



COMMUNICABLE DISEASE IN **MONTANA**

ANNUAL REPORT **2018**



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 2018. These reportable conditions met the 2018 case definitions provided by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE).¹ 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 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 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:

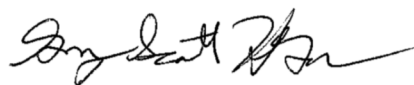
- *Responding to and tracking outbreaks of infectious diseases, such as influenza, foodborne, and vectorborne illnesses*
- *Testing for and treating infectious diseases*
- *Preparing communities for disease outbreaks*
- *Providing messages to prevent transmission of disease*

The unique nature of this work requires community members and healthcare providers to work closely with public health and notify them regarding all reportable diseases and any unusual cases. State and Local public health staff are 'on-call' for disease reporting, consultation, and outbreak investigation and control to 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 partners during 2018. Data trends and public health events of importance are described and analyzed 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) of the Montana Department of Public Health and Human Services (DPHHS) 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 DPHHS 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. This section also works closely with the DPHHS Food and Consumer Safety section (FCS).

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.

VECTORBORNE AND ZOOBOTIC DISEASES

Vectorborne Epidemiology monitors and provides assistance with investigating vectorborne and zoonotic diseases such as those caused by ticks, mosquitoes, and animals.

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.

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 coordinates antibiotic stewardship programs in the state.

COMMUNICABLE DISEASE NURSE CONSULTANT

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

MONTANA INFECTIOUS DISEASE INFORMATION SYSTEM (MIDIS)

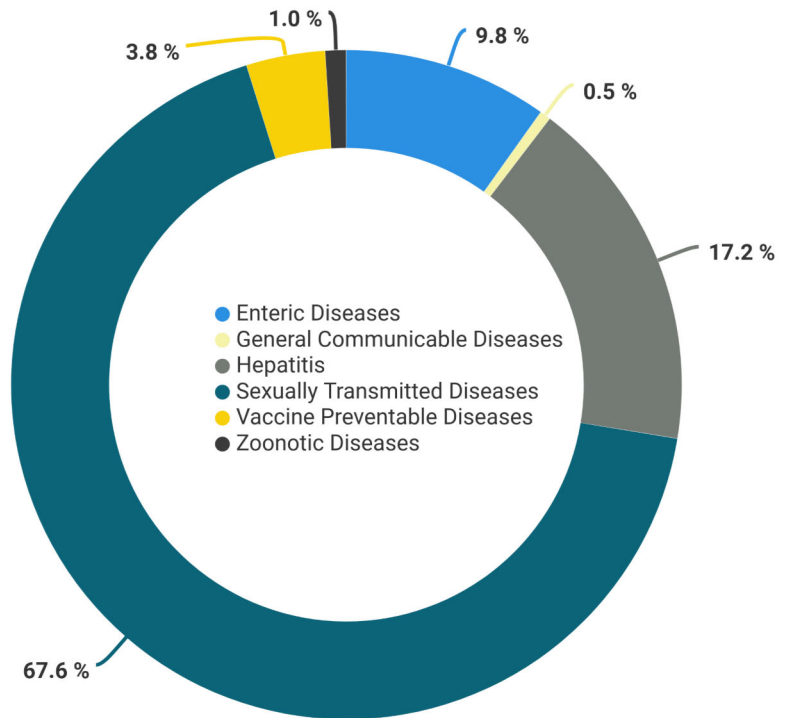
Montana Infectious Disease Information System (MIDIS) Epidemiology maintains the surveillance database used for reportable communicable conditions in Montana. This database also transmits nationally reportable data to the Centers for Disease Control and Prevention. Epidemiologists and local public health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

Preface

The *2018 Montana Communicable Disease Annual Report* contains data for notifiable diseases and conditions reported to Montana DPHHS in 2018. 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). In 2018, Montana DPHHS tracked more than 9,000 communicable disease cases. Each reported case is investigated by local health jurisdictions, and includes contact investigations and application of control measures to prevent further spread of disease. The distribution of reportable disease cases in 2018 is depicted in Figure 1.

The Notable Events section presents information on noteworthy reports from 2018 for selected diseases that were above expected values. Incidence data, describing new cases of reportable conditions in 2018, incidence rates, and historical five-year median, 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 2018 (N=9,088)



Notable Events 2018

Increase in incidence of gonorrhea

The incidence rate of gonorrhea in Montana was relatively stable until the rate increased from 10.7 per 100,000 in 2012 to 81.9 per 100,000 in 2015. After the number of reported cases leveled off between 2015 and 2017, the number of gonorrhea cases again increased by 50% in 2018 to a rate of 111.9/100,000 (Figure 2). This increase follows national trends and the 2018 Montana rate of 111.9 per 100,000 remains lower than the 2018 US rate of 179 per 100,000.

FIGURE 2. REPORTED GONORRHEA CASES, MONTANA 2012–2018

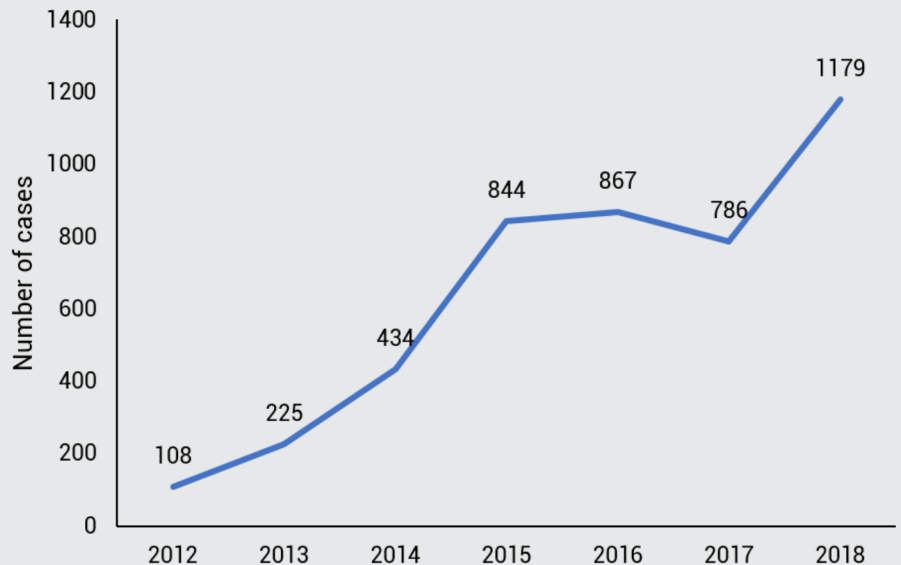
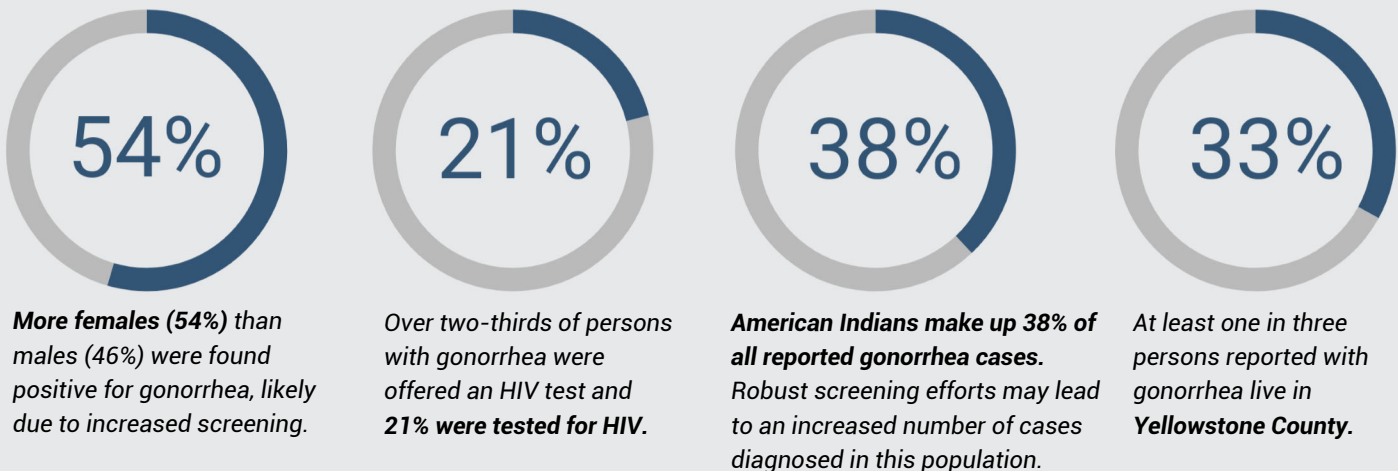


FIGURE 3. CHARACTERISTICS OF REPORTED GONORRHEA CASES – MONTANA, 2018



Multi-state Foodborne Outbreaks

More illnesses linked to multi-state foodborne disease outbreaks were reported in Montana in 2018 than any other year on record. There were nine cases of Shiga toxin-producing *Escherichia coli* (STEC) O157 in Montana that were part of a multi-state outbreak linked to consumption of romaine lettuce. Six of the cases consumed chopped romaine in dishes eaten at multiple branches of a national restaurant chain with locations in Montana. Four of the STEC cases were hospitalized for their illness.

Two Montana cases were also part of a multi-state outbreak of *Salmonella* Mbandaka linked to Honey Smacks cereal. The Montana Public Health Laboratory (MTPHL) was the first state laboratory to isolate the outbreak strain of *Salmonella* from a box of Honey Smacks cereal that had been consumed by one of the cases. One *Salmonella* Mbandaka case was hospitalized.

408 cases of *Salmonella* Newport including eleven confirmed and eight probable cases from Montana, were part of a multi-state outbreak linked to ground beef. The beef was purchased from multiple grocery

stores in Montana, and a national recall of over 12 million pounds of beef was implemented as a result of this multi-state investigation.

West Nile Virus 2018 Season

West Nile Virus (WNV) is one of several arboviral diseases that are transmitted primarily by arthropods such as mosquitoes and ticks, and is the most common arboviral disease in Montana. The number of WNV cases reported during 2018 was the third highest since WNV was first detected in Montana in 2002. In 2018, 47 symptomatic human cases, four asymptomatic viremic blood donor cases, and 50 equine cases of WNV were reported. About half (51%) of cases occurred in individuals over 60 years of age, and 53% percent were neuroinvasive disease. In 2018, a total of 18 counties reported at least one human case of WNV. Case counts for counties are as follows: Blaine (3), Carbon (1), Cascade (11), Chouteau (2^o), Custer (2), Garfield (1), Hill (3*), Lake (1), Lewis and Clark (2), McCone (3), Pondera (1), Ravalli (1), Richland (1), Roosevelt (2*^o), Teton (1), Toole (3), Valley (4), and Yellowstone (9*).

*viremic (blood donor) cases included; ^o tribal health department counts included in county totals

Foodborne and Diarrheal Diseases



Enteric illnesses are most often reported during spring and summer months. In 2018, 51% of the 896 enteric diseases reported to Montana DPHHS occurred between May and August. Of note, incidence of campylobacteriosis increased for the fifth year in a row in Montana as well as the U.S. This is likely due to the broader use of culture-independent diagnostic testing (CIDT). The incidence of Shiga-toxin producing *E. coli* (STEC) was 47% higher in 2018 compared to the previous five years. However, the incidence of salmonellosis has decreased for the third year in a row (Figure 4).

CAMPYLOBACTERIOSIS

Campylobacteriosis is a diarrheal illness caused by the bacteria *Campylobacter*. The incidence of campylobacteriosis in Montana was 40.7 cases per 100,000 population in 2018, which is 2.1 times higher than the national average of 19.5 cases per 100,000 population. Campylobacteriosis is often caused by exposure to cattle and live poultry, which are common in Montana as they are often associated with farming and ranching. In 2018, 28% of 421 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

TABLE 1. SELECTED ENTERIC ILLNESSES IN MONTANA, 2018

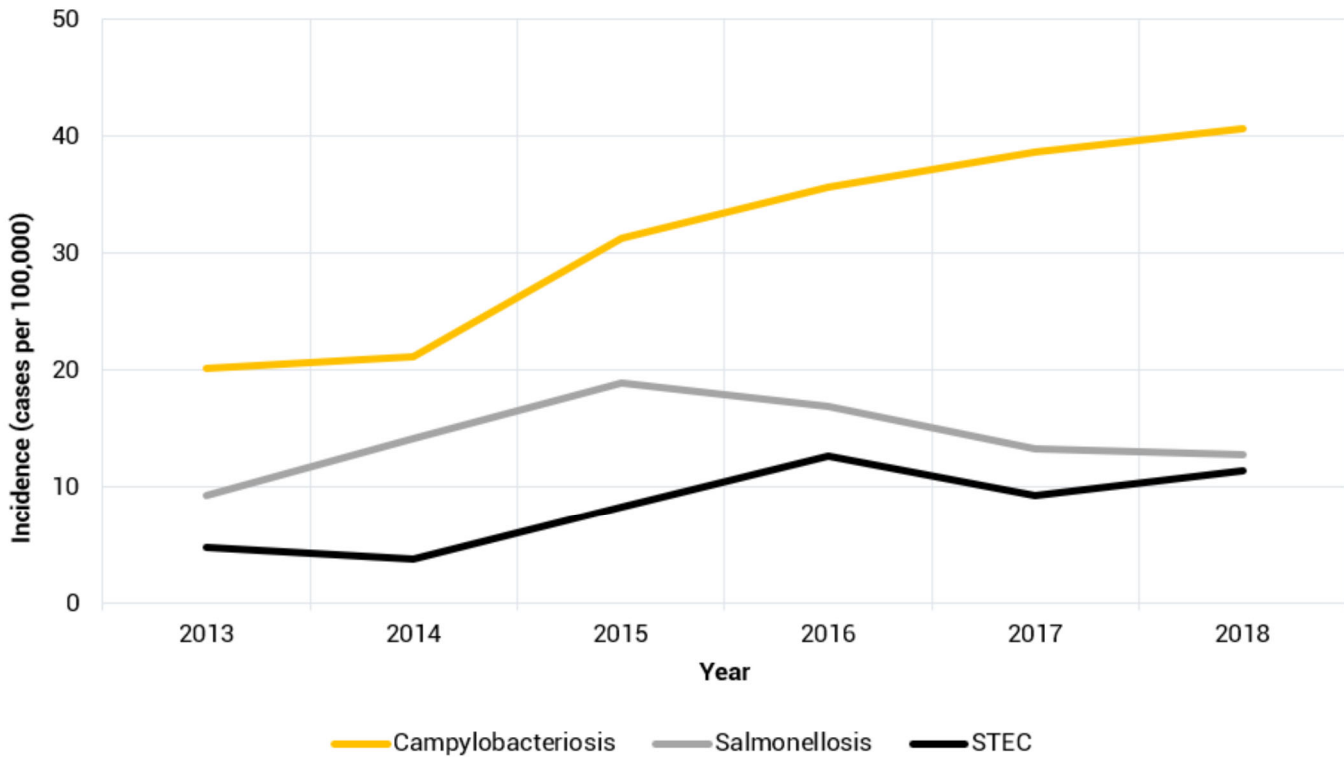
Condition	Cases	2018 Incidence (per 100,000)	2013-2017 Incidence (per 100,000)
Campylobacteriosis	432	40.7	29.4
Salmonellosis	135	12.7	14.5
Shiga-toxin producing <i>E. coli</i> (STEC)	121	11.4	10.0
Giardiasis	89	8.4	7.7
Cryptosporidiosis	81	7.6	7.0
Shigellosis	12	1.1	2.9

bacteria *Salmonella*, and is characterized by a sudden onset of diarrhea, abdominal pain, fever, and nausea. In 2018, 135 cases of salmonellosis were reported in Montana. The incidence rate of *Salmonella* cases in 2018 was 12.7 per 100,000 population, which is a decrease for the third year in a row and is lower than the five-year average of 14.5 salmonellosis cases per 100,000 population between 2013 and 2017. Common risk factors for *Salmonella* infection include exposure to live poultry, and ingestion of contaminated food. In 2018, 26 (19.3%) of Montana's salmonellosis cases were linked to multi-state outbreaks: sources included live poultry, cereal, and ground beef contaminated with *Salmonella*.

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 121 cases of STEC reported in 2018, 76 of which were confirmed. Cattle are a common reservoir for STEC bacteria, and are a primary source of infection in

FIGURE 4. SELECT ENTERIC ILLNESS RATES OVER TIME – MONTANA, 2013-2018



Montana. In 2018, 14% 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. Approximately 26% of isolates are serogrouped as O157:H7, which is more likely to cause severe illness than non-O157 serogroups. There are many different serogroups of STEC beyond O157 in Montana, the most predominant non-O157:H7 serogroups are O26 (30%), O121 (18%), O103 (7%), and all others [including nontypeable] (19%) [Figure 5]. Montana had nine confirmed O157:H7 cases that were linked to a multi-state outbreak associated with romaine lettuce in 2018. Twenty-nine (24%) of all STEC cases reported in 2018 were hospitalized. There was one reported case of hemolytic uremic syndrome (HUS), a rare but serious kidney disease that is often the result of a STEC infection.

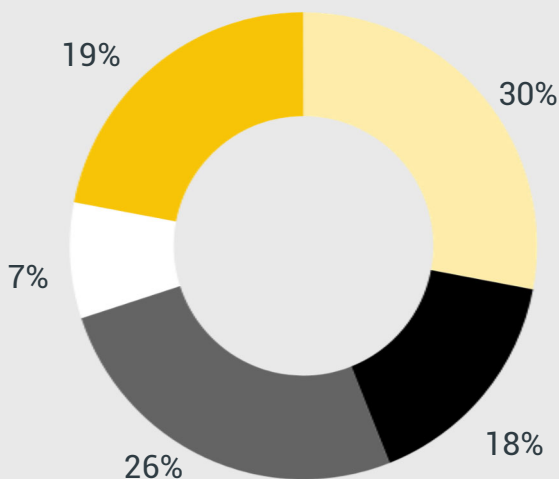


FIGURE 5. SEROGROUP OF STEC CASES IN MONTANA, 2018 (N=73*)

- O26
- O121
- O157:H7
- O103
- Other/Non-typeable[†]

*Only 73 confirmed specimens could have serogrouping completed.

[†]Not all confirmed specimens could be serogrouped at the MTPHL.

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 2018, there were 89 cases of giardiasis and 81 cases of cryptosporidiosis reported in Montana. Of those, 20% drank untreated water and 32% had recreational water exposure prior to illness onset. The incidence rate of giardiasis decreased for the first time since 2014, and the 2018 incidence of 8.4 cases per 100,000 population is lower than the five-year average incidence of 10.0 cases per 100,000 population. The incidence rate of cryptosporidiosis has fluctuated over the past five years, but the 2018 incidence of 7.6 cases per 100,000 population is the highest it has been since 2013, when there were 12.3 cases per 100,000 population (Figure 7).

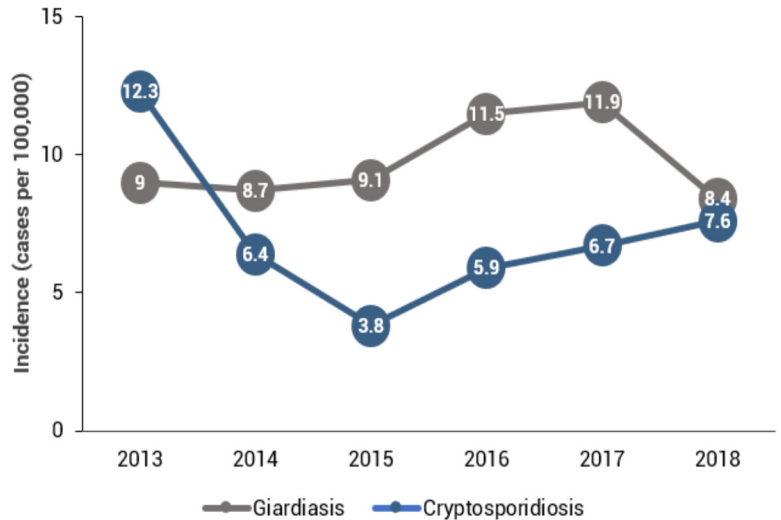
CYCLOSPORIASIS

Cyclospora is a parasite that causes diarrheal illness in humans. Humans are the only reservoir, and transmission is often linked to consumption of contaminated food or water. There were ten cyclosporiasis cases in Montana in 2018, which is more than the total number of cases reported in Montana during the previous five years combined (8). Six of the 2018 cases were part of an outbreak linked to a point source outbreak involving a salad bar at a cafeteria in western Montana.

SHIGELLOSIS

Shigellosis is a bacterial illness caused by *Shigella*, and the only significant reservoir is humans. In

FIGURE 7: PARASITIC INFECTIONS IN MONTANA -- 2013-2018

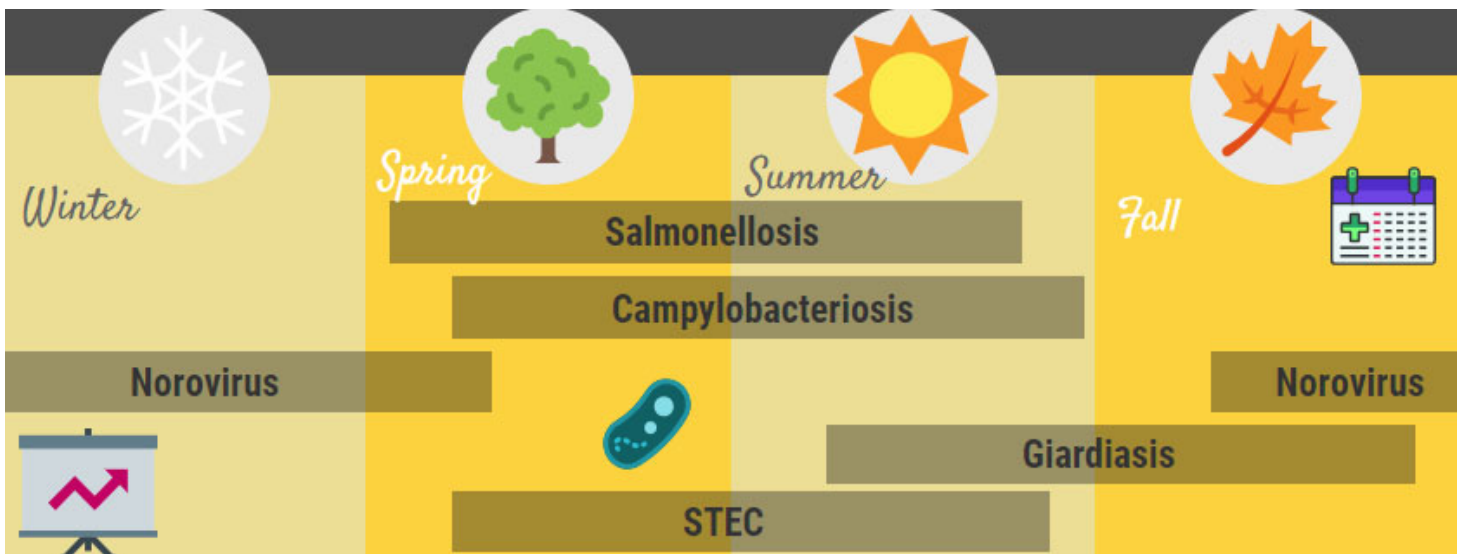


2018, 12 cases of shigellosis were reported (1.1 per 100,000), which is about average for a non-outbreak year in Montana. This pathogen is transmitted via the fecal-oral route, and those most at risk of infection are young children, travelers to developing countries, men who have sex with men, and individuals with weakened immune systems.

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 fourteen cases of vibriosis reported in Montana in 2018, compared to eight in 2017. Of the 2018 cases, ten ate raw oysters and one travelled outside of Montana.

FIGURE 6: SOME ENTERIC DISEASES ARE MORE COMMON DURING CERTAIN MONTHS OF THE YEAR





TYPHOID FEVER

Typhoid fever is a serious disease caused by *Salmonella* serotype Typhi. Most cases of typhoid fever in the United States become infected through international travel. Montana has an average of less than one case per year. In 2018, there was one reported case of typhoid fever, in a child less than 18 years old with travel to Pakistan, where there is an ongoing outbreak of typhoid fever.

LISTERIOSIS

Listeriosis is a serious bacterial infection 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 no cases of listeriosis reported in 2018.

BOTULISM

Botulism is a rare but serious illness caused by a toxin produced by *Clostridium botulinum*. The toxin attacks the body's nerves and causes difficulty breathing, muscle paralysis, and sometimes death. In Montana, an average of less than one case is reported per year. In 2018, no cases of botulism were reported.

ENTERIC OUTBREAKS

There were 31 Montana-specific enteric illness outbreaks in 2018 that sickened 602 people, including one hospitalization and no deaths.

Of the 31 enteric outbreaks, 20 (65%) had at least one confirmatory laboratory specimen submitted for testing. Of the 20 outbreaks with a confirmed specimen, 16 (80%) were caused by norovirus. Norovirus is the most common pathogen in enteric outbreaks. While it is not reportable in Montana at an individual case level, outbreaks of norovirus are. The remaining four enteric outbreaks were caused by *Salmonella* (2), *Cyclospora*, and Shiga toxin-producing *E. coli* O157:H7.

In addition, 30 Montanans were linked to multi-state outbreaks connected to contaminated food items. This is the highest number of illnesses linked to multi-state foodborne events on record. There were eight hospitalizations associated with these outbreaks. An additional three salmonellosis cases were linked to a multistate outbreak with exposure to live poultry.

The majority of enteric outbreaks (55%) occurred at long-term care settings. Other noteworthy settings include schools and daycares (13%), events such as weddings (10%), hospitals (6.5%), and restaurants (6.5%). The majority (81%) 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 (HIB), hepatitis B, measles, meningococcal disease, mumps, pertussis, polio, rubella, tetanus, varicella, and yellow fever.⁴ Many of these conditions are rarely reported in Montana (see Appendix I). On average, VPD comprise approximately 4-7% of reportable disease cases in Montana. In 2018, the most frequently reported vaccine preventable diseases in Montana were pertussis and varicella (chickenpox).

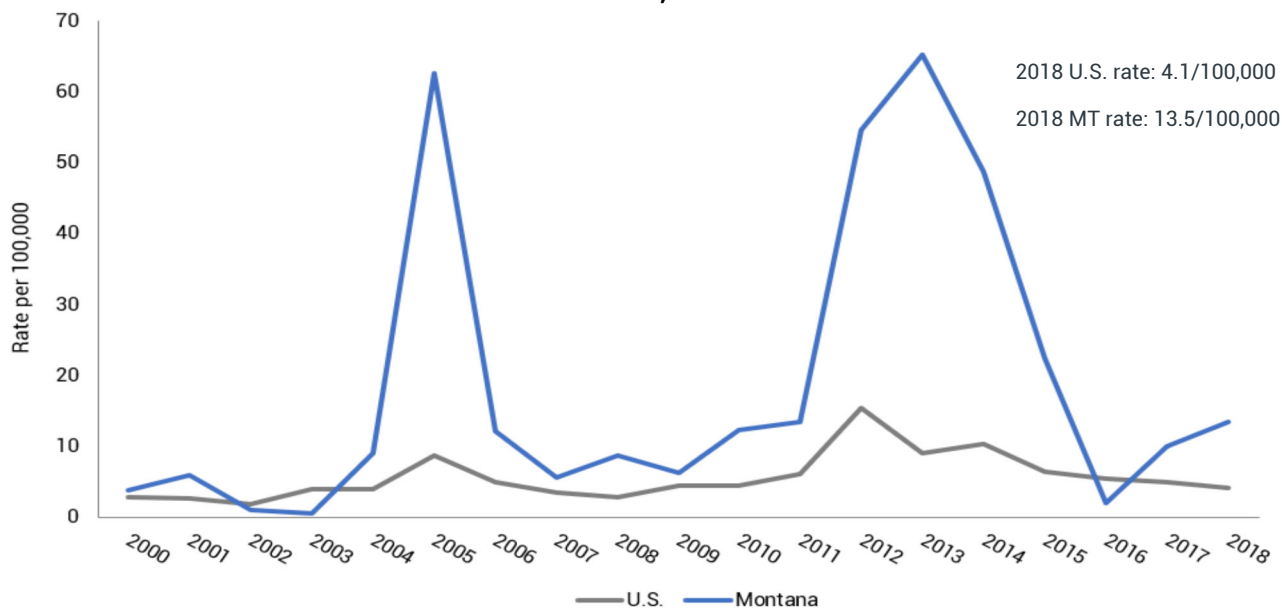


PERTUSSIS

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 8). 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 noted in 2017 and 2018 with 106 and 143 cases, respectively. Most of the increase was attributed to localized outbreaks. The median age of cases was 13 years (range: 1 month – 89 years). Two individuals, both children <18 years, were hospitalized. Of those <18 years with documented immunization status (n=106), 75% had a history of pertussis containing vaccine, however, only 56% were vaccinated appropriately for age.

FIGURE 8. REPORTED PERTUSSIS CASES – MONTANA, 2000-2018



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 57 cases in 2018, largely due to the implementation of varicella vaccination (Figure 9A). Of these, 15% were children less than one year of age who were too young to receive vaccine. The median age of cases was five years (range: 5 months – 52 years). Of the pediatric cases eligible for vaccine who were evaluated for immunization status (n=51), 5% 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, one to three cases are reported per year in Montana and typically are associated with international travel. However, in recent years numbers have been increasing in the United States and have been associated with several outbreaks on college campuses. An increase has been noted in Montana as well, with 26 cases reported linked to an outbreak in 2016 and six cases reported during each of the past two years, although most were in non college-aged individuals (Figure 9B). In 2018, six cases were reported all from one county. The median age of cases was 11 years. Risk factors included out-of-country travel and having contact to a known case. One third of the mumps cases reported in 2018 were up to date with MMR vaccination.

FIGURE 9A . REPORTED VARICELLA CASES – MONTANA, 2007–2018

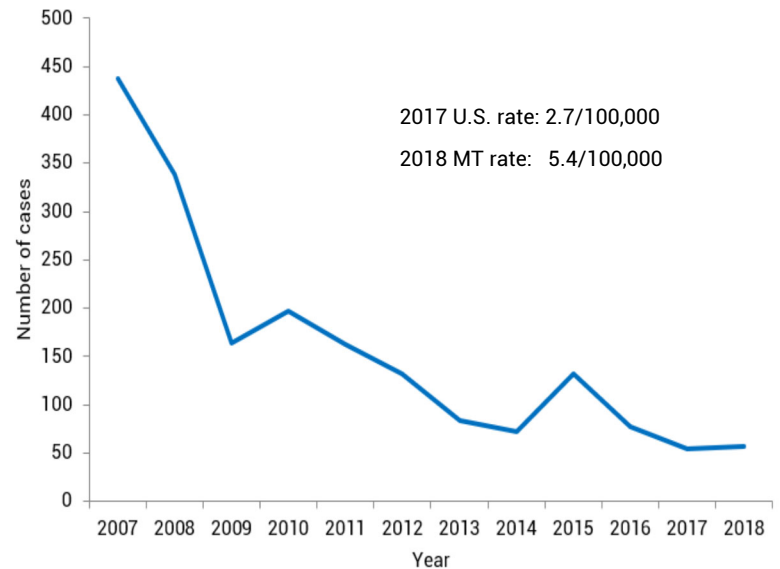
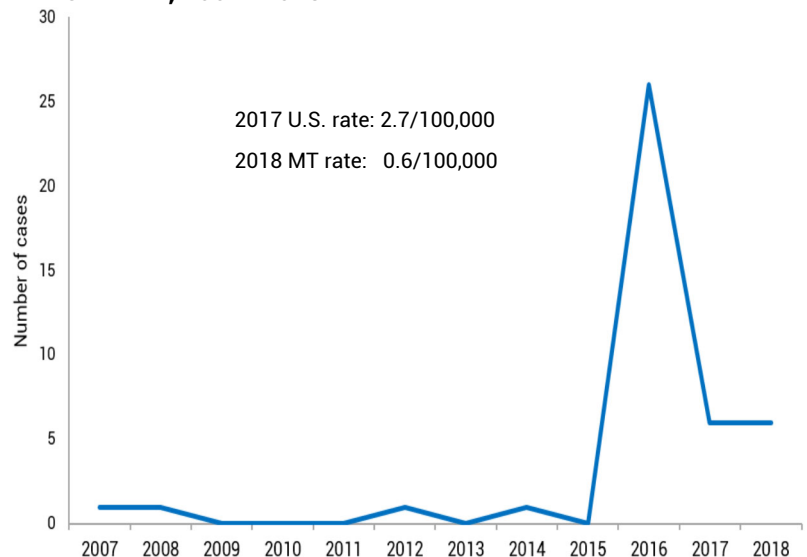


FIGURE 9B. REPORTED MUMPS CASES – MONTANA, 2007–2018



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 past three influenza seasons have varied in terms of onset, peak activity, and duration (Figure 10). Reports of influenza activity began in October 2018. By late December, activity had increased to seasonal levels across the state as well as nationwide. Peak activity occurred during mid-February. Season totals include 13,576 cases, 767 hospitalizations, and 38 deaths attributed to influenza. Thirty-three influenza outbreaks were reported; long-term care facilities were the most common setting. Cases were reported from all but one county in Montana (Treasure), and only three counties reported five or fewer influenza cases for the entire season (range: 5–1,931).

Influenza type A was the predominant virus identified in individuals hospitalized for influenza (92%). The cumulative influenza-related hospitalization rate in Montana (frequency of cases during the influenza season) was 74.1 per 100,000 population. The majority of Montanans who were hospitalized due to influenza were aged ≥65 years. The most common comorbidities

of individuals hospitalized for influenza were cardiovascular disease, chronic lung conditions, and metabolic conditions such as diabetes. Of the 38 influenza-related deaths reported, 11 (29%) occurred among adults aged <65 years. One pediatric death (aged 0–17 years) was reported during the 2018–2019 season.

Of those hospitalized for influenza with documented immunization status (n=742), 45% received a seasonal influenza vaccine. Of those with at least one identified underlying risk factor, only 20% of children and half of adults received a vaccine (Figure 11). Vaccine efficacy (VE) of the 2018-19 influenza vaccine was 29%³

FIGURE 11. INFLUENZA VACCINATION STATUS OF HOSPITALIZED CHILDREN AND ADULTS WITH AT LEAST ONE RISK FACTOR – MONTANA, 2018-2019 SEASON

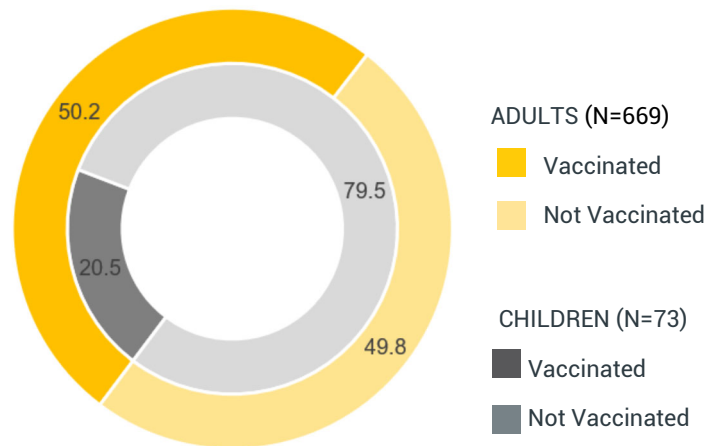
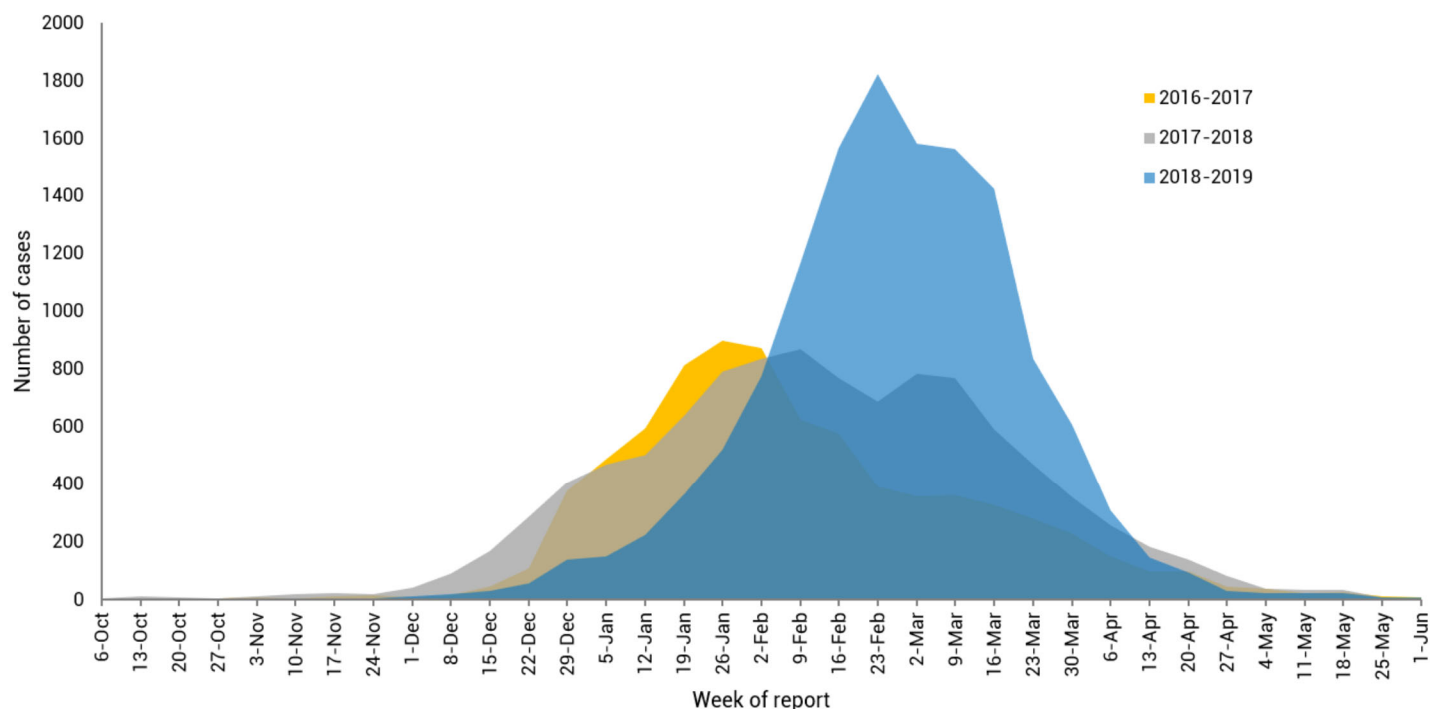
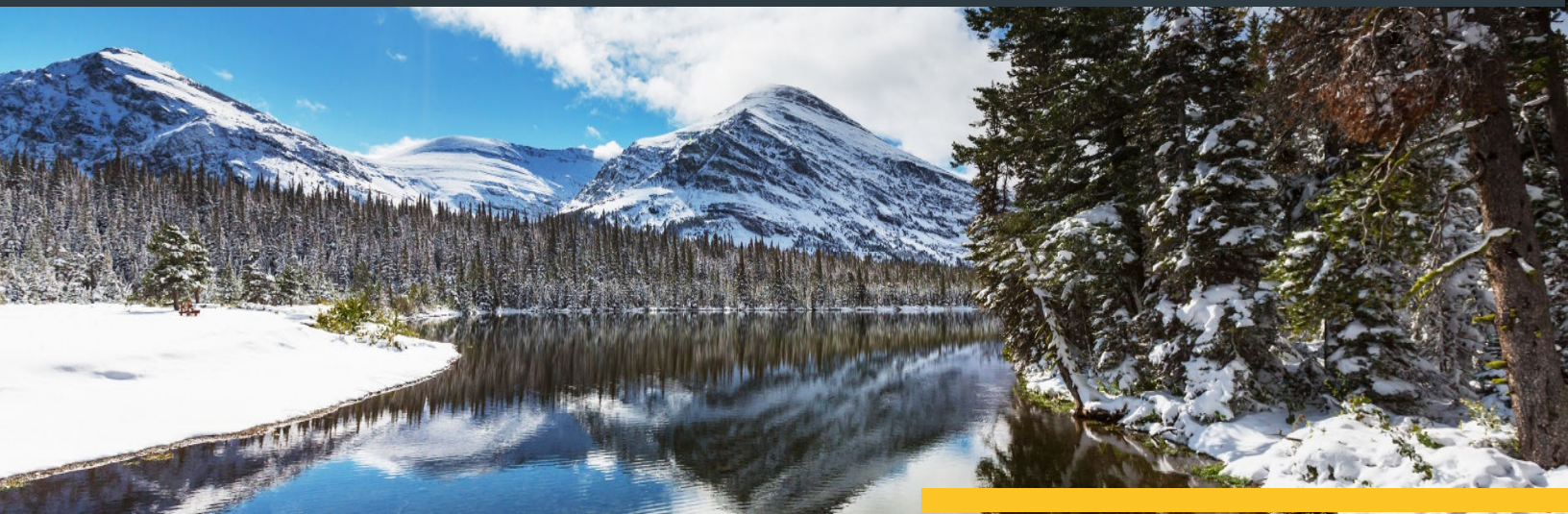


FIGURE 10. COMPARISON OF INFLUENZA SEASONS – MONTANA, 2016-2017, 2017-2018, 2018-2019 SEASONS





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.

HAEMOPHILUS INFLUENZAE

Seventeen cases of *Haemophilus influenzae* were reported (1.6 per 100,000 population) in 2018. Twelve percent of cases occurred in children aged less than five years. The most common serotype identified was 'nontypeable' (these strains do not produce a polysaccharide capsule). In addition, three cases of invasive *H. influenzae* type B (HIB), the type that is vaccine preventable, were reported in one child and two adults. The child was not up to date for age with HIB vaccine.

STREPTOCOCCUS PNEUMONIAE

Pneumococcal disease is an invasive infection caused by *Streptococcus pneumoniae* bacteria. Certain serotypes of *S. pneumoniae* are vaccine preventable. In 2018, 121 cases (11.4 per 100,000 population) of invasive *Streptococcus pneumoniae* were reported in Montana. The median age of patients was 58 years (range: 2 months – 97 years).

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*; five cause the most disease worldwide (A, B, C, W, Y). The most common serotypes isolated in the United States are B, C, and Y. Vaccines to protect against these serotypes are available. In 2018, zero cases of meningococcal disease were reported.

OTHER INVASIVE DISEASES

Streptococcal toxic shock syndrome (STSS) is an invasive bacterial disease caused by group A *Streptococcus*. This syndrome can develop in up to one third of invasive group A *Streptococcus* infections, and it causes multiple organs to fail which may result in death in approximately 50% of cases. Two cases of streptococcal toxic shock syndrome were reported in 2018.

Sexually Transmitted Diseases

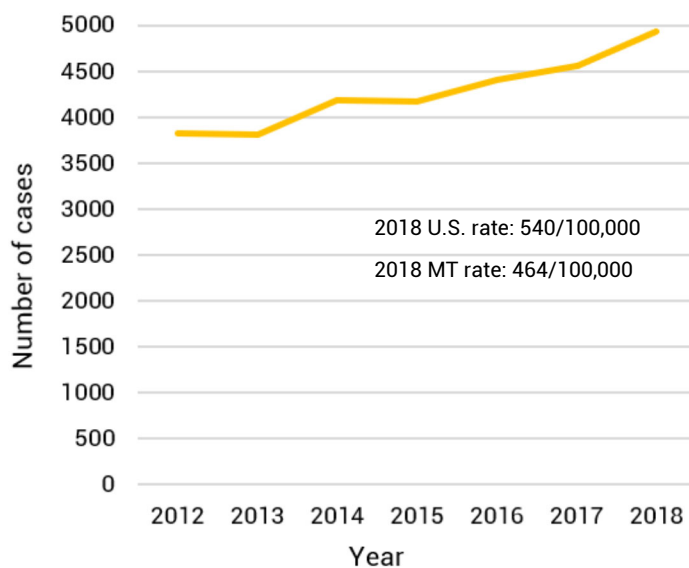


Sexually transmitted diseases (STD) continue to be the most frequently reported communicable disease in Montana. Approximately 4,900 cases of chlamydia alone were reported in 2018. All but four Montana counties reported at least one STD case.

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 HIV⁵.

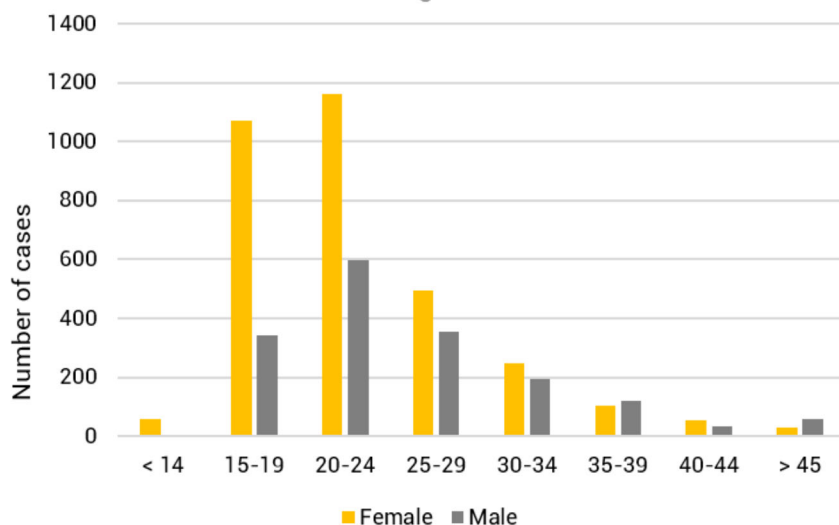
FIGURE 12. CHLAMYDIA CASES – MONTANA, 2012-2018



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 2012, case rates have increased in Montana (Figure 12). In 2018, 3,229 chlamydia cases (65%) were reported in females. The greater proportion of cases among females may be attributed to screening recommendations, 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 13).

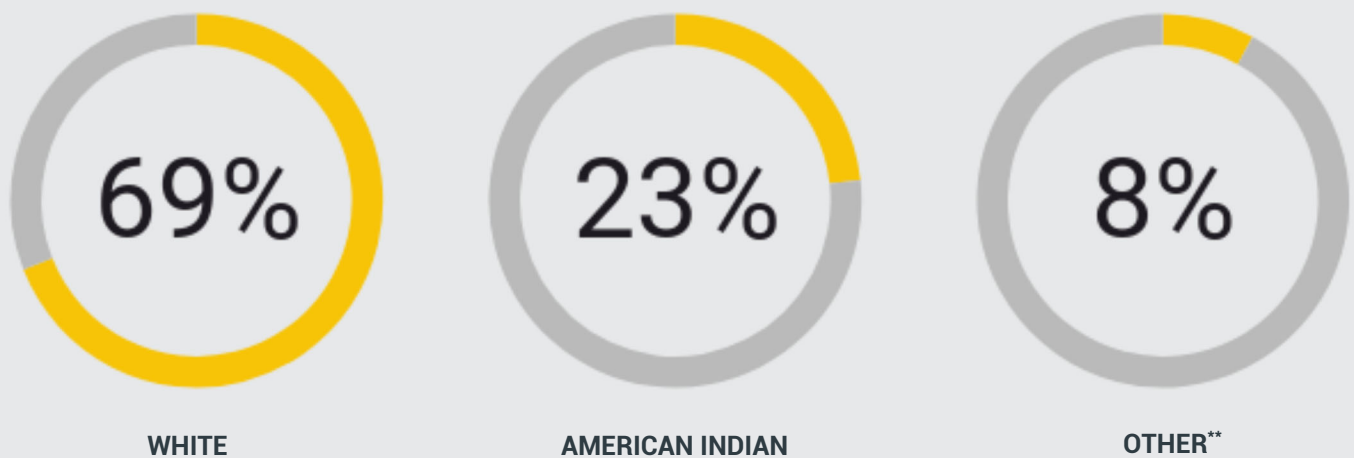
FIGURE 13. CHLAMYDIA CASES BY SEX AND AGE – MONTANA 2018





American Indians are disproportionately infected by chlamydia making up 23% of the cases while comprising 6.6% of the Montana population (Figure 14). 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. However, the specific magnitude of the contribution has not been measured. In addition, increased screening and efforts to identify and test contacts can lead to increased case finding.

FIGURE 14. CHLAMYDIA CASES BY RACE* – MONTANA, 2018



* 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* and is the second most commonly reported STD in Montana and the United States. Urethral infections caused by gonorrhea among men can produce symptoms that cause them to seek treatment soon enough to prevent sequelae, but often not soon enough to prevent transmission to others. Among women, infections are commonly asymptomatic or might not produce recognizable symptoms until complications (e.g., pelvic inflammatory disease [PID]) have occurred. PID can result in tubal scarring that can lead to infertility and ectopic pregnancy. In addition, epidemiologic and biologic studies provide strong evidence that gonococcal infections facilitate the transmission of HIV⁵.

In 2018, 1,176 gonorrhea cases were reported to DPHHS. The incidence rate of gonorrhea in Montana was stable until 2012, when the rate steadily

FIGURE 15. GONORRHEA CASES – MONTANA, 2012-2018

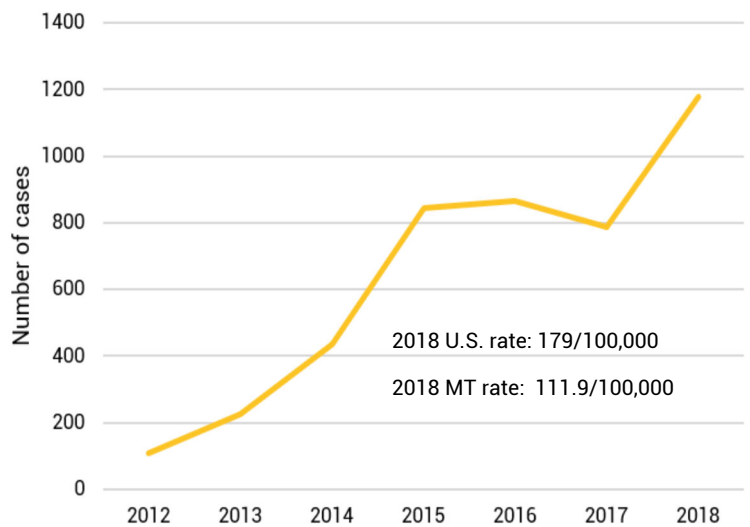
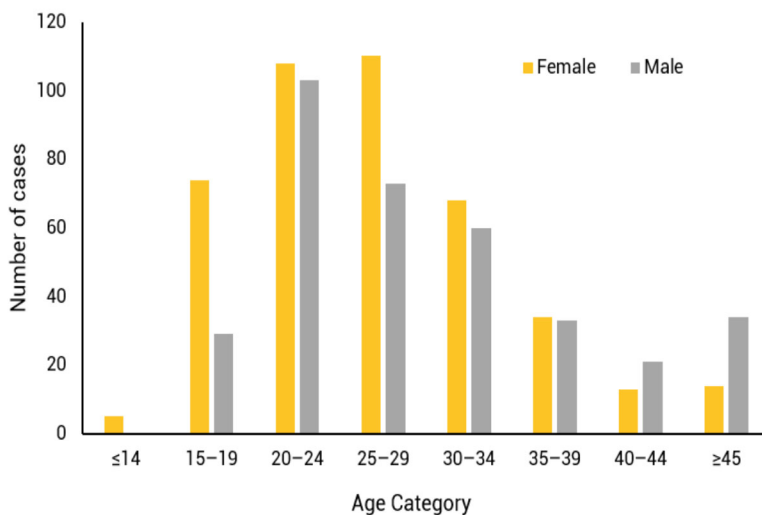


FIGURE 16. GONORRHEA CASES BY SEX AND AGE – MONTANA, 2012-2018

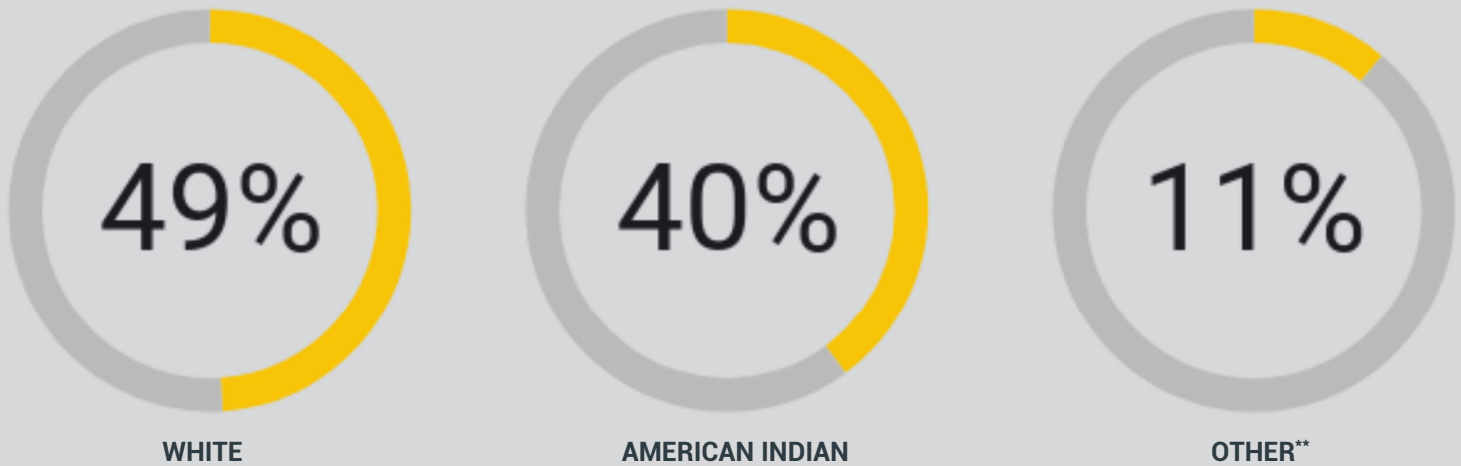


increased from 10.7 to 81.9 per 100,000 in 2015 (Figure 15). After the number of cases leveled off between 2015 and 2017, the number of reported cases increased by 50% in 2018. The increase in the number of gonorrhea cases in Montana mirrors national STD trends and the 2018 Montana rate of 111.9 per 100,000 remains lower than the 2018 US rate of 179 per 100,000.

Figure 16 displays the distribution of cases by sex and age group. 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. In all age groups, 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.

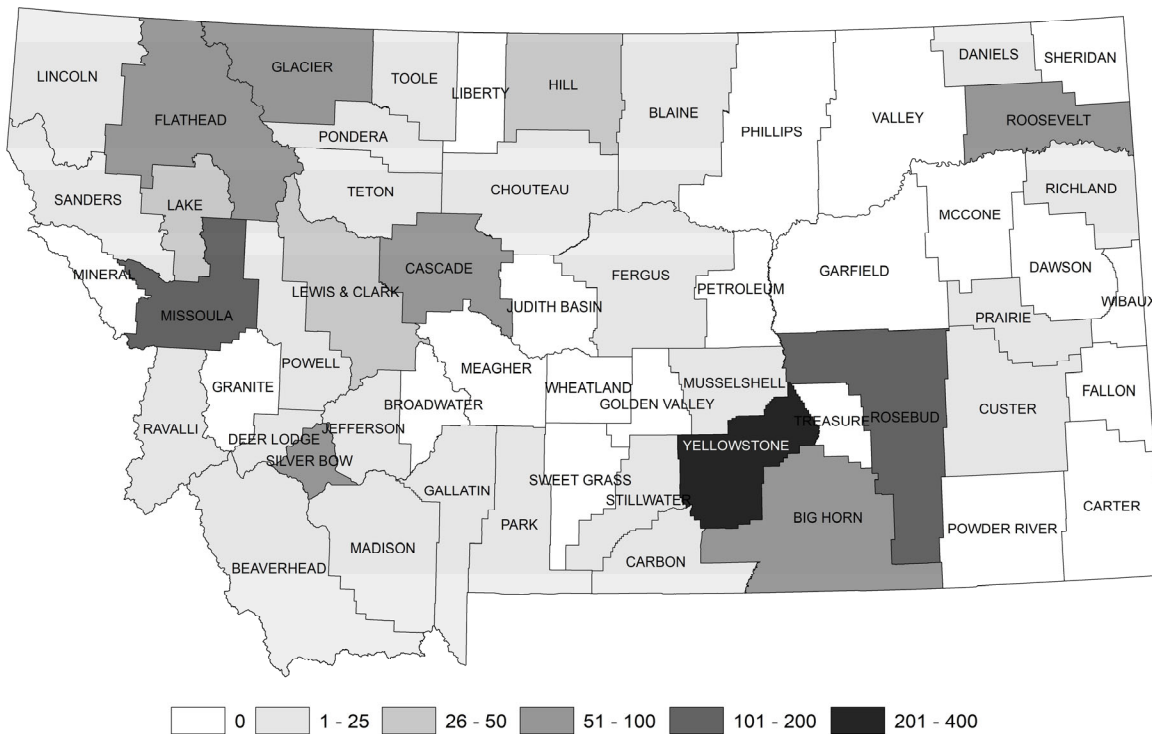
American Indians are disproportionately infected by gonorrhea making up 40% of the cases while comprising 6.6% of the Montana population (Figure 17). Broader STD screening efforts among American Indians seeking services at Indian Health Services (IHS) and tribal clinics may contribute to the higher incidence rate in this population. However, the specific magnitude of the contribution has not been measured. In addition, increased screening and efforts to identify and test contacts can lead to increased case finding.

FIGURE 17. GONORRHEA CASES BY RACE* – MONTANA, 2018



* 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

FIGURE 18. GONORRHEA CASES BY COUNTY – MONTANA, 2018



The map in Figure 18 shows the geographic distribution of gonorrhea cases in Montana reported in 2018. Gonorrhea cases are not evenly distributed among Montana's counties. Yellowstone (33%), Rosebud (10%) and Missoula (9%) counties accounted for more than half of all cases during 2018.

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.

Syphilis is 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. Syphilis rates in Montana increased beginning in 2015, and the number of primary and secondary syphilis (P&S) reached a peak in 2017 with 48 cases reported to DPHHS. This upward trend did not continue during 2018 when 45 cases of P&S syphilis were reported (Figure 19).

In 2018 the percent of reported P&S syphilis cases among men in Montana was much higher than that of women (Table 2). Similar to national trends, Montana data show that men who have sex with men (MSM) continue to account for the majority of P&S syphilis cases.

FIGURE 19. PRIMARY AND SECONDARY SYPHILIS CASE RATE – MONTANA, 2010–2018

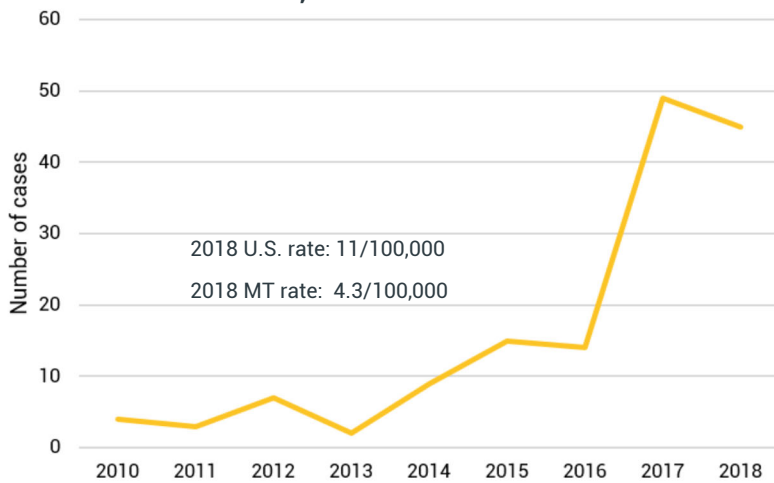


FIGURE 20. PRIMARY AND SECONDARY SYPHILIS CASE RATE – MONTANA, 2010–2018



*Yellowstone, Missoula, and Gallatin

TABLE 2. NEWLY DIAGNOSED SYPHILIS* BY SELECT CHARACTERISTICS (N=45) – MONTANA, 2018

Characteristics	Number
Sex	
Male	35
Female	10
Age at diagnosis (years)	
≤19	5
20–24	7
25–29	6
30–34	11
35–39	7
40–45	1
45+	8
Ethnicity, race	
Non-Hispanic, white	33
American Indian	3
Unknown	2
Non-Hispanic, other	7

*primary and secondary cases

HIV/AIDS

HIV (human immunodeficiency virus) is spread through certain body fluids and 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 lessen the chance of transmission to others. Left untreated, opportunistic infections or cancers take advantage of a weakened immune system and signal that the person has Acquired Immune Deficiency Syndrome (AIDS).

In 2018, 24 newly diagnosed HIV cases were reported in Montana. Six 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. The linear trend line in Figure 21 shows that the rate of new cases has remained stable during this time. More than 70% of new cases were reported from Yellowstone, Missoula, Cascade, Gallatin, and Flathead counties.

The leading transmission categories are male-to-male sexual contact (MSM) and injecting drug use (IDU) (Table 3). When comparing the five-year average with 2018, there has been an increase in injecting drug use as a risk factor in both the MSM and the heterosexual population.

FIGURE 21. REPORTED NEWLY DIAGNOSED HIV CASES PER 100,000 – MONTANA, 2008–2018

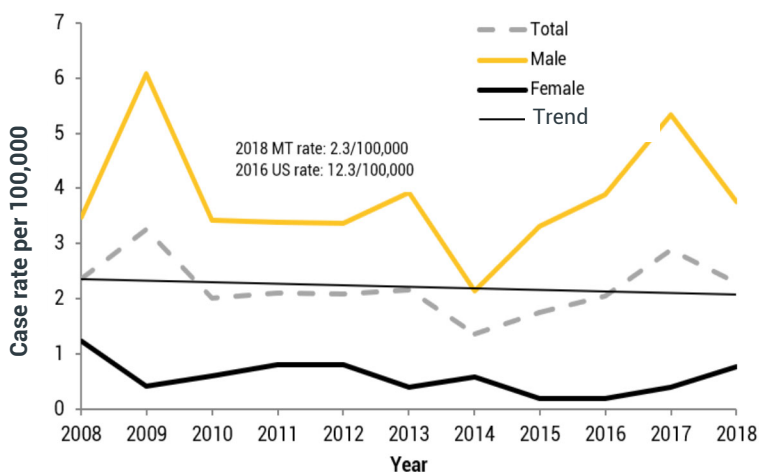


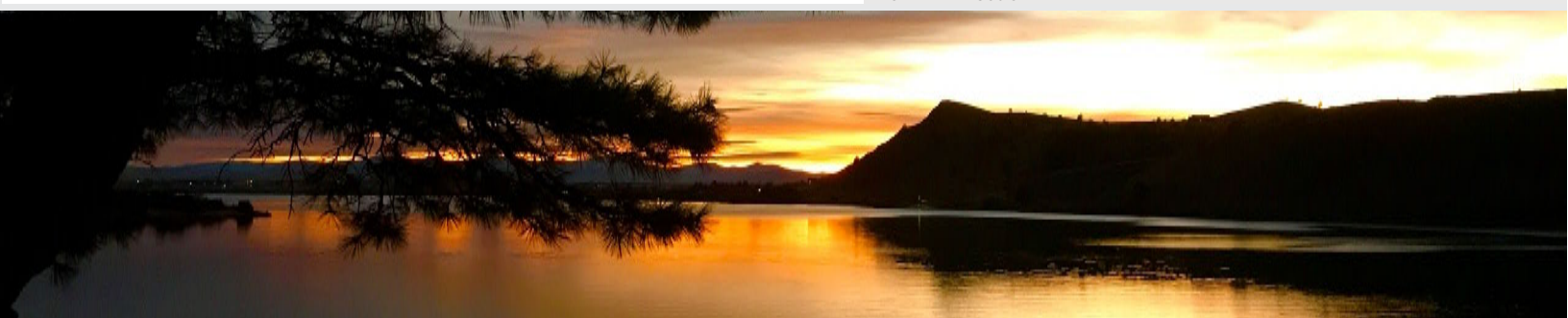
TABLE 3. PERSONS NEWLY DIAGNOSED WITH HIV BY SELECT CHARACTERISTICS (N=24) – MONTANA, 2018

Characteristics	
Male	20
Female	4
Age at diagnosis (years)	
≤14	0
15-24	3
25-34	11
35-44	7
45-54	0
≥55	3
Ethnicity, race	
Non-Hispanic, white	16
Non-Hispanic, American Indian	3
Non-Hispanic, other*	2
Hispanic, any race	3
Transmission category by sex[†]	
Male Only	
Male sexual contact with another male (MSM)	12
Injection drug use (IDU)	0
MSM & IDU	5
Heterosexual contact [‡]	2
No identified risk	1
Female Only	
Injection drug use (IDU)	2
Heterosexual contact	1
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 disease is transmitted from person to person. The bacteria usually infect the lungs, but can also infect other parts of the body such as the kidney, spine, and brain. Not everyone infected with TB bacteria becomes sick. As a result, two TB related conditions exist: latent TB infection (LTBI) and TB disease. Without treatment, about 10% of persons with normal immune systems infected with TB 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 22) since 1990. During the 1990s, an average of 19.9 cases was reported each year. From 2000–2009, an average of 12.6 cases per year was reported (range: 7–21 cases per year). During 2010–2018, an average of 5.8 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 2.8 cases per year since 2010. However, in 2018, three cases of TB in American Indians were reported after none were reported in the previous two years. Annual cases of TB among foreign born persons has decreased remarkably from an average of 2.3 cases during 2000–2009 to 0.4 cases during 2010–2018.

Five cases of active TB were reported in Montana in 2018 (Table 4). Counties of residence included Rosebud, Flathead, Missoula, Glacier, and Roosevelt. The 2018 Montana TB incidence rate was 0.5 cases per 100,000 population, significantly lower than the 2018 U.S. case rate of 2.8 per 100,000 (Figure 23).

All the cases reported in 2018 were U.S. born. Risk factors of note for these cases included: conversion from latent TB infection (LTBI) to active disease, extended travel outside of the U.S. to TB endemic countries, and receipt of a diseased organ from a transplant. Four of the five cases had pulmonary/pleural disease. One had extrapulmonary ocular TB disease.

Since 2000, 7.9% of the total TB cases reported in

FIGURE 22. REPORTED ACTIVE TUBERCULOSIS CASES BY RACE – MONTANA, 1990–2018

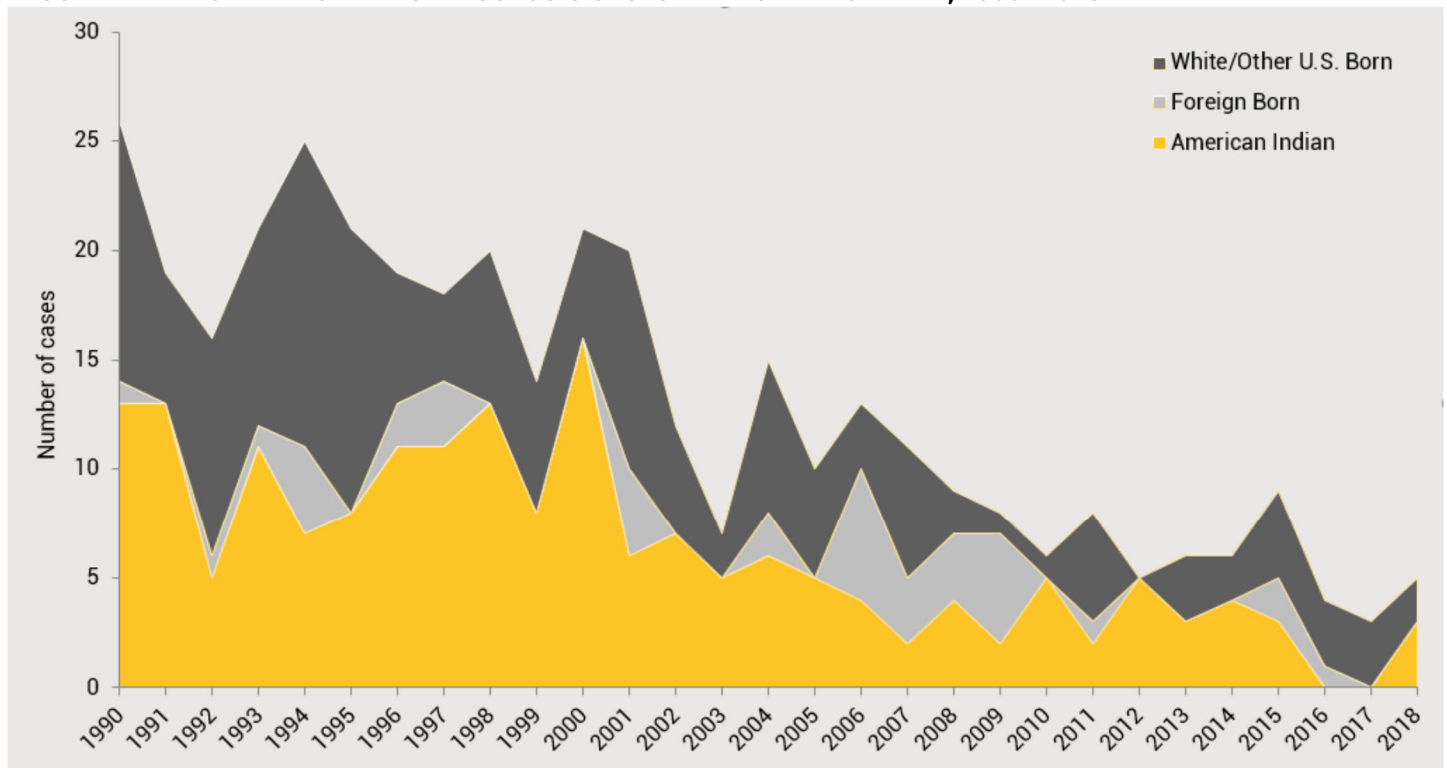
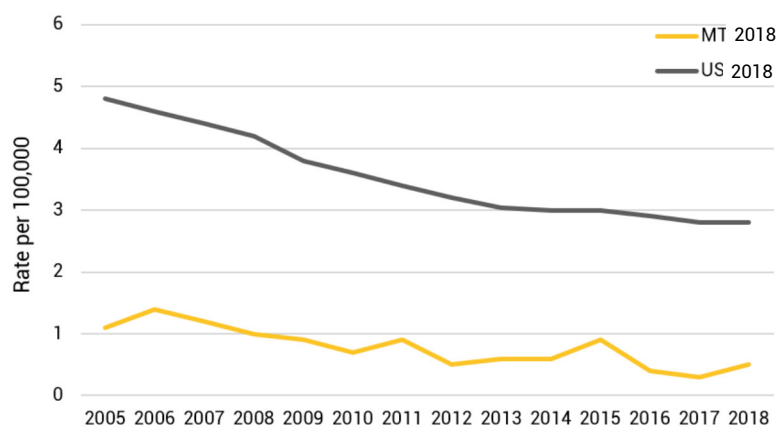
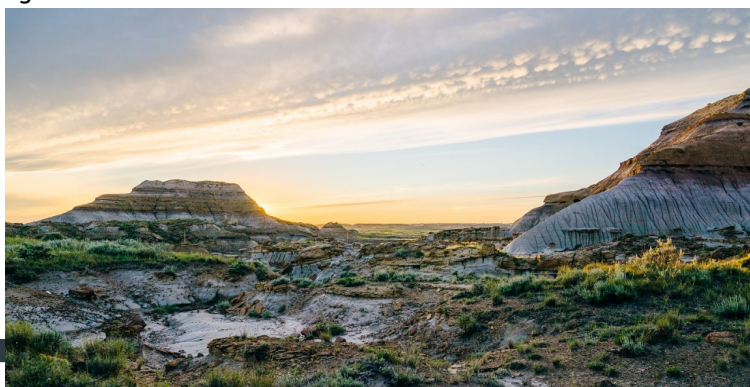


FIGURE 23. TUBERCULOSIS INCIDENCE RATE – MONTANA AND UNITED STATES, 2005–2018

Montana had single resistance to Isoniazid (INH) and 1.7% (3 cases) were multi-drug resistant tuberculosis (MDR-TB). All cases were managed using directly observed therapy (DOT). None of the 2018 cases were drug-resistant TB; however, samples were never collected on the ocular patient due to the invasive nature of the specimen collection. All cases responded to and completed tuberculosis treatment within 12 months of its initiation. One case required a very comprehensive contact investigation. The local health department responded quickly, effectively, and managed the case with all its complexity in a manner that was exceptional.

Six pediatric cases (aged <15 years) have been reported since 2000; none were reported in 2018. 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 LTBI and active disease, and an effective vaccine are critical for achieving national and global TB elimination.

**TABLE 4. TUBERCULOSIS CASE SUMMARY—MONTANA, 2018**

Characteristics	
New TB Cases	5
Incidence Rates (per 100,000)	
Montana	0.5
Sex	
Male	4
Female	1
Age at diagnosis (years)	
<5	0
5-14	0
15-24	1
25-44	1
45-64	2
≥65	1
Ethnicity, race	
Non-Hispanic, White	2
Non-Hispanic, American Indian	3
Non-Hispanic, Other	0
Site of Disease	
Pulmonary/Pleural	4
Extrapulmonary only	1
Pulmonary & Extrapulmonary	0
Drug Resistance	
No resistance	5
Isoniazid resistance	0
Multiple-drug resistance	0
Country of Origin	
U.S. born	5
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. Complications 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 2018, no new cases of HAV were reported in Montana.

HEPATITIS B

Hepatitis B is a liver infection caused by the hepatitis B virus (HBV). Hepatitis B is transmitted when blood,



semen, or another body fluid from a person infected with the virus enters the body of someone who is not infected. This can happen through sexual contact, injection drug use (IDU), or from mother to baby at birth. For some, HBV is an acute, or short-term, illness but for others, it can become a long-term, chronic infection. Chronic hepatitis B can lead to serious health issues, including cirrhosis or liver cancer. HBV infections have decreased significantly over time with increased use of an effective vaccine. In 2018, 20 chronic HBV infections were reported in Montana. It's possible that some of these cases may have had the disease for years but were only recently identified. The median age was 39 years and 50% of cases were female. Only one acute HBV case, indicating recent infection, was reported in Montana, in an adult male >18 years.

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), and is spread primarily through contact with blood of an infected person. Like HBV, HCV can be either acute or chronic. Chronic HCV infection can last a lifetime and lead to serious liver problems, including cirrhosis or liver cancer.

In 2018, 1,530 cases of chronic HCV were reported to DPHHS (Table 5, Figure 25). Not all cases were newly acquired; some may have been infected years ago. The incidence rate of chronic HCV infections in Montana between 2013 and 2018 is shown in Figure 24. It should be noted that an increased screening efforts may lead to an increased number of HCV cases being diagnosed.

FIGURE 24. INCIDENCE RATE OF CHRONIC HEPATITIS C (HCV) INFECTIONS – MONTANA, 2018

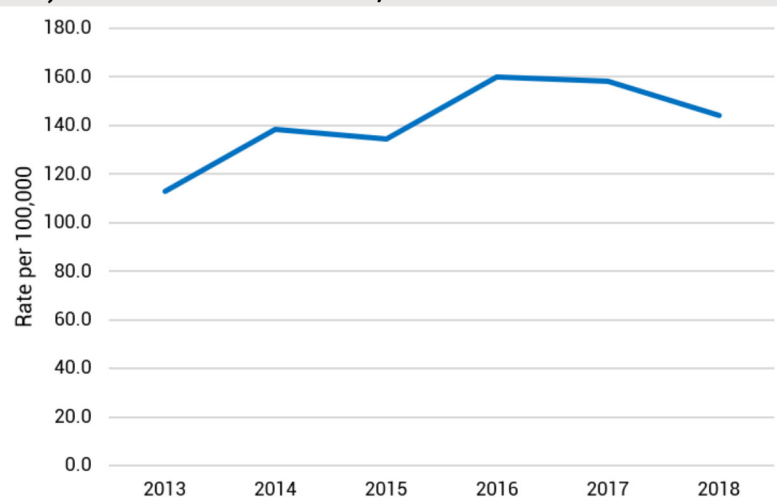


FIGURE 25. NEWLY REPORTED CHRONIC HEPATITIS C INFECTIONS BY AGE GROUP – MONTANA, 2018

Two age groups are at a higher risk of having hepatitis C: the baby boomer generation (birth between 1945-1965) due to lack of blood screening prior to 1992 and individuals <35 who share needles to inject drugs. Nationwide, 75% of new cases of hepatitis C is among individuals who inject drugs.

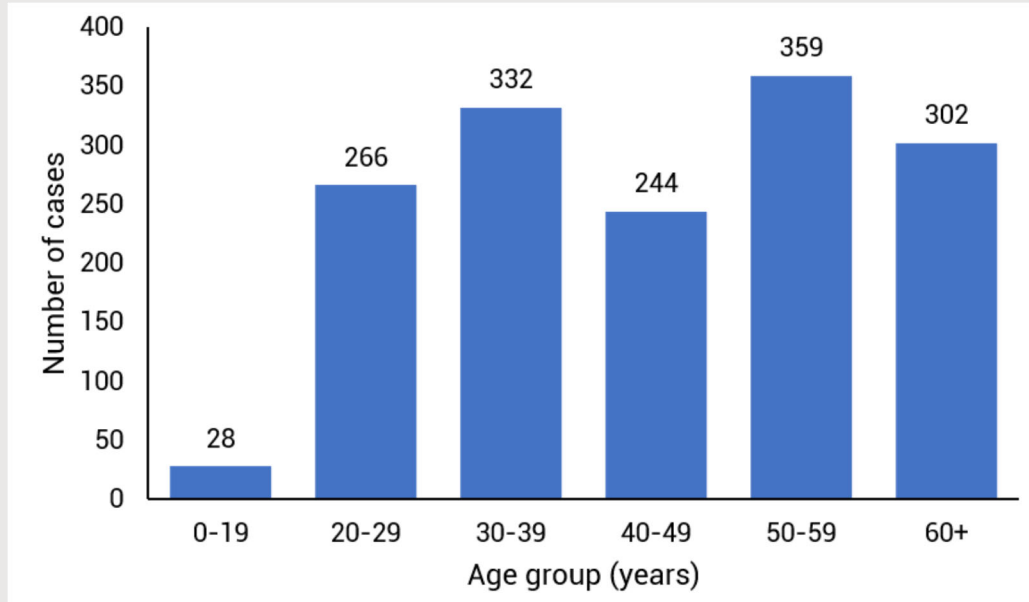


TABLE 5. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH CHRONIC HEPATITIS C – MONTANA, 2018 (N=1,530)

	SEX		RACE		
Male	911	59.5%	White	1046	68.5%
Female	615	40%	American Indian	370	24%
Unknown	4	<1%	Other/Unknown	114	7.5%

Acute hepatitis C is a short-term viral infection caused by the hepatitis C virus. People with acute HCV carry the infection for a small window of time, often just several months. Most people with the acute form of HCV 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 HCV are often not detected. It leads to chronic infection in 75 to 80% of cases.

An average of 16 cases (1.5 per 100,000) of acute HCV cases are reported to DPHHS each year (Figure 26). Thirteen cases were reported in 2018 (Table 6). The most common risk factor identified was IDU.

FIGURE 26. ACUTE HEPATITIS C INFECTIONS – MONTANA, 2013-2018

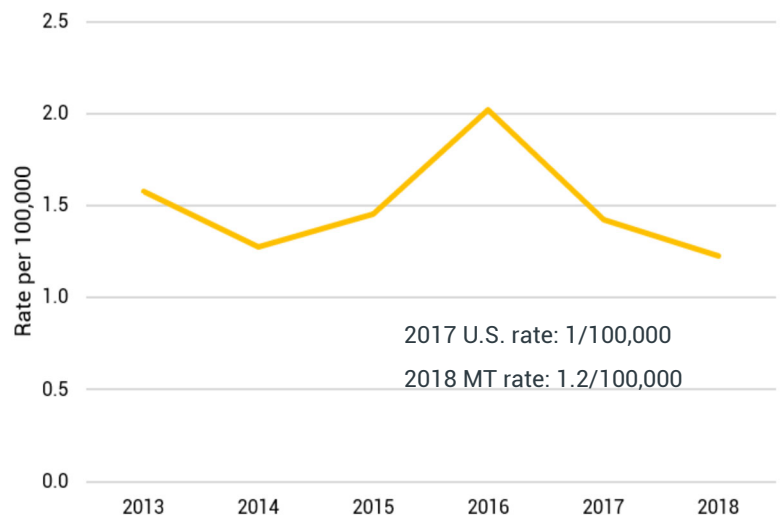


TABLE 6. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH ACUTE HCV, MONTANA 2018 (N=13)

	SEX		RACE		
Male	8	62%	White	9	69%
Female	5	38%	American Indian	4	31%

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.

In 2018, 15 bats, one skunk, and one cat out of 504 animals tested positive for the rabies virus (Figure 28) at the Montana Veterinary Diagnostic Laboratory. Ten of the positive animals were associated with potential human exposure. The last cases of human rabies in Montana were reported in 1996 and 1997, both of which were associated with bat exposures. Rabies in humans is preventable through prompt and appropriate medical care and use of post-exposure prophylaxis (PEP). In 2018, 223 individuals received the recommendation to pursue PEP to prevent disease after exposure to an animal that is capable of transmitting rabies (Figure 27). PEP was administered to 15 individuals without a public health recommendation.



FIGURE 27. TYPES OF EXPOSURES THAT LED TO PEP RECOMMENDATIONS -- MONTANA, 2018

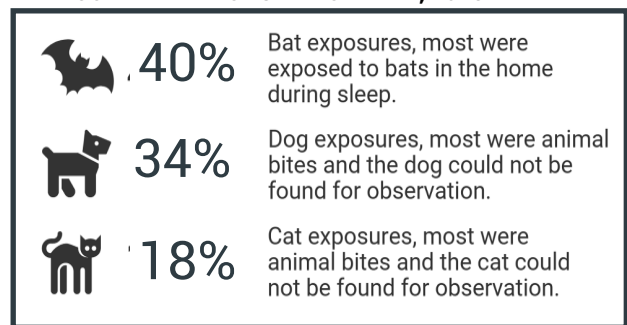
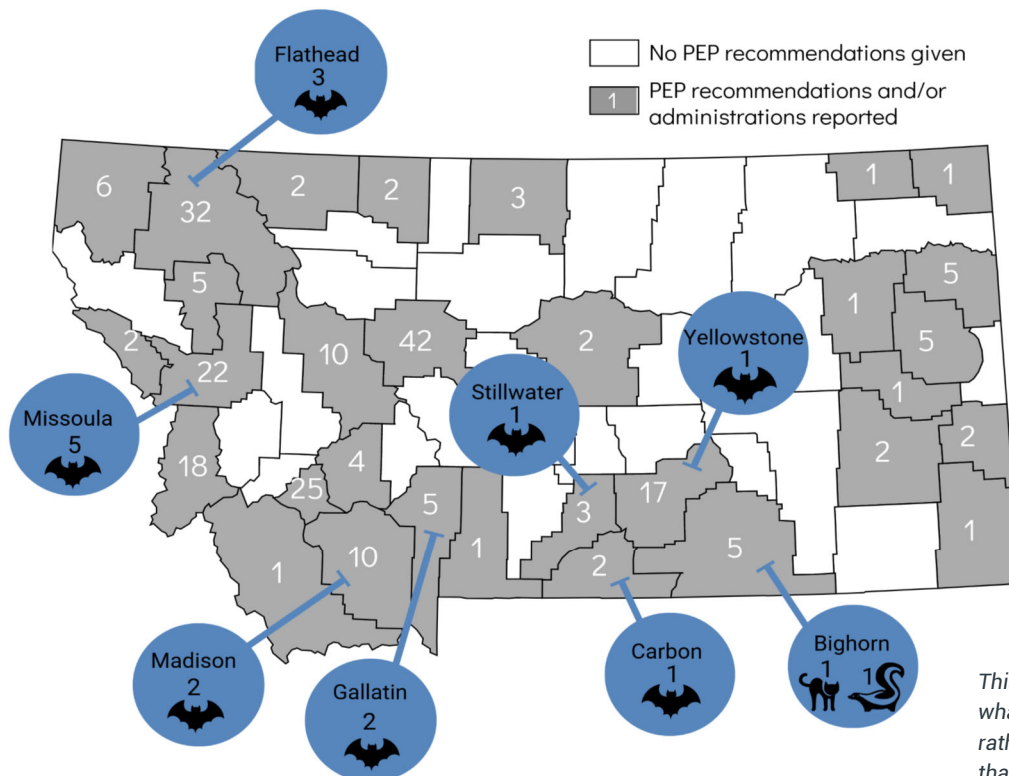


FIGURE 28. ANIMALS THAT TESTED POSITIVE FOR RABIES VIRUS – MONTANA, 2018



In 2018, rabies post-exposure prophylaxis (PEP) was recommended by public health in 32 local health jurisdictions to 238 individuals

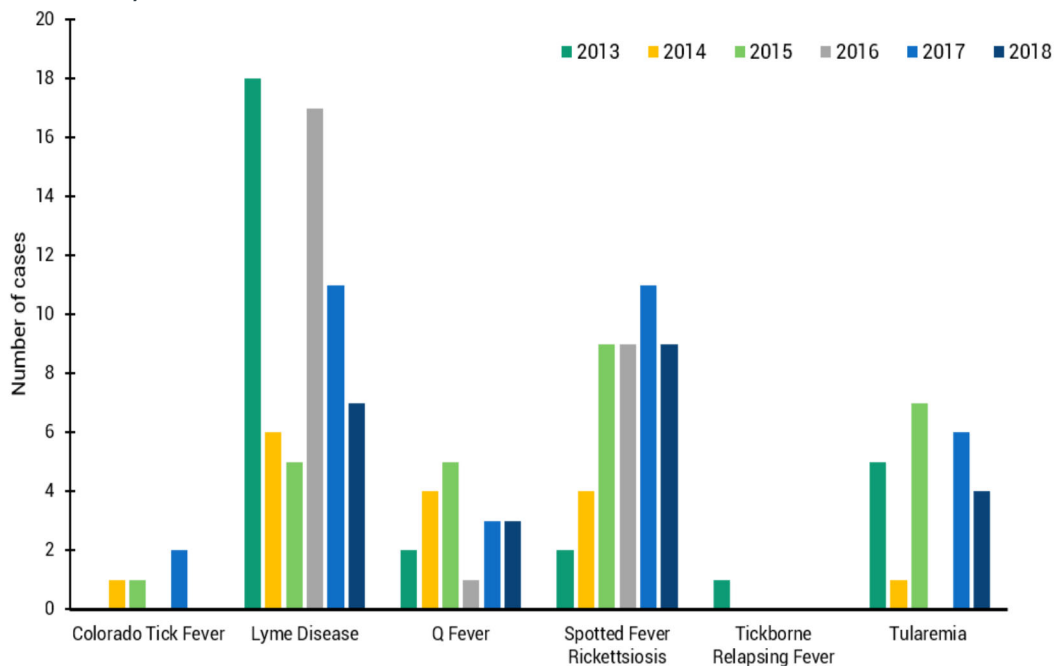
This map reflects positive animals based on what was found and tested across the state, rather than a systematic survey. It is assumed that the potential for rabid bats exists all over Montana.



TICKBORNE DISEASES

Pathogens present in Montana and that can be transmitted to humans by ticks include those that cause Colorado tick fever virus (*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 29. In general, 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, but in 2018, it was the most commonly reported tickborne illness.

FIGURE 29. REPORTED CASES OF TICKBORNE DISEASES – MONTANA, 2013–2018



*Almost all Lyme disease cases are acquired outside of Montana

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 2018, there were four cases of tularemia and three cases of Q fever (3 acute; 0 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 of the bacteria could occur.

OTHER VECTORBORNE DISEASES

There were several travel-associated vectorborne diseases reported in Montana in 2018. These diseases include Anaplasmosis (1) and Malaria (3). Before traveling, Montanans should plan to limit exposure to mosquitoes and ticks and get appropriate vaccines or prophylaxis to prevent vectorborne diseases.

WEST NILE VIRUS

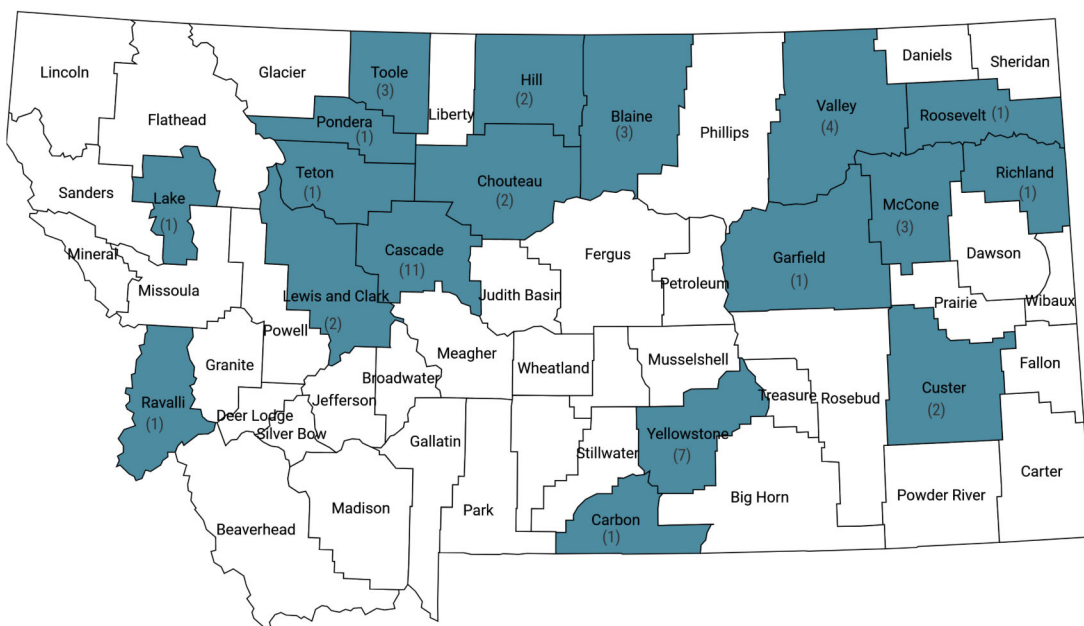
West Nile virus (WNV) is an arbovirus that is transmitted by infected mosquitoes throughout the United States. The majority of persons infected with WNV do not exhibit symptoms. Less than one percent of infected persons develop West Nile neuroinvasive disease (WNND), a serious and potentially life-threatening condition. In 2018, a total of 18 counties reported at least one human case of WNV (Figure 30). 47 human cases of WNV were reported, plus four viremic blood donors. Of those, 25 were WNND, all of which were hospitalized. One death was reported in 2018. Twenty-three percent (11) of the cases were in individuals aged 60-69 years of age. Other age groups

affected included those 20-29 (3), 30-39 (5), 40-49 (8), 50-59 (7), 70-79 (8), 80-89 (5) years.

Since the introduction of WNV into Montana in 2002, the number of cases in Montana has varied from year to year. Ten of the 17 years of WNV surveillance had fewer than 20 annual cases (range 0–11). Four years had between 26 and 51 (2005, 2006, 2013, 2018) and two years (2003 and 2007) had over 200.

WNV season usually runs from July until October, with the majority of cases reported in August and September. In addition, mosquito pool data is reported to Montana DPHHS each year. This year, there were 22

FIGURE 30. COUNTIES REPORTING WNV CASES – MONTANA, 2018



counties that submitted mosquitoes for WNV testing. Nine had positive specimens reported (Blaine, Cascade, Fergus, Gallatin, Hill, Judith Basin, Lewis and Clark, Phillips, and Valley).

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.



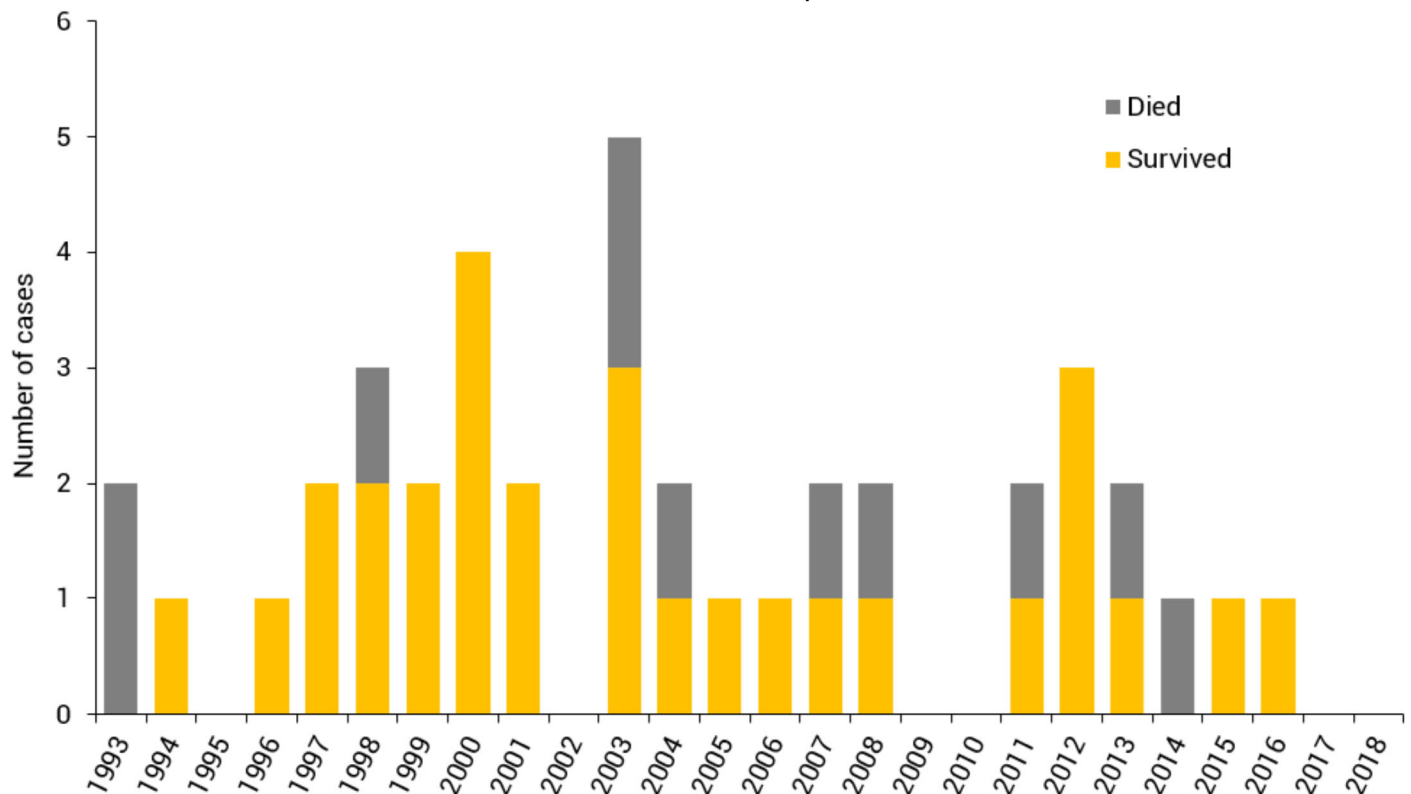


HANTAVIRUS

Hantavirus is a 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 30). No cases were reported in Montana in 2017 or 2018. 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 30. HANTAVIRUS CASES AND OUTCOMES – MONTANA, 2018



Other Diseases



COCCIDIOIDOMYCOSIS (VALLEY FEVER)

Coccidioidomycosis, also called Valley fever, is an infection caused by the fungus *Coccidioides immitis*. 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 present. The remainder are Montana residents that spend their winters in endemic areas. In 2018, there were 28 cases of coccidioidomycosis reported, 71% of whom were aged 60 years and older. All cases reported previous travel to areas endemic for *C. immitis*.

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. Case rates average at 1 to 1.5 cases per million population per year in the U.S.

In Montana, the case rate was approximately two per million population per year in 2018 with two cases of confirmed sporadic CJD reported.





LEGIONELLOSIS

Legionellosis is an infection caused by the bacterium *Legionella*. The disease presents as 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, or have chronic diseases are most at risk for infection. *Legionella* bacteria are found naturally in the environment, but 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 eight cases reported a year, but 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 ten reported cases of Legionnaires' disease in Montana in 2018, and 70% were aged 50 years or older. Of the ten cases, all were hospitalized and there was one death. 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 31. CHARACTERISTICS OF *LEGIONELLA*



Legionnaires' disease is a **severe form of pneumonia**, most often caused by the bacterium *Legionella pneumophila*. People who are at risk can become ill by breathing in small droplets of water that contain *Legionella*.

The number of legionellosis cases in Montana has **increased 750%** between 2000 and 2017 (2 to 17 cases). Ten cases were reported in 2018.

Potential factors affecting the rise in cases are an **increase in diagnostic testing and environmental factors** such as increased rain, drought, and warmer temperatures that disrupt water systems.

2019 Communicable Disease Preview

- Changes to the reporting rules were completed in the fall of 2019 and will be implemented on January 1, 2020. New diseases such as latent tuberculosis infection (LTBI), *Candida auris*, and carbapenem-resistant organisms have all been added to the list of either reportable conditions or confirmation of diseases.
- The first carbapenemase-producing carbapenem-resistant Enterobacteriaceae (CP-CRE) was reported in Montana in 2019. As of this printing, the DPHHS Healthcare Acquired Infections (HAI) Program has investigated a total of 11 potential multidrug-resistant organism (MDRO) events. Of those, three were confirmed as CP-CRE, three were CRE, and one was carbapenem-resistant *Pseudomonas aeruginosa*. The remainder were related to multi-state outbreaks that Montana HAI Program assisted with; no Montana cases were identified in either outbreak. More to come on these outbreaks in the 2019 Annual Report!

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Appendix I: Comparative Statistics for Reportable Communicable Diseases—Montana, 2012-2018*

CONDITION	Reported cases								5 year median
	2012	2013	2014	2015	2016	2017	2018	2018 Rate [†]	
Anaplasmosis	0	0	0	1	0	4	1	0.1	1
Botulism, infant	0	0	1	0	1	2	0	0	<1
Campylobacteriosis	233	205	216	323	372	406	432	40.7	372
Chlamydia	3827	3818	4193	4183	4423	4552	4901	461.4	4423
Coccidioidomycosis	3	3	10	12	13	18	28	2.6	13
Colorado Tick Fever	1	0	1	1	0	2	0	0	<1
Creutzfeldt Jakob Disease	1	3	3	1	1	2	2	0.2	2
Cryptosporidiosis	69	125	66	39	62	70	81	7.6	66
Cyclosporiasis	0	0	2	3	0	3	10	0.9	3
Dengue Fever	2	5	1	6	3	1	0	0	1.5
Giardiasis	67	91	89	93	120	125	89	8.4	93
Gonorrhea	108	224	434	844	868	781	1176	110.7	844
<i>Haemophilus influenzae</i> , invasive	6	6	14	15	19	19	17	1.6	17
Hemolytic Uremic Syndrome (HUS)	1	0	5	2	1	2	1	0.1	2
Hepatitis A	6	6	5	2	3	3	0	0	3
Hepatitis B, acute	2	4	0	7	1	3	1	0.1	1
Hepatitis B, chronic	27	21	32	35	21	35	20	1.9	32
Hepatitis C, acute	9	16	13	15	21	15	13	1.2	15
Hepatitis C, chronic	1544	1142	1413	1386	1664	1665	1530	144.0	1530
Hepatitis C, perinatal	NR	NR	NR	NR	NR	NR	1	0.1	N/A
HIV	22	23	14	18	22	30	23	2.2	22
Legionellosis	4	10	5	8	10	17	10	0.7	10
Listeriosis	1	0	1	1	2	2	0	0	1
Lyme disease	6	18	6	5	17	11	7	0.7	7
Malaria	0	0	2	1	5	3	3	0.3	3
Meningococcal disease	10	1	4	1	2	1	0	0	1
Mumps	1	0	1	1	26	6	6	0.6	6
Pertussis	547	663	494	230	21	106	143	13.5	143
Q fever	2	2	4	5	1	3	3	0.3	3
Rabies, animal	25	36	16	21	10	13	17	1.6	16
Salmonellosis	110	94	145	195	177	140	135	12.7	145
Shiga toxin-producing <i>Escherichia coli</i> (STEC)	44	49	39	85	133	97	121	11.4	97
Shigellosis	12	69	44	14	8	10	12	1.1	12
Spotted Fever Rickettsiosis	3	2	4	9	9	11	9	0.8	9
Streptococcal toxic shock syndrome	0	0	0	4	3	3	2	0.2	3
<i>Streptococcus pneumoniae</i> , invasive	33	31	41	61	99	112	121	11.4	99
Syphilis (primary and secondary)	3	8	9	13	14	48	45	4.2	14
Tetanus	1	0	0	0	0	1	0	0	<1
Tuberculosis	5	6	6	9	4	3	5	0.5	5
Tularemia	3	5	1	7	3	6	4	0.4	4
Typhoid fever	0	0	3	0	0	0	1	0.1	<1
Varicella	133	84	72	132	77	54	57	5.4	72
Vibriosis	NR	3	2	0	2	8	14	1.3	2
West Nile	6	38	5	3	7	11	47	4.4	7

*Confirmed and probable cases only. [†]Rate = per 100,000. NR = Not Reportable. N/A = Not Applicable.

Appendix II: Cases of reportable communicable diseases by jurisdiction – Montana, 2018¹

COUNTY	Anaplasmosis	Campylobacteriosis	Chlamydia	Coccidioidomycosis	Creutzfeldt Jakob Disease	Cryptosporidiosis	Cyclosporiasis	Giardiasis	Gonorrhea	Haemophilus influenzae, invasive	Hemolytic Uremic Syndrome (HUS)	Hepatitis B, acute	Hepatitis B, Chronic	Hepatitis C, acute	Hepatitis C, chronic	Hepatitis C, perinatal infection	HIV	Legionellosis	Lyme disease	Malaria	Mumps	Pertussis	Q fever	Rabies, animal	Salmonellosis	Shiga toxin-producing Escherichia coli (STEC)	Shigellosis	Spotted Fever Rickettsiosis	Streptococcal Toxic Shock Syndrome	Streptococcus pneumoniae, invasive	Syphilis	Tuberculosis	Tularemia	Typhoid Fever	Varicella (Chickenpox)	Vibriosis	West Nile Virus		
LINCOLN	--	5	44	1	--	1	--	5	5	--	--	--	--	1	33	--	--	--	--	--	--	13	--	--	3	4	--	--	--	--	--	--	--	--	--	2	--	--	
MADISON	--	7	12	1	--	1	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--	2	--	2	--	--	--	--	1	--	--	--	--	--	--	--	
MCCONE	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	
MEAGHER	--	4	4	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	
MINERAL	--	1	13	--	--	--	--	1	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	
MISSOULA	--	44	618	1	--	6	4	13	101	2	--	--	5	--	149	--	1	--	--	--	--	--	--	5	15	12	2	1	--	6	9	1	--	--	5	1	--		
MUSSELSHELL	--	1	7	2	--	1	--	--	1	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	
PARK	--	6	28	--	--	6	--	1	5	1	--	--	--	--	21	--	1	1	--	--	--	--	2	--	--	2	1	1	--	1	--	--	--	--	--	--	--	--	
PHILLIPS	--	3	5	--	--	--	--	--	2	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	
PONDERA	--	4	9	1	--	1	--	2	1	--	--	--	--	--	7	--	--	--	--	--	--	--	--	--	3	2	--	--	--	--	--	--	--	--	--	--	1	1	
POWDER RIVER	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
POWELL	--	4	19	--	--	2	--	2	2	--	--	--	--	1	109	--	--	--	--	--	--	--	--	--	1	2	--	--	--	2	--	--	--	--	--	--	--	--	
PRAIRIE	--	3	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
RAVALLI	--	13	111	--	--	6	--	9	3	--	--	--	1	--	44	1	--	--	1	--	--	--	7	1	--	--	5	2	--	1	--	--	--	--	1	1	1		
RICHLAND	--	4	28	1	1	4	--	--	1	--	--	--	--	--	11	--	--	--	--	--	--	--	--	--	--	1	--	1	--	6	--	--	--	--	2	--	1		
ROOSEVELT/FT. PECK	--	3	142	--	--	--	--	--	80	--	--	--	--	--	69	--	--	--	--	--	--	--	--	--	3	--	1	--	--	4	--	1	--	--	--	--	--	1	
ROSEBUD/N. CHEYENNE	--	7	152	--	--	--	--	1	116	--	--	--	--	--	40	--	--	--	--	--	--	--	--	--	4	1	--	--	--	1	1	1	1	--	--	--	--	--	
SANDERS	--	11	22	--	--	3	--	1	3	--	--	--	1	--	22	--	--	--	--	--	--	--	2	--	--	2	1	--	--	2	--	--	--	--	--	1	--	--	
SHERIDAN	--	2	3	--	--	1	--	--	--	--	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	
SILVER BOW	--	13	125	2	--	--	1	2	51	--	--	--	2	--	88	--	--	--	--	--	--	--	--	--	1	--	1	1	1	--	8	3	--	--	--	--	1	--	
STILLWATER	--	4	16	--	--	2	--	--	8	2	1	--	--	--	9	--	--	1	--	--	--	--	--	1	--	1	--	--	--	2	1	--	--	--	--	1	--	--	
SWEET GRASS	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	
TETON	--	3	6	--	--	--	--	--	1	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	
TOOLE	--	3	9	--	--	--	--	--	8	--	--	--	--	--	25	--	--	--	--	--	--	--	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--	3	--
TREASURE	--	1	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VALLEY	--	--	29	--	--	--	--	1	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	4	--
WHEATLAND	--	1	4	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WIBAUX	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
YELLOWSTONE	--	47	885	--	--	3	--	7	391	1	--	--	4	5	257	--	10	--	1	1	--	1	2	1	15	13	--	--	--	22	14	--	--	1	7	3	7		
MONTANA	1	432	4901	28	2	81	10	89	1176	17	1	1	20	13	1529	1	23	10	7	3	6	143	3	17	135	121	12	9	2	121	45	5	4	1	57	14	47		

¹Confirmed and probable cases that were newly reported to DPHHS in 2018; ²HUS cases are those associated with STEC infection. ³Primary and secondary cases.

Appendix III: Montana Demographic Profile, 2018



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.*[‡]

CHARACTERISTIC	POPULATION	PERCENT [‡]
	1,062,305	100
GEOGRAPHIC CLASSIFICATION		
Urban	160,137	15.1
Rural	312,759	57.7
Frontier	289,409	27.2
SEX		
Male	534,852	50.3
Female	527,453	49.7
AGE GROUP (YEARS)		
<1	12,099	1.1
1-4	50,437	4.7
5-14	128,807	12.1
15-24	136,536	12.9
25-39	204,857	19.3
40-64	330,667	31.1
65+	198,902	18.7
RACE		
White	962,460	90.6
American Indian	77,367	7.3
African American	10,321	1.0
Asian	12,157	1.1
ETHNICITY		
Non-Hispanic	1,019,802	96.0
Hispanic	42,503	4.0

*The Montana Infectious Disease Information System (MIDIS) generated report of 2010-2018 data. The six counties are Yellowstone, Missoula, Gallatin, Flathead, Cascade, and Lewis and Clark. [‡]Based on 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 April 1, 2010, July 1, 2010-July 1, 2018. United States resident population by year, county, single-year of age (0, 1, 2, ..., 85 years and over), bridged race, Hispanic origin, and sex. Prepared under a collaborative arrangement with the U.S. Census Bureau. Available from: http://www.cdc.gov/nchs/nvss/bridged_race.htm as of April 24, 2004; Oct 26, 2012; June 25, 2019.

Appendix IV: Diseases Reportable to Public Health in Montana, 2018

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 cases of 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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