017 population estimates from the National Center for Health Statistics. Bridged-race intercensal estimates of the July 1, 1990-July 1, 1999; July 1, 2000-July 1, 2009. Postcensal estimates of the resident population of the United States for July 1, 2010-July 1, 2014. United States resident population by year, county, single-year of age, sex, bridged race, and Hispanic origin. Prepared by the U.S. Census Bureau with support from the National Cancer Institute. Available on the Internet at: <http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm> as of April 24, 2004; Oct 26, 2012; July 17, 2018.



## Appendix IV: Diseases Reportable to Public Health in Montana, 2017

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)
Campylobacteriosis	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>	Tickborne 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 $\leq$ 13 years of age)	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



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