COMMUNICABLE DISEASE IN MONTANA

ANNUAL REPORT 2019

Public Health IN THE 406

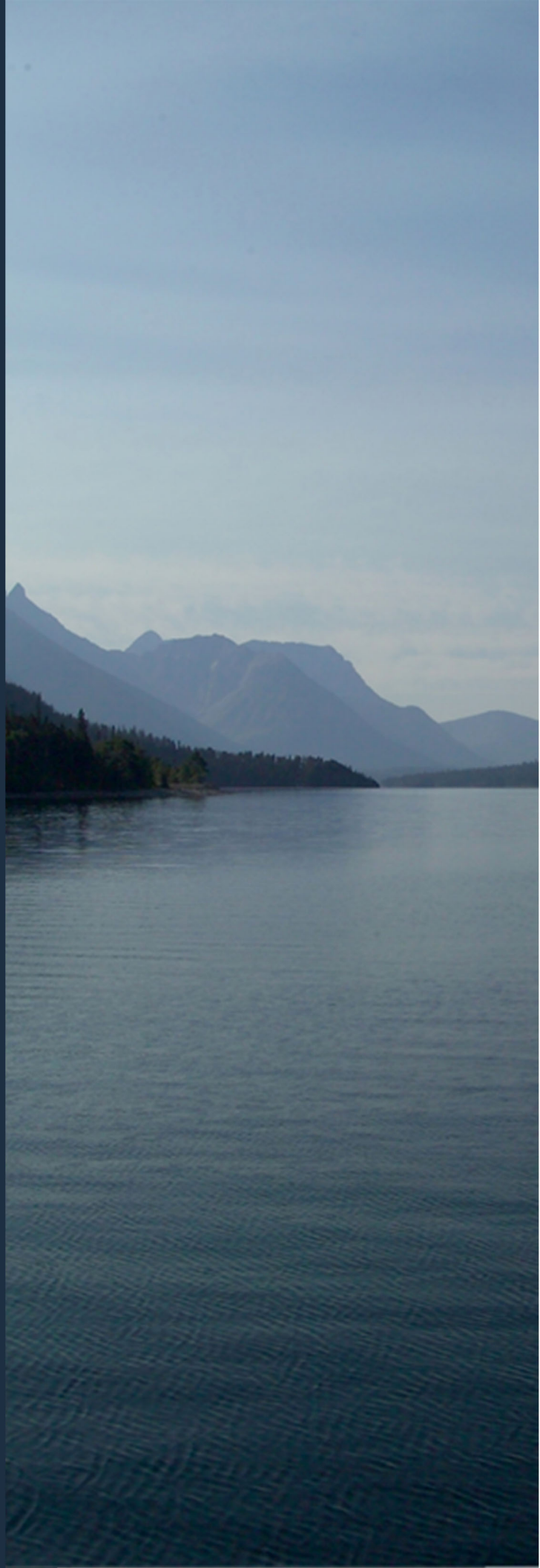
MONTANA COMMUNICABLE DISEASE EPIDEMIOLOGY

Prepared by the Communicable Disease Epidemiology Section

Public Health and Safety Division

Montana Department of Public Health and Human Services

Contents



Public Health IN THE 406

MONTANA COMMUNICABLE DISEASE EPIDEMIOLOGY

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 2019. These reportable conditions met the 2019 case definitions provided by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). 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*

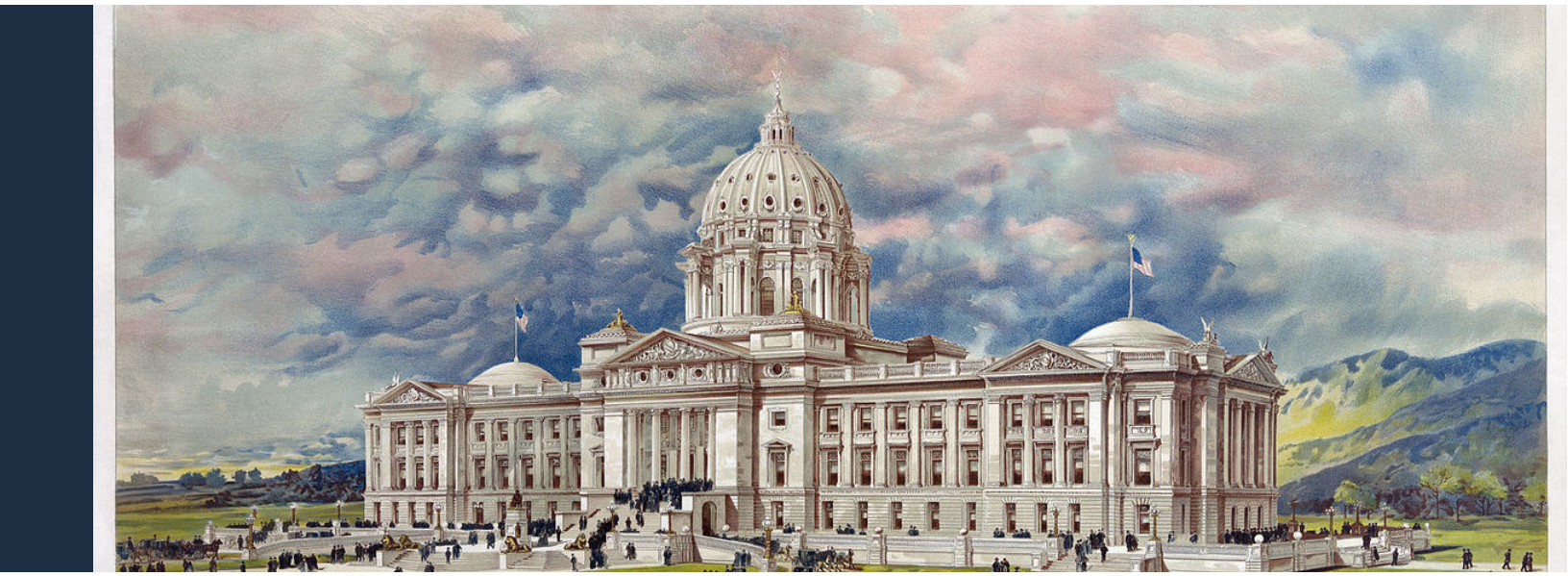
The unique nature of this work requires staff to be 'on call' for disease reporting, consultation, and outbreak investigation and control to quickly respond to communicable disease urgencies and emergencies.

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 2019. 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,

Maggie Cook-Shimanek, 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 ZOONOTIC DISEASES

Vectorborne Epidemiology monitors and provides assistance with investigating vectorborne 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)

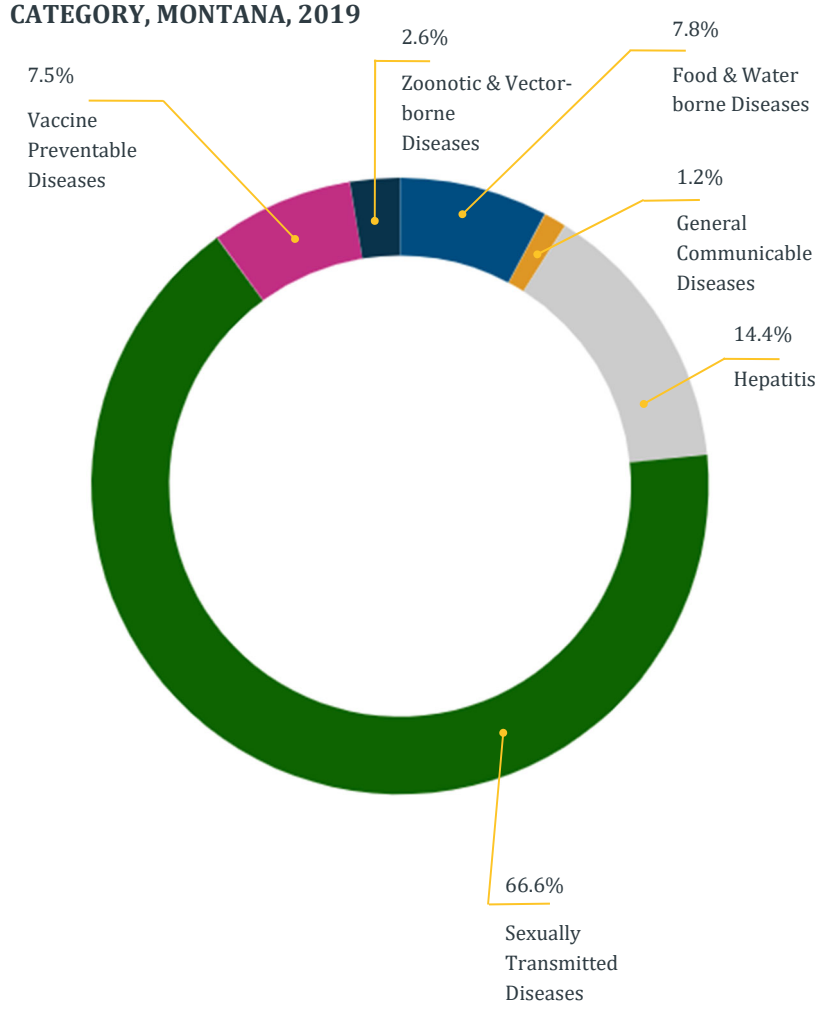
Montana Infectious Disease Information System (MIDIS) Epidemiology maintains the surveillance database used for reportable communicable conditions in Montana. This database also transmits nationally reportable data to the Centers for Disease Control and Prevention. Epidemiologists use this database daily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

Preface

The *2019 Montana Communicable Disease Annual Report* contains data for notifiable diseases and conditions reported to Montana DPHHS in 2019. 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 2019, 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 2019 is depicted in Figure 1.

The Notable Events section presents information on noteworthy reports from 2019 for selected diseases that were above expected values. Incidence data, describing new cases of reportable conditions in 2019, 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, 2019



Notable Events 2019

SUDDEN INCREASE IN INCIDENCE OF HEPATITIS A

Hepatitis A is a very contagious, vaccine-preventable liver infection. It is spread through ingestion of the virus through close personal contact and eating contaminated food or drink. This is why proper surveillance and high vaccination rates are important to public health.

After several years of fewer than ten reported annual cases, Hepatitis A cases increased from zero cases in 2018 to 17 cases in 2019 (Figure 2). This mirrors nationwide trends as well; hepatitis A incidence in the United States increased over 1000% since 2015. The increase in 2019 has

FIGURE 2. REPORTED HEPATITIS A CASES — MONTANA, 2006-2019

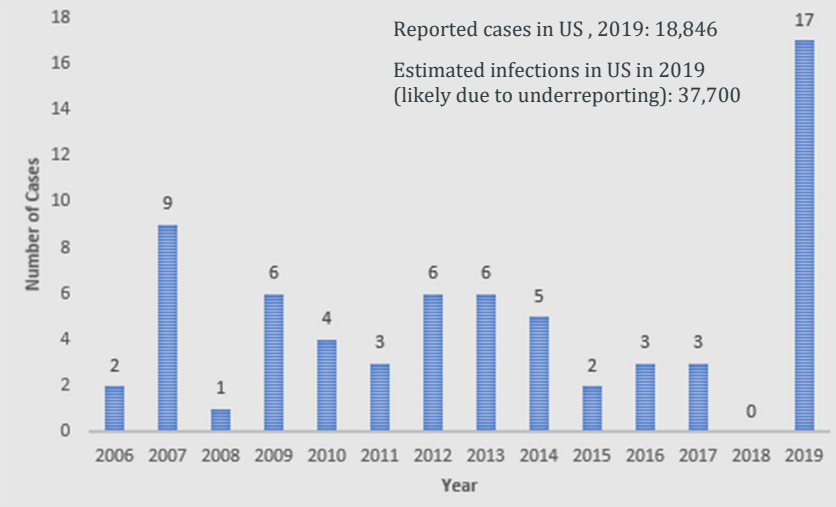
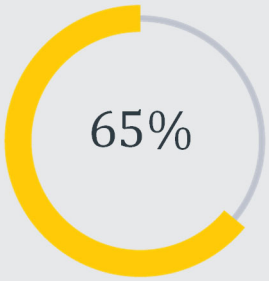
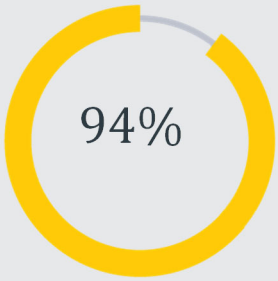


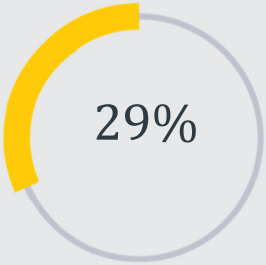
FIGURE 3. CHARACTERISTICS OF REPORTED HEPATITIS A CASES — MONTANA, 2019



More than half of the reported cases of Hepatitis A in Montana were female.



The majority of cases were older than 18 years of age.



29% of Hepatitis A cases were reported among men who have sex with men (MSM).

Almost half of Hepatitis A cases reported in Montana in 2019 were reported by Yellowstone County.

been linked to person-to-person outbreaks reported in more than 30 states, predominantly due to injection drug use (IDU) and outbreaks among people experiencing homelessness. These characteristics were identified in Montana cases as well.

DENGUE IN TRAVELERS

The occasional reported case of dengue is not unusual in Montana, but having six cases reported in Montana in one year is abnormally high. Despite this high incidence, all cases of dengue reported in Montana were found to be travel-associated. Through continued surveillance, it will be noted if dengue is found to be in the mosquito population indigenous to Montana.

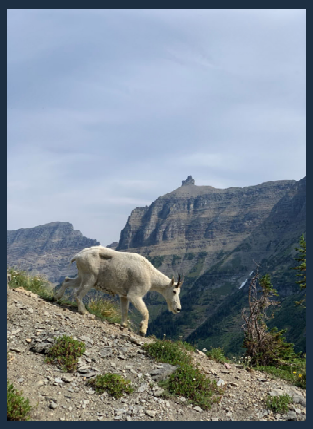
CONTINUED INCREASE IN INCIDENCE OF GONORRHEA

For the past 10 years in the United States, a significant uptick has been seen in the number of reported cases of gonorrhea. This trend is being mimicked in Montana as well.

From 2010, when Montana reported 101 cases, to 2019, when Montana reported 1,571 cases, the incidence of gonorrhea has increased by more than 1400%.

It is believed that this increase in reported cases is partially due to an increase in screening tests being performed all across the state. This would suggest that gonorrhea has been underreported for many years.

Foodborne and Diarrheal Diseases



Enteric illnesses are most often reported during spring and summer months. In 2019, 61% of the 746 enteric diseases reported to Montana DPHHS occurred between March and August. Of note, incidence of campylobacteriosis in Montana has decreased for the first time in five years (Figure 4). The incidence of Shiga toxin producing E.coli (STEC) was 29% lower in 2019 compared to the previous five years (Table 1). In addition, the incidence of salmonellosis has increased for the first time since 2015 (Figure 4).

TABLE 1. ENTERIC ILLNESSES IN MONTANA, 2019

Condition	Cases	2019 Incidence (per 100,000)	2014-2018 Incidence (per 100,000)
Campylobacteriosis	374	35.0	33.6
Salmonellosis	136	12.7	15.2
Giardiasis	79	7.4	9.9
Shiga-toxin producing *E.coli* (STEC)	69	6.5	9.1
Cryptosporidiosis	72	6.7	6.1
Shigellosis	11	1.0	1.7

CAMPYLOBACTERIOSIS

Campylobacteriosis is a diarrheal illness caused by the bacteria *Campylobacter*. The incidence of campylobacteriosis in Montana was 35.0 cases per 100,000 population in 2019, which is 79% 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 2019, only one outbreak was identified, with an attack rate of 80% among exposed persons; the primary source was not determined. Exposure to cattle or live poultry was reported in 30% of 374 cases in Montana. Common sources of transmission include exposure to cattle or live poultry and consumption of raw milk, untreated water, and undercooked foods such as chicken.

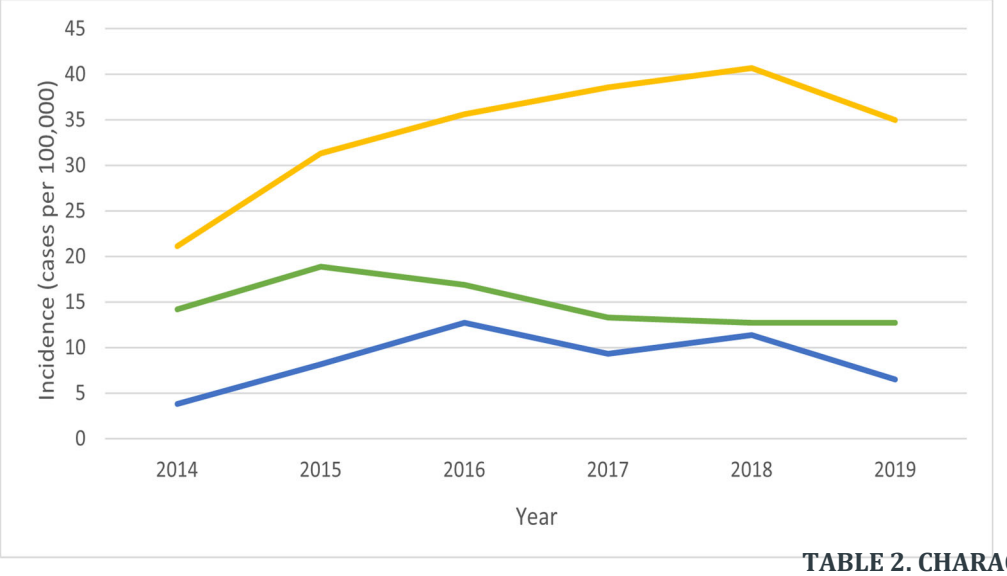
SALMONELLOSIS

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 2019, 136 cases of salmonellosis were reported in Montana. The incidence rate of Salmonella cases in 2019 was 12.7 per 100,000 population, which is an increase from 2018, but is lower than the five-year average of 15.2 salmonellosis cases per 100,000 population between 2014 and 2018. Common risk factors for *Salmonella* infection include exposure to live poultry, and ingestion of contaminated food. In 2019, 5 (3.7%) of Montana's salmonellosis cases were linked to one outbreak: no common exposures were identified. Two of those linked to the outbreak were hospitalized.

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

FIGURE 4. SELECT ENTERIC ILLNESS RATES OVER TIME — MONTANA, 2014-2019



illness in humans. In Montana there were 69 cases of STEC reported in 2019, 43 of which were confirmed. Cattle are a common reservoir for STEC bacteria and are a primary source of infection in Montana. In 2019, 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. Fifteen (22%) of the 69 STEC cases reported in 2019 were hospitalized. In 2019 in Montana, there were zero reported cases of hemolytic uremic syndrome (HUS), a rare but serious kidney disease that can result from an STEC infection.

TABLE 2. CHARACTERISTICS OF CASES OF SHIGA-TOXIN PRODUCING *E. COLI* (STEC), MONTANA 2019

Characteristics	Number
Sex	
Male	30
Female	38
Unknown	1
Age at diagnosis (years)	
0-4	8
5-9	3
10-19	13
20-29	8
30-39	8
40-49	5
50-59	3
60-69	12
70-79	5
80+	3
Ethnicity	
Not Hispanic or Latino	60
Unknown	8
Hispanic or Latino	1

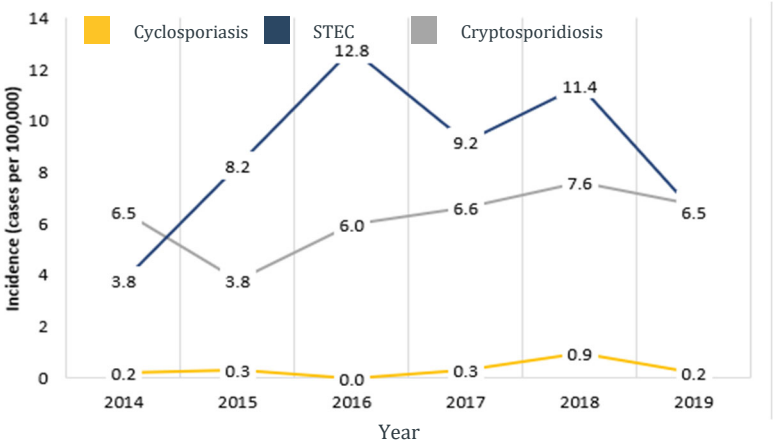
CRYPTOSPORIDIOSIS AND GIARDIASIS

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 2019, there were 79 cases of giardiasis and 72 cases of cryptosporidiosis reported in Montana. Of those, 15% drank untreated water and 26% had recreational water exposure prior to illness onset. The incidence rate of giardiasis decreased for the second time since 2014, and the 2019 incidence of 7.4 cases per 100,000 population is lower than the five-year average incidence of 9.9 cases per 100,000 population. The incidence rate of cryptosporidiosis has fluctuated over the past five years, but the 2019 incidence of 6.7 cases per 100,000 population is almost half the rate it was during Montana's highest season in 2013, when there were 12.3 cases per 100,000 population.

SHIGELLOSIS

Shigellosis is a bacterial illness caused by *Shigella*, and the only significant reservoir is humans. In 2019, 11 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.

FIGURE 6. SELECT ENTERIC ILLNESS INCIDENCE OVER TIME — MONTANA, 2014-2019



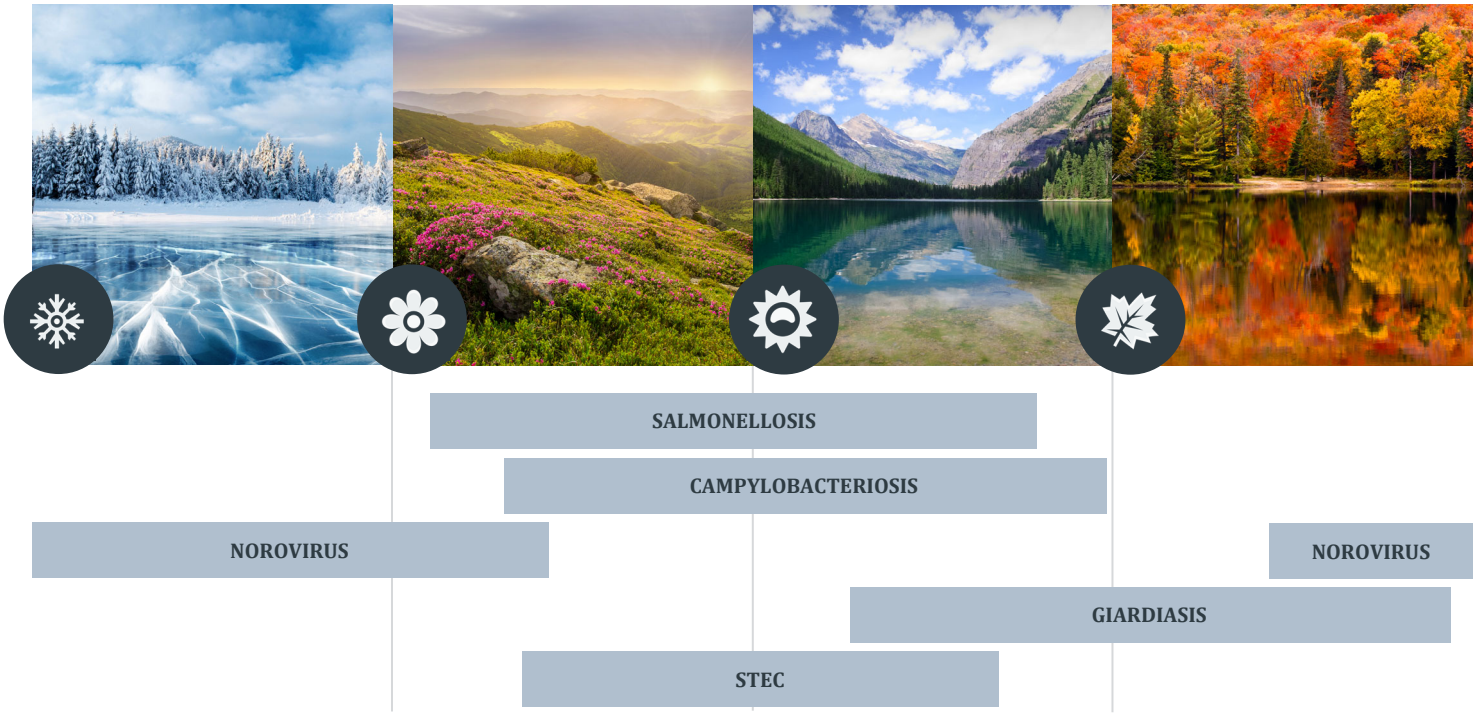
LISTERIOSIS

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 2019.

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 two cases of vibriosis reported in Montana in 2019, compared to

FIGURE 5: SOME ENTERIC DISEASES ARE MORE COMMON DURING CERTAIN TIMES OF THE YEAR



fourteen in 2018. Of the 2019 cases, one ate a raw oyster (outside of Montana) and the other had seawater exposure while travelling outside of Montana.

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 2019, one case of infant botulism was reported.

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 2019, there were no reported cases of typhoid fever.

ENTERIC OUTBREAKS

Montana reported 34 enteric illness outbreaks in 2019 that sickened 620 people. Of those, there were 38 hospitalizations and one death. Of the 34 enteric outbreaks, 24 (71%) had at least one confirmatory laboratory specimen submitted for testing. Of the 24 outbreaks with a confirmed specimen, 21 (88%) 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 reportable. The remaining three enteric outbreaks were caused by *Salmonella*, *Campylobacter,* and rotavirus.

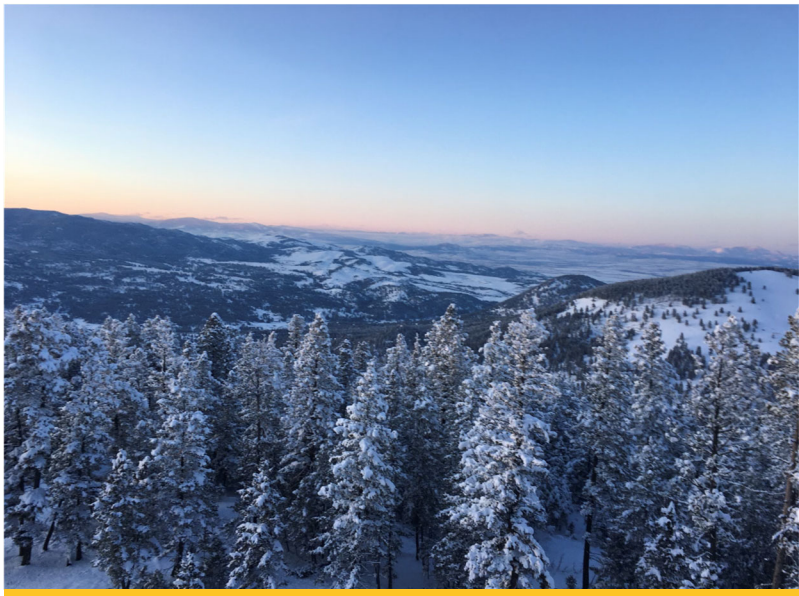
In addition to the outbreaks reported with exposures in Montana, two Montanans were linked to a multi-state outbreak of salmonellosis with exposure to live poultry. Those cases were linked to cases from other states using whole genome sequencing (WGS), and public health investigations linked them to live poultry exposure.

The majority of enteric outbreaks (62%) occurred at assisted living and long-term care facilities. Other noteworthy settings include child care (12%), hospitals and rehab centers (8.8%), and other (18%). Other settings included community events, a restaurant, an independent living center, and a lodge at a national park.

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. More than half (53%) of enteric illness outbreaks were reported within two days 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.[4] 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 2019, the most frequently reported vaccine preventable diseases in Montana were pertussis and varicella (chickenpox).

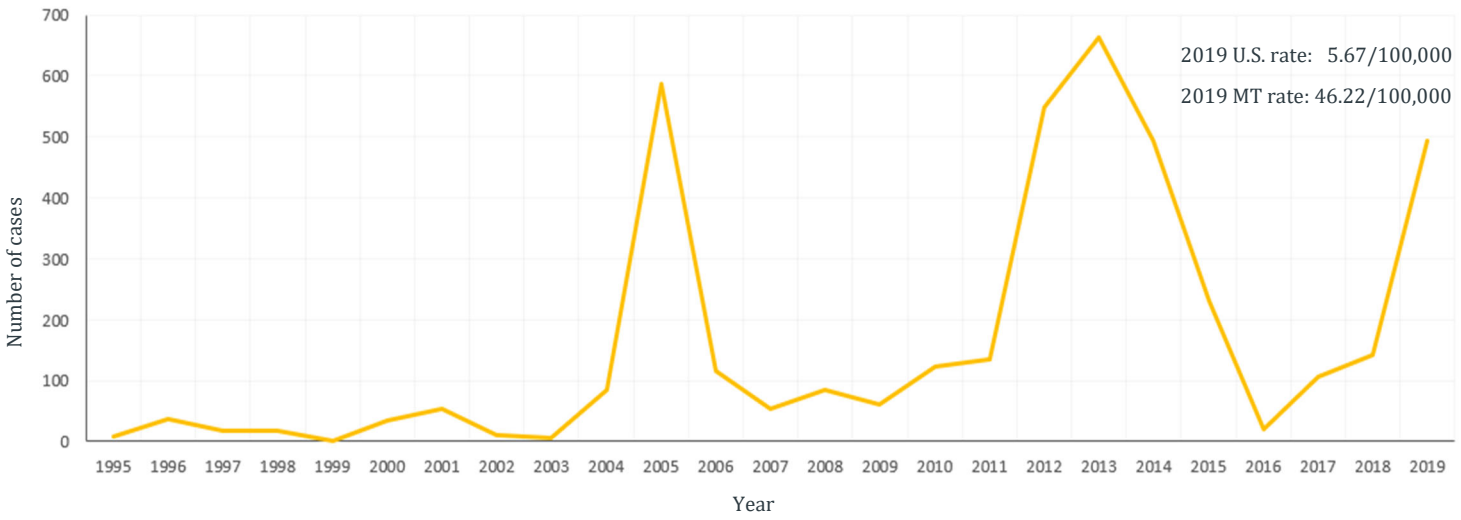


PERTUSSIS

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. In Montana, peaks occurred in 2005 and 2013, when 586 and 663 pertussis cases were reported, respectively (Figure 7). Following the peak in 2013, the number of reported cases of pertussis steadily declined through 2016. However, 2019 showed a significant increase with 494 cases reported. This is 2.5 times higher than the number of reported cases in 2018 (143). In 2019 the pertussis case rate in Montana was over eight times greater than the case rate in the United States.

The median age of pertussis cases in Montana was 15 years (range: <1 month – 86 years). Three individuals, all children <1 month, were hospitalized. One individual (>85 years) died. Of those <18 years with documented immunization status (n=344), 83% had a history of pertussis containing vaccine.

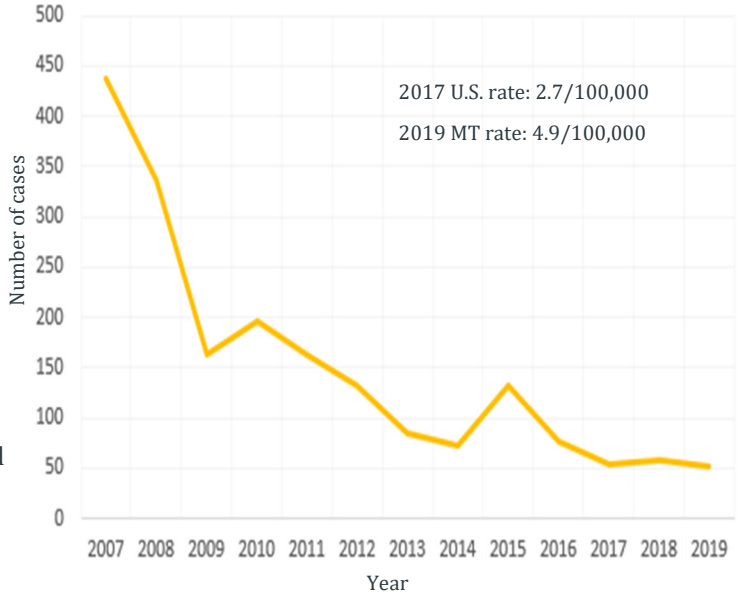
FIGURE 7. REPORTED PERTUSSIS CASES — MONTANA, 1995-2019



VARICELLA

Varicella-zoster virus is the causative agent of chickenpox. Over the past 13 years, the number of varicella cases reported in Montana has declined from a peak of 437 cases in 2007 to 52 cases in 2019, largely due to the implementation of varicella vaccination (Figure 8). Of these 52 reported cases, 8% (4) were children less than one year of age who were too young to receive vaccine. The median age of cases was nine years (range: <1 month – 50 years). Of the pediatric cases eligible for vaccine who were evaluated for immunization status (n=29), 66% had reported a history of varicella vaccination.

FIGURE 8. REPORTED VARICELLA CASES — MONTANA, 2007–2019



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 of mumps 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 year in 2017 and 2018, although most were in non-college aged individuals.

In 2019, 17 cases of mumps were reported, 71% (12) of which were all reported in Gallatin county residents. The median age of cases was 12 years. Risk factors included out-of-country travel, having contact to a known case, being unvaccinated, and being of school age. Of the cases reported in 2019, 65% (11) did not have any history of mumps-containing vaccine and 64% (7) of non-vaccinated cases had non-medical exemptions.

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 October 2019. By December, activity had increased to concerning levels across the state as well as nationwide. Peak activity occurred during late February/ early March. Season totals include 11,255 reported cases, 514 hospitalizations, and 41 deaths attributed to influenza. Eighteen influenza outbreaks were reported; schools were the most common setting. Cases were reported from all counties in Montana, and only one county reported fewer than five influenza cases for the entire season (range: 2–1,682).

The most common influenza subtype identified this season was Influenza B, which was unusual as this strain typically predominates late in the influenza season. Influenza B predominated until January and was then followed by a late increase in Influenza A H1N1 (2009) and Influenza A H3N2.

The cumulative influenza-related hospitalization rate in Montana (frequency of cases during the influenza season) was 48.4 per 100,000 population (Figure 9). The majority of Montanans who were hospitalized due to influenza were aged ≥65 years. The most common comorbidities of individuals hospitalized for influenza were age <5 years or ≥65 years, cardiovascular disease, chronic lung conditions, and metabolic conditions such as diabetes. Of the 41 influenza-related deaths reported, 9 (22%) occurred among adults aged <65 years. Zero pediatric deaths (aged 0–17 years) were reported during the 2019–2020 season.

Of those hospitalized for influenza with documented immunization status (n=464), 51% (236) had not received seasonal influenza vaccine. More than 60% of children and almost half of adults did not receive a vaccine (Figure 10).

FIGURE 10. INFLUENZA VACCINATION STATUS OF HOSPITALIZED CHILDREN AND ADULTS— MONTANA, 2019-2020 SEASON

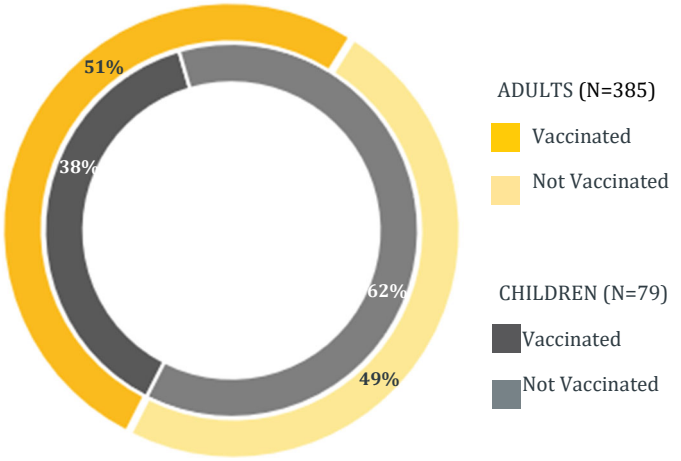
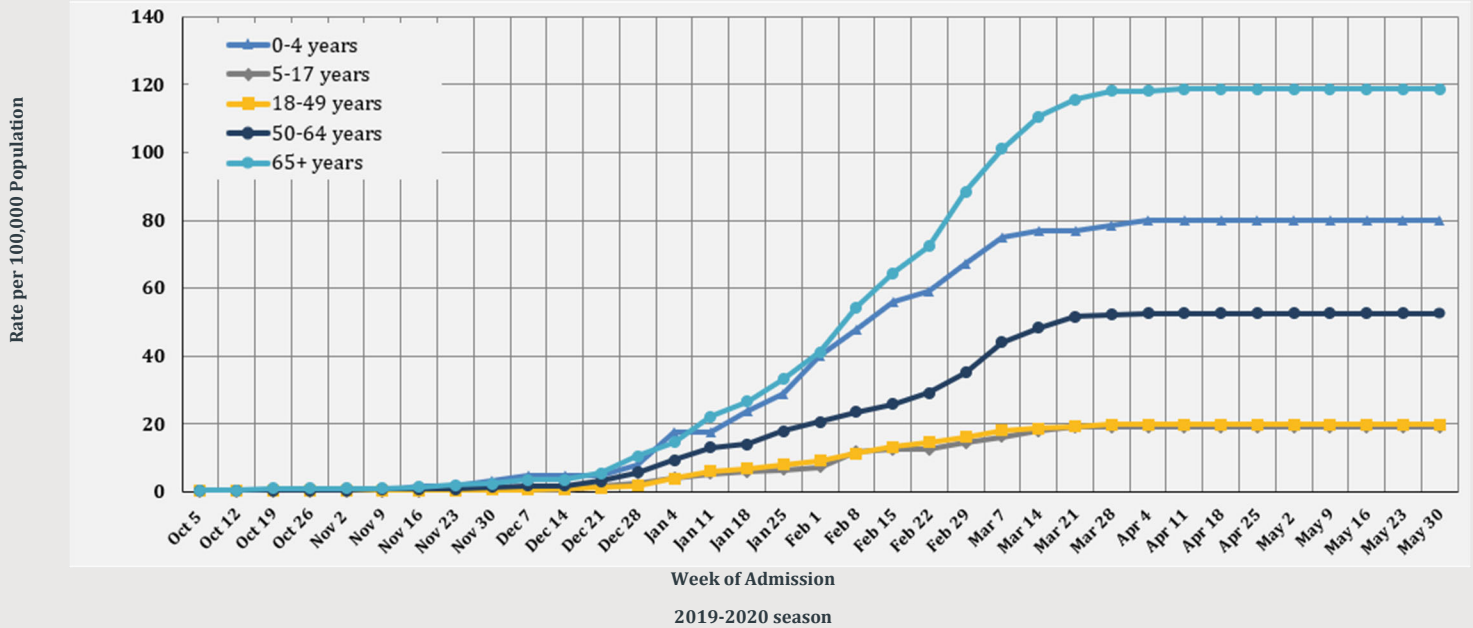


FIGURE 9. INFLUENZA CUMULATIVE HOSPITALIZATION RATES BY AGE GROUP — MONTANA, 2019-2020 SEASON



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 2019, three meningococcal disease cases were reported in Montana in adults. All three cases were aged >55 years. None of the individuals had received a meningococcal vaccine. Serotyping was successful in identifying Serogroup Y in two of the three cases.

HAEMOPHILUS INFLUENZAE

Twenty-seven cases of *Haemophilus influenzae* were reported (2.5 per 100,000 population) in 2019. Seven percent of cases (n=2) were in children aged less than 5 years. Zero cases of invasive *H. influenzae* type B, the type that is vaccine preventable, were reported.

STREPTOCOCCUS PNEUMONIAE

Pneumococcal disease is an infection caused by *Streptococcus pneumoniae* bacteria. In 2019, 131 cases (12.3 per 100,000 population) of invasive *Streptococcus pneumoniae* were reported in Montana. The median age of patients was 62 years (range: 2 months – 93 years).

OTHER INVASIVE DISEASES

Two cases of streptococcal toxic shock syndrome, caused by invasive group A *Streptococcus*, were reported in 2019. Both cases were in males, >18 years of age.

Sexually Transmitted Infections

Sexually transmitted infections (STIs) continue to be the most frequently reported communicable diseases in Montana. Approximately 4,752 cases of chlamydia alone were reported in 2019. Of all Montana counties, 90% of them reported at least one STI case.

CHLAMYDIA

Chlamydia is caused by the bacterium *Chlamydia trachomatis* and is the most commonly reported communicable disease in Montana and the United States. *Chlamydia* infections are usually asymptomatic and may go unnoticed. In women, it can result in pelvic inflammatory disease (PID), a major cause of infertility, ectopic pregnancy, and chronic pelvic pain. *Chlamydia* infection can also facilitate the transmission of HIV[5]. 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 2011, case rates have generally increased in Montana (Figure 11). In 2019, 3,120 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, 2019

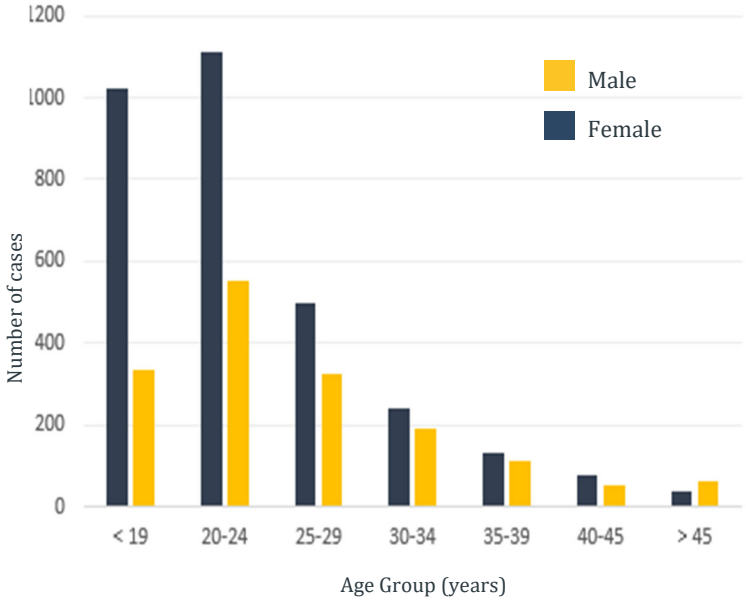
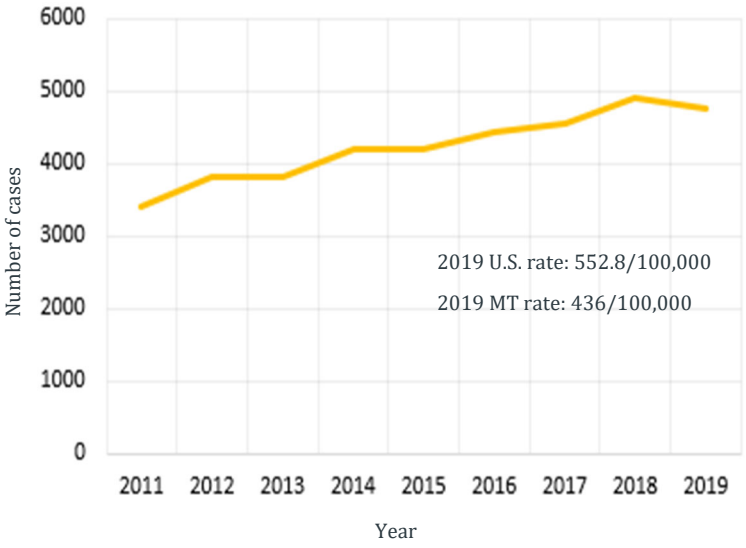
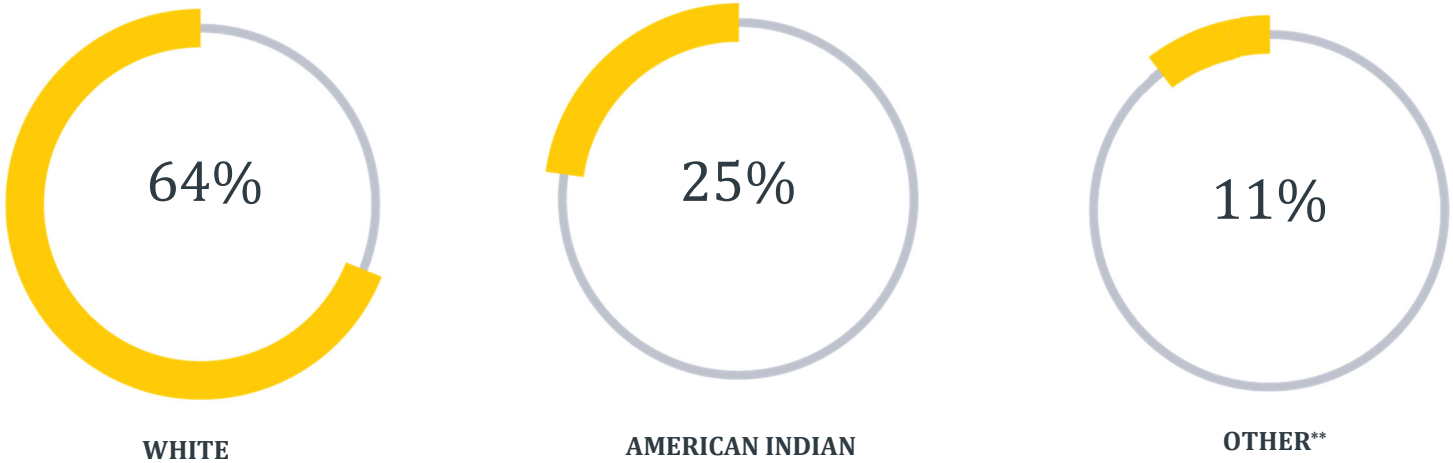


FIGURE 11. CHLAMYDIA CASES — MONTANA, 2011-2019



In 2019, the chlamydia incidence for persons identified as American Indian was nearly four times greater than those reported as white (Figure 13). Broader STI screening efforts among American Indians seeking services at Indian Health Services and tribal clinics may contribute to the higher reported chlamydia incidence in this population.

FIGURE 13. CHLAMYDIA CASES BY RACE* — MONTANA, 2019



* Race classification is irrespective of ethnicity (Hispanic or non-Hispanic)
** Other includes persons of more than one race, Black or African American, and Asian/Pacific Islander, or unknown

GONORRHEA

Gonorrhea is an infection caused by the bacterium *Neisseria gonorrhoeae.* It is the second most commonly reported STI in Montana and the United States. Incidence rates have been dramatically increasing over the last five years (Figure 14). 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[4].

In 2019, 1571 gonorrhea cases were reported to DPHHS. This is a 34% increase from 2018 (1176). Despite recent increases, the incidence rate of gonorrhea in Montana is lower (147.0/100,000) than the incidence rate of the U.S. (186.7/100,000).

In Montana, American Indians are disproportionately impacted by gonorrhea. In 2019, despite comprising only 7% of the population, American Indians accounted for 40% of the gonorrhea cases in Montana (Figure 15). Broader STI 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 14. GONORRHEA INCIDENCE — MONTANA VS US, 2010-2019

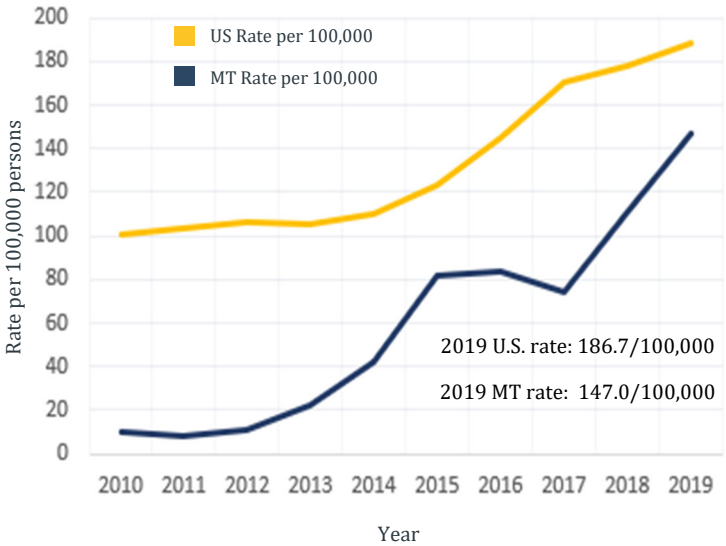


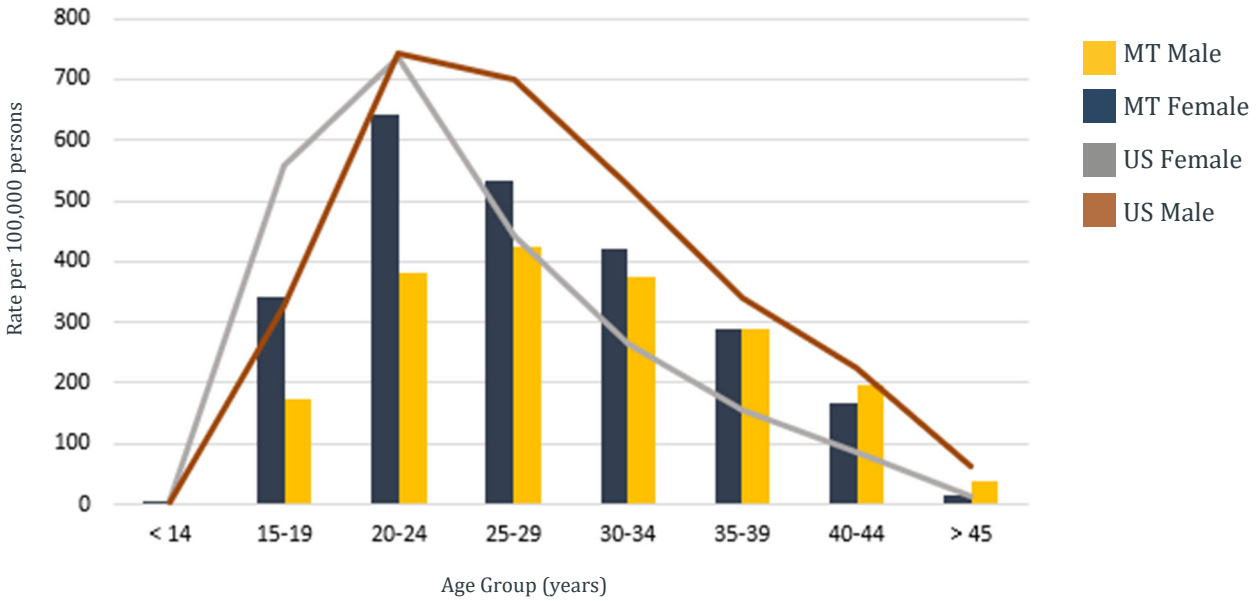
FIGURE 15. GONORRHEA CASES BY RACE* — MONTANA, 2019

* 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 16 displays the distribution of gonorrhea incidence by sex and age group in Montana as well as in the United States in 2019. In Montana, 831 gonorrhea cases (53%) were reported among females. Over the last five years, females have remained the majority of reported gonorrhea cases in Montana, unlike the rest of the US, where males are the majority of cases reported in individuals over 25 years.

Of the 363 cases of gonorrhea diagnosed in the 20–24 year age group, 218 (60%) occurred among females. A large portion of the gonorrhea cases occur in the 20–24 and 25–29 year age groups, which - in 2019 - accounted for 45% of the cases reported in Montana.

FIGURE 16. GONORRHEA INCIDENCE BY SEX AND AGE —MONTANA VS US, 2019



SYPHILIS

Syphilis is a genital ulcerative STI 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 lesion. Infected pregnant women can also 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 adults 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 from 14 in 2016 to 48 in 2017. In 2019, the cases again increased to 59 newly reported cases of primary or secondary syphilis. This is the most reported cases of syphilis that Montana has seen in over a decade.

Montana's primary and secondary syphilis rate increased to 5.5 cases per 100,000 population in 2019 from 0.8 in 2014 (Figure 17). Syphilis incidence in Montana was lower than U.S. rate in 2019. Demographic characteristics are noted in Table 3, showing that most syphilis cases in Montana in 2019 were males (73%).

FIGURE 17. PRIMARY AND SECONDARY SYPHILIS CASE RATE — MONTANA, 2011–2019

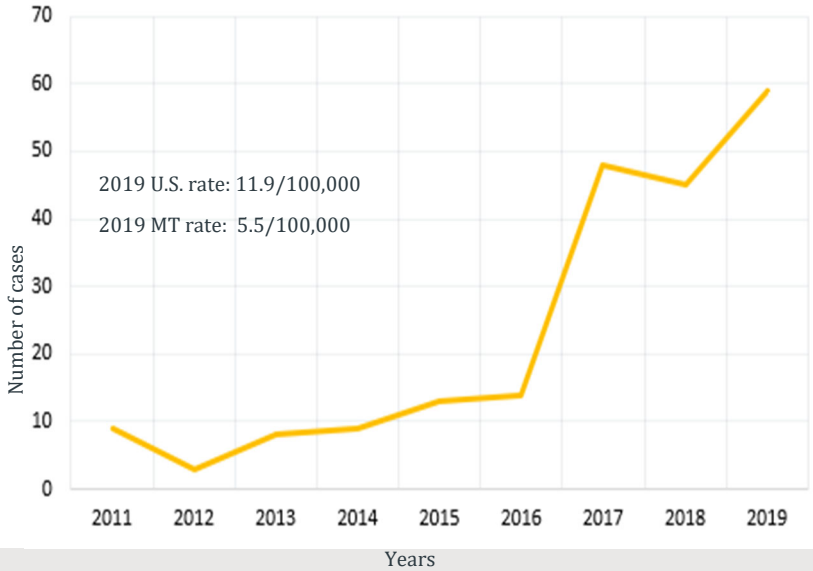


TABLE 3. NEWLY DIAGNOSED SYPHILIS* BY SELECT CHARACTERISTICS (N=59) — MONTANA, 2019

Characteristics	Number
Sex	
Male	43
Female	16
Age at diagnosis (years)	
≤19	6
20–24	8
25-29	11
30-34	10
35-39	9
40-45	5
45+	10
Ethnicity and race	
American Indian, non-Hispanic	16
White, non-Hispanic	26
Multi-race, non-Hispanic	11
Hispanic, all races	6

*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 prevent transmission to others through sexual contact. 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 2019, 26 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 to 32 new cases have been reported each year. Figure 18 shows that the rate of new cases has remained stable during this time. More than 70% of new cases were reported from the most populous counties: Yellowstone, Missoula, Cascade, Gallatin, and Flathead. The leading transmission categories are male-to-male sexual contact (MSM) and injecting drug use (IDU) (Table 4).

FIGURE 18. REPORTED NEWLY DIAGNOSED HIV CASES PER 100,000 — MONTANA, 2009–2019

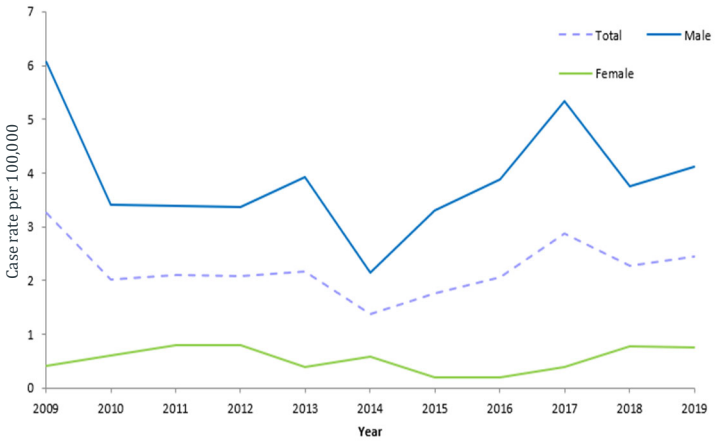


TABLE 4. PERSONS NEWLY DIAGNOSED WITH HIV BY SELECT CHARACTERISTICS (N=26) — MONTANA, 2019

Characteristics	Number
Sex	
Male	22
Female	4
Age at diagnosis (years)	
<13	0
13-14	0
15-24	5
25-34	8
35-44	7
45-54	2
55-64	2
≥65	2
Ethnicity and race	
American Indian, non-Hispanic	1
White, non-Hispanic	20
Multi-race, non-Hispanic	2
Hispanic, all races	3
Transmission category by sex†	
Male Only	
Male sexual contact w/ another male (MSM)	12
Injection drug use (IDU)	2
MSM & IDU	5
High-risk Heterosexual contact‡	1
No identified risk	2
Female Only	
Injection drug use (IDU)	2
High-risk Heterosexual contact‡	1
No identified risk	1

†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 and in the United States has steadily decreased over the past two decades. Figure 19 presents the number of TB cases over time by foreign-born persons and by race for U.S.-born persons. Overall, TB rates have steadily declined from 26 cases in 1990 to two in 2019, the lowest number of TB cases ever recorded in Montana.

During the 1990s, an average of 20 cases were reported annually. From 2010-2019, an average of 5.4 cases per year were reported (range: 2-9 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 2.5 cases since 2010 (Figure 19). 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 2010-2019.

Two cases of active TB were reported in Montana in 2019. Counties of residence included Blaine and Cascade. The 2019 Montana TB incidence rate was 0.2 cases per 100,000 population, which is 13.5 times lower than the 2019 U.S. rate (2.7 per 100,000 population) (Figure 20).

Both cases reported in 2019 were foreign-born. One case had pulmonary/pleural disease, and the other had extrapulmonary TB of the foot. Risk factors of note for these cases included: birth in a TB endemic county, homelessness, and being a resident of correctional facilities.

FIGURE 19. REPORTED ACTIVE TUBERCULOSIS CASES BY RACE — MONTANA, 1990–2019

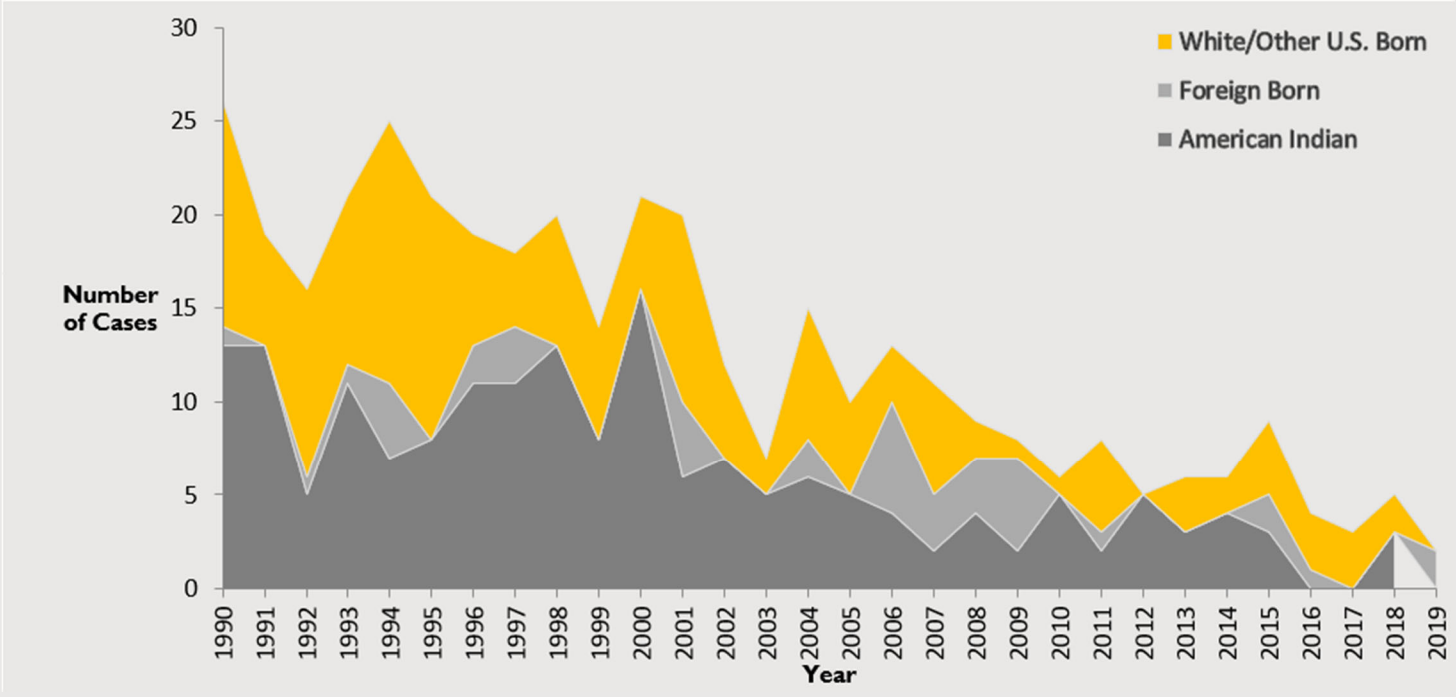
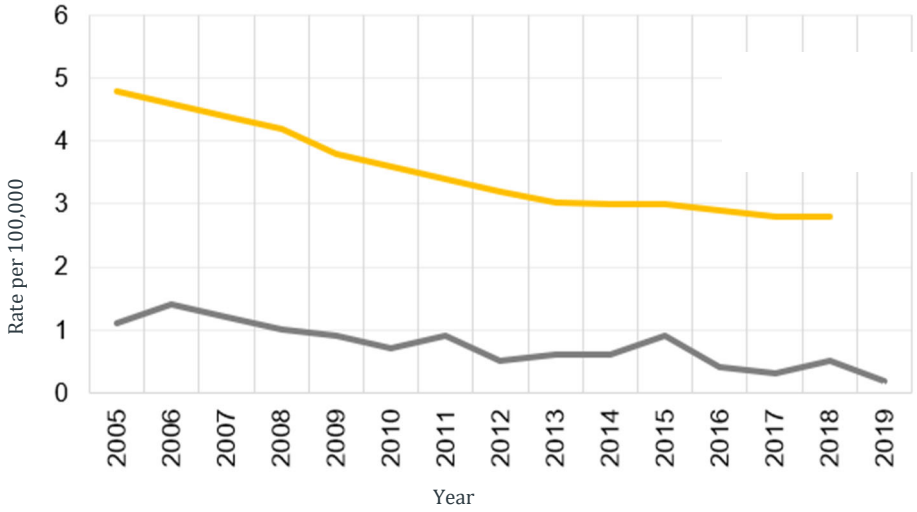
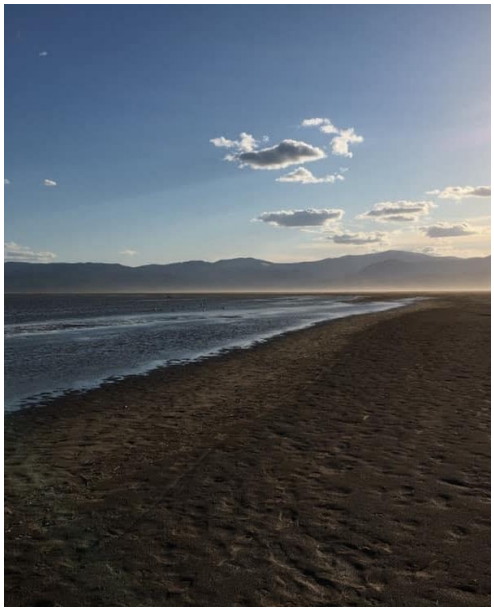


FIGURE 20. TUBERCULOSIS INCIDENCE RATE — MONTANA AND UNITED STATES, 2005–2019





One case reported in 2019 was detained by Immigration and Customs Enforcement (ICE) and moved out of state to a detention facility where the treatment was started.

Neither of the cases reported in 2019 had drug-resistant TB. Since 2000, 8.1% of the total TB cases reported in Montana had a single resistance to Isoniazid (INH) and 1.7% (3 cases) were multidrug resistant tuberculosis (MDR-TB).

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 and ethnic minorities, and persons experiencing homelessness. Improved diagnostic tools, new drugs that enable shorter, effective treatment of both latent TB infection and active disease, and an effective vaccine are critical for achieving national and global TB elimination.

Viral Hepatitis

Hepatitis refers to an inflammation of the liver. Heavy alcohol use, toxins, some medications, and certain medical conditions can cause hepatitis. However, hepatitis is 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 2019, 17 cases of HAV were reported in Montana. This is the largest number of cases seen in one year in Montana in over a decade. The significant increase in cases in 2019 is due to an outbreak amongst injection drug users (IDU), persons who are incarcerated, and people experiencing homelessness.

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, 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 2019, 25 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 54 years and 52% of cases were female. Only one acute HBV case, indicating recent infection, was reported in Montana, in an adult female >18 years.

HEPATITIS C

Hepatitis C is a 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 2019, 1,335 cases of chronic HCV 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 2013 and 2019 is shown in Figure 21.

The Centers for Diseases Control and Prevention recommends that all pregnant women be screened for HCV and all adults ≥18 years be tested at least once. It should be noted that an increase in screening efforts may lead to an increased number of HCV cases being diagnosed.

FIGURE 21. INCIDENCE RATE OF CHRONIC HEPATITIS C INFECTIONS — MONTANA, 2013-2019

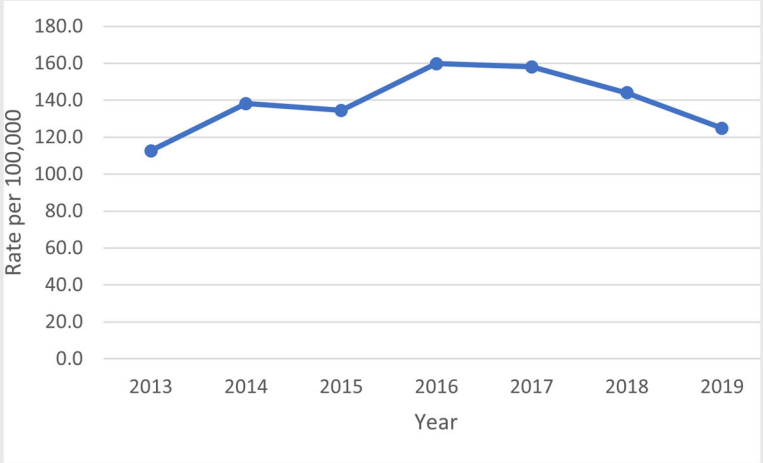


FIGURE 22. NEWLY REPORTED CHRONIC HEPATITIS C INFECTIONS BY AGE GROUP — MONTANA, 2019

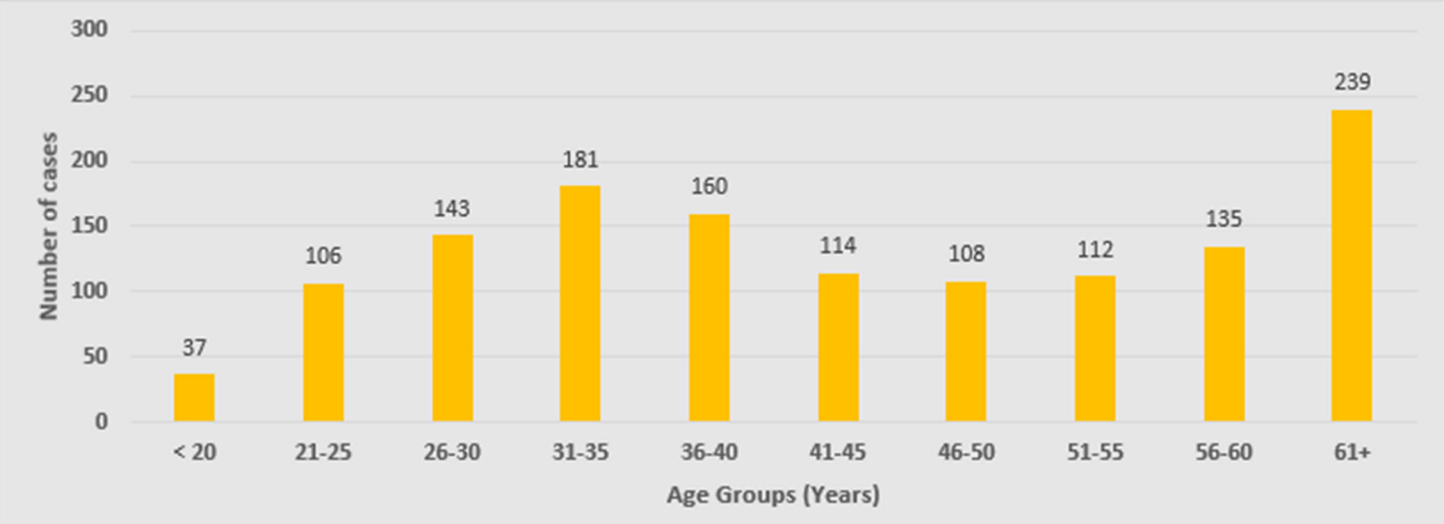


TABLE 5. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH CHRONIC HEPATITIS C — MONTANA, 2019

GENDER			RACE		
Male	792	59%	White	895	67%
Female	539	41%	American Indian	312	23%
Unknown	4	<1%	Other/Unknown	128	10%

Acute hepatitis C is a short-term viral infection caused by the hepatitis C virus. After being infected with acute HCV, about 80% of people will go on to develop chronic HCV. 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.

An average of 16 cases (1.5 per 100,000) of acute HCV cases are reported to DPHHS each year. Nineteen cases were reported in 2019. The most common risk factor identified was IDU.

FIGURE 23. ACUTE HEPATITIS C INFECTIONS — MONTANA, 2013-2019

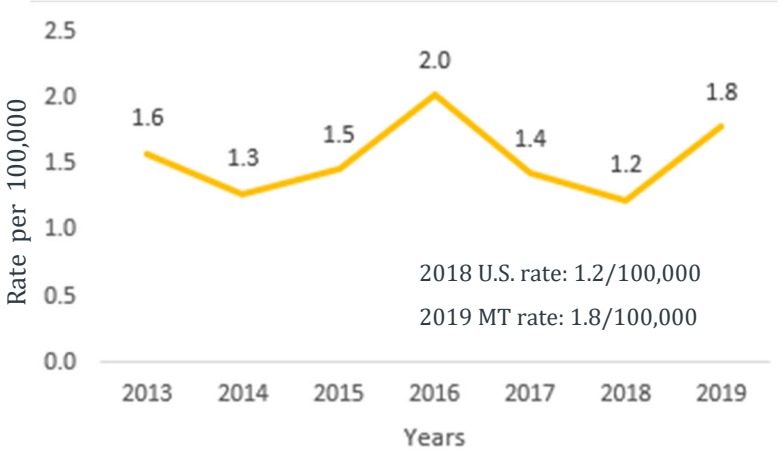


TABLE 6. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH ACUTE HCV, MONTANA 2019 (N=19)

GENDER			RACE		
Male	9	47%	White	10	53%
Female	10	60%	American Indian	6	32%
Unknown	-—	-—	Other/Unknown	3	16%

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. Most 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 2019, 501 animals were tested for rabies at the Montana Veterinary Diagnostic Laboratory, resulting in 17 bats and one skunk positive for the rabies virus (Figure 24). The last cases of human rabies in Montana were reported in 1996 and 1997, both were associated with bat exposures.

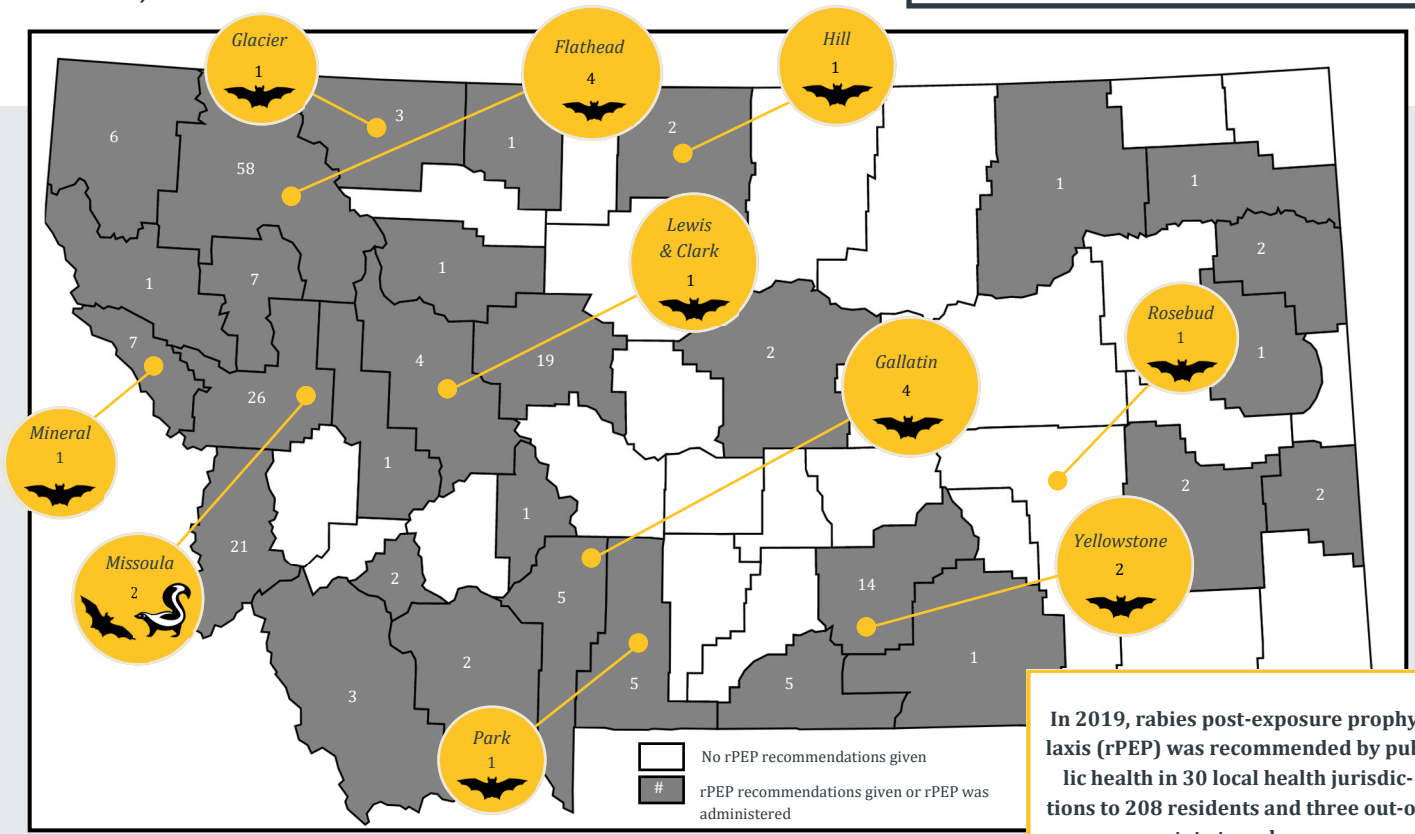
Rabies in humans is preventable through prompt and appropriate medical care and use of rabies post-exposure prophylaxis (rPEP). In 2019, 206 Montana residents and three out of state residents potentially exposed in Montana received the recommendation to pursue rPEP to prevent disease after exposure to an animal that is capable of transmitting rabies (Figure 24). Of those who were administered rPEP, fourteen people pursued rPEP without public health recommendation and 117 people pursued rPEP with public health recommendation.

FIGURE 25. TYPES OF EXPOSURES THAT LED TO rPEP RECOMMENDATIONS -- MONTANA, 2019

What type of animal exposures were involved with these PEP recommendations?

- **40%** Bat exposures are generally the most common type of animal exposure in Montana.
- **34%** Dog exposures: most happen through animal bites. No dogs involved in human exposure were tested for animal rabies.
- **14%** Cat exposures: most were animal bites. No cats involved in human exposure were suitable for testing.

FIGURE 24. ANIMALS THAT TESTED POSITIVE FOR RABIES VIRUS — MONTANA, 2019



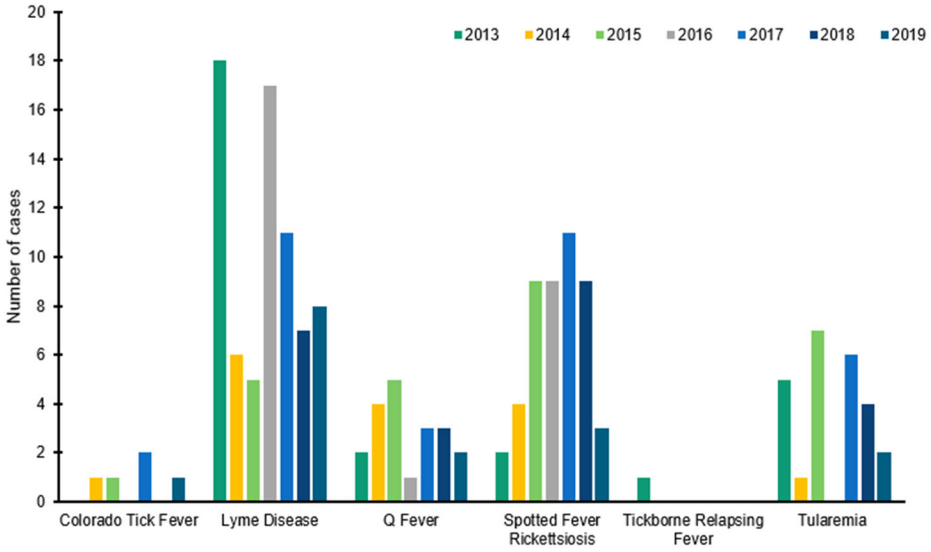
This map reflects positive animals based on what was found and tested across the state, rather than a systematic survey. It is assumed that the potential for rabid bats and skunks exists all over Montana.

In 2019, rabies post-exposure prophylaxis (rPEP) was recommended by public health in 30 local health jurisdictions to 208 residents and three out-of-state travelers.

TICKBORNE DISEASES

Pathogens present in Montana that can be transmitted to humans by ticks include those that cause Colorado tick fever virus, 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 seven years is shown in Figure 26. In general, the most commonly reported tickborne disease in Montana is Lyme disease, with almost all cases acquired outside of Montana. Spotted fever rickettsiosis is generally the second most reported tickborne disease in Montana, and in 2019 this trend continued (Figure 26).

FIGURE 26. REPORTED CASES OF TICKBORNE DISEASES — MONTANA, 2013–2019



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 2019, there were two cases of tularemia and two cases of Q fever (2 acute; 0 chronic) reported in Montana residents.

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 two travel-associated vectorborne diseases reported in Montana in 2019. These diseases include dengue (6) and Chikungunya virus (1).

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

DENGUE

Dengue is a virus spread by the bite of an infected *Aedes* species of mosquito, specifically the *Ae. aegypti* and *Ae. albopictus* mosquitos. There are four related viruses in the dengue family; dengue virus 1, 2, 3 and 4. Due to this, a person can be infected up to four separate times in their lifetime. Thankfully, Montana does not see many cases of dengue because these specific *Aedes* mosquitos are not found here. For this reason, all Montana cases have been associated with travel, generally outside of the country. Since 2003, Montana has seen an average of 0-2 cases per year. The 2019 season of 6 reported cases was an increase from the average since Montana's last reported case in 2017.

WEST NILE VIRUS

West Nile virus (WNV) is an arbovirus that is transmitted by infected mosquitoes throughout the United States. Most 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 2019, a total of three counties reported a human case of WNV (Custer, Lewis and Clark, and Sanders). Three human cases of WNV were reported, plus one viremic blood donor. The three cases were all WNND, of which two were hospitalized. No deaths were reported in 2019. All three cases reported in the 2019 WNV season occurred in individuals over 60 years of age. Since the introduction of WNV into Montana in 2002, the number of cases in Montana has varied from year to year. Eleven of the eighteen years of WNV surveillance had fewer than 20 annual cases (range 0–11). Four years had between 26 and 51 cases (2005, 2006, 2013, 2018) and two years (2003 and 2007) had over 200 cases. WNV season usually runs from July until October, with most cases reported in August and September.

In addition, mosquito pools are tested and reported to Montana DPHHS each year. In 2019, there were 30 counties that submitted mosquitoes for WNV testing. A total of seven counties reported a positive mosquito pool. These counties included Blaine, Cascade, Lake, Lewis and Clark, Sheridan, Valley, and Yellowstone.

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 repellant, limited outdoor activity during dawn and dusk, covering skin with clothing, and elimination of breeding pools in vessels around the home.

HANTAVIRUS

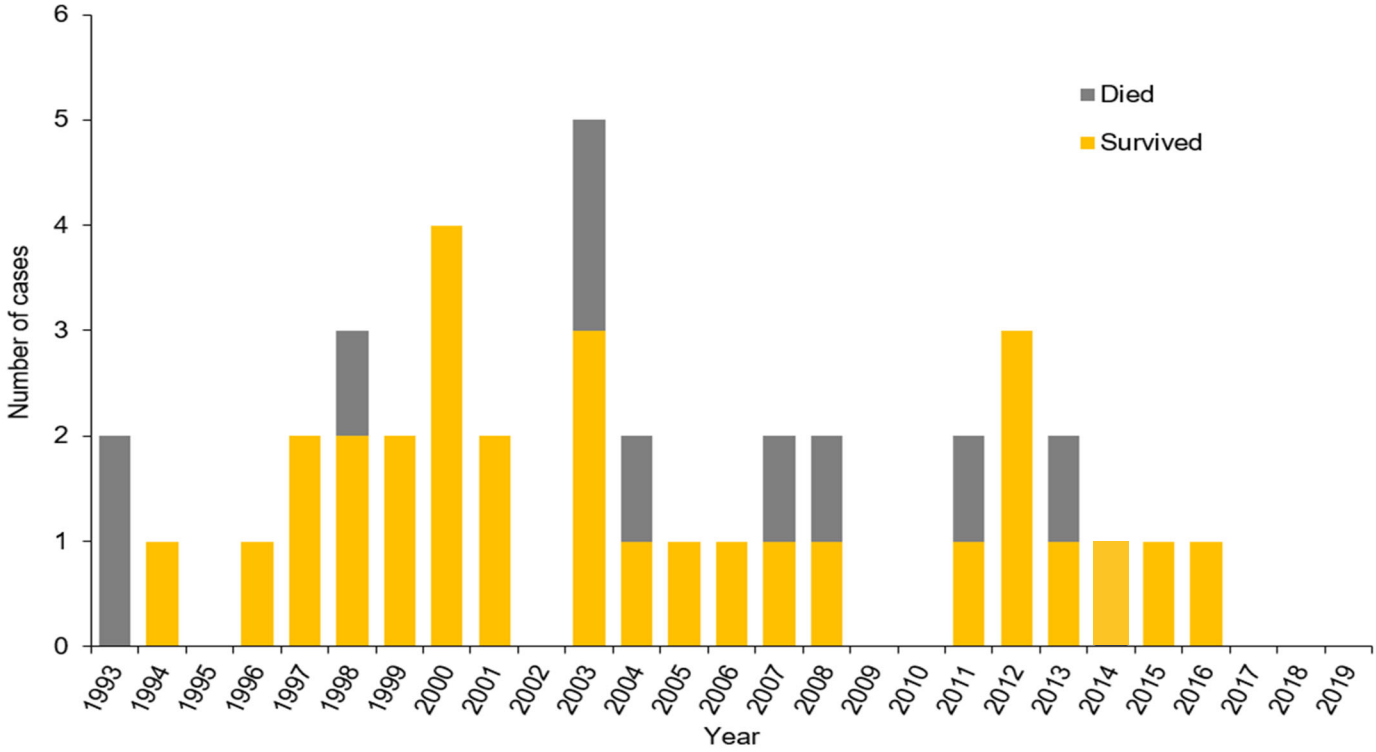
Hantavirus is a serious disease first recognized in 1993 and is most often caused by the Sin Nombre virus in Montana. It is transmitted to humans through exposure to infected rodent urine, droppings, or saliva. The deer mouse is the most common host of the virus and is widespread in Montana.

Most 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 44 cases of hantavirus infection, including 10 deaths (Figure 27).

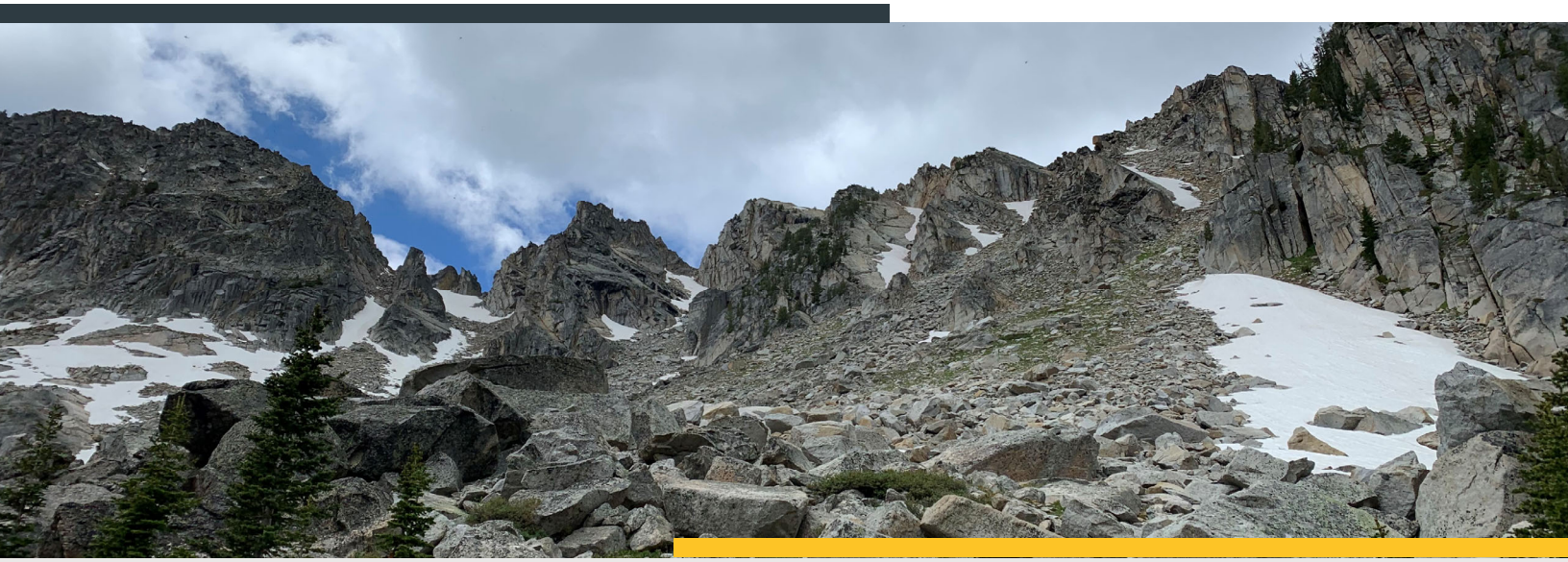
No cases of hantavirus were reported in Montana in the past three years: 2017, 2018, or 2019.

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, 1993-2019



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, Mexico, and South America. In the United States, *Coccidioides* fungus can be found in Arizona, California, Nevada, New Mexico, Texas, and Utah. People can become infected by breathing in dust that contains the fungal spores. Coccidioidomycosis is most common in adults aged 60 and older.

Coccidioidomycosis is not endemic in Montana. Most of Montana's cases are in individuals that previously lived or worked in areas where coccidioidomycosis is endemic. The remainder of cases that are seen in Montana are residents that spend their winters in endemic areas.

In 2019, there were 25 cases of coccidioidomycosis reported, 17 of whom were aged 60 years and older. All cases reported spending time in states endemic for *C. immitis.*

CREUTZFELDT-JAKOB DISEASE

Creutzfeldt-Jakob Disease (CJD) is a rare transmissible spongiform encephalopathy (TSE) that is universally fatal and 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 2019, two cases of CJD were reported, both in males older than 65 years.

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 14 reported cases of Legionnaires' disease in Montana in 2019, and 86% were aged 50 years or older. Of the 14 cases, 12 were hospitalized and there were zero 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, 2019

AT RISK BY BREATHING IN SMALL DROPLETS

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*.

CASES INCREASED BY 280%

The number of Legionellosis cases in Montana has increased by 180% between 2010 and 2019, with 4 cases reported in 2010 and 14 cases reported in 2019.

RAIN, DROUGHT, WARMER TEMPERATURES

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.

Acknowledgements

- *We thank our local public health jurisdictions for their dedication to public health.*
- *Additional gratitude to the Montana Public Health Laboratory (MTPHL) for assistance during disease investiga tions.*
- *The Montana Department of Commerce and the CDEpi team for beautiful photos of Montana.*

References

1. Centers for Disease Control and Prevention (CDC). 2019 Nationally Notifiable Infectious Conditions. Available at: 2019 National Notifiable Infectious Diseases (Historical) (cdc.gov)
2. National Center for Health Statistics. Bridged-race postcensal Vintage 2019 population estimates for April 1, 2010—July 1, 2019. 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: Bridged-Race Population Estimates - Data Files and Documentation (cdc.gov) as of August, 9, 2021.
3. World Health Organization (WHO). Estimates of disease burden. Available at: http://www.who.int/immunization/monitoring_surveillance/burden/estimates/en/
4. Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect.* 1999; 75(1): 3–17. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1758168/pdf/v075p00003.pdf

Appendix I: Comparative Statistics for Reportable Communicable Diseases—Montana, 2011–2019*†

CONDITION	Reported cases										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019 Rate‡	5 year median
Botulism, infant	0	0	0	1	0	1	2	0	1	0.09	1
Campylobacteriosis	236	233	205	216	323	372	406	432	374	34.99	372
Chlamydia	3412	3827	3818	4193	4183	4423	4552	4901	4752	444.62	4552
Coccidioidomycosis	5	3	3	10	12	13	18	28	25	2.34	18
Colorado Tick Fever	1	1	0	1	1	0	2	0	1	0.09	1
Cryptosporidiosis	77	69	125	66	39	62	70	81	72	6.74	70
Cyclosporiasis	0	0	0	2	3	0	3	10	2	0.19	3
Dengue Fever	0	2	5	1	6	3	1	0	6	0.56	3
Giardiasis	87	67	91	89	93	120	125	89	79	7.39	93
Gonorrhea	84	108	224	434	844	868	781	1176	1571	146.99	844
Haemophilus influenzae, invasive	3	6	6	14	15	19	19	17	27	2.53	19
Hepatitis A	3	6	6	5	2	3	3	0	17	1.59	3
Hepatitis B, acute	0	2	4	0	7	1	3	1	1	0.09	1
Hepatitis B, chronic	24	27	21	32	35	21	35	20	25	2.34	25
Hepatitis C, acute	9	9	16	13	15	21	15	13	19	1.78	15
Hepatitis C, chronic	1349	1544	1142	1413	1386	1664	1665	1530	1335	124.91	1530
HIV/AIDS	21	22	23	14	18	22	30	23	26	2.43	22
Legionellosis	1	4	10	5	8	10	17	10	14	1.31	10
Lyme disease	11	6	18	6	5	17	11	7	8	0.75	8
Meningococcal disease	4	10	1	4	1	2	1	0	3	0.28	1
Mumps	0	1	0	1	1	26	6	6	17	1.59	6
Pertussis	134	547	663	494	230	21	106	143	494	46.22	143
Q fever	15	2	2	4	5	1	3	3	2	0.19	3
Rabies, animal	18	25	36	16	21	10	13	17	18	1.68	17
Rabies, post-exposure prophylaxis (rPEP)	NR	NR	NR	112	198	153	199	223	206	19.46	199
Salmonellosis (excluding para-typhoid and typhoid)	120	110	94	145	195	177	140	135	136	12.72	140
Shiga toxin-producing *Escherichia coli (STEC)*	39	44	49	39	85	133	97	121	69	6.46	97
Shigellosis	124	12	69	44	14	8	10	12	11	1.03	11
Spotted Fever Rickettsiosis	1	3	2	4	9	9	11	9	3	0.28	9
Streptococcal toxic shock syndrome	0	0	0	0	4	3	3	2	2	0.19	3
Streptococcus pneumoniae, invasive	22	33	31	41	61	99	112	121	131	12.26	112
Syphilis (primary and secondary)	9	3	8	9	13	14	48	45	59	5.52	45
Tetanus	1	1	0	0	0	0	1	0	1	0.09	0
Transmissible spongiform encepha-lopathies (TSE), including CJD	4	1	3	3	1	1	2	2	2	0.19	2
Tuberculosis	8	5	6	6	9	4	3	5	2	0.19	4
Tularemia	3	3	5	1	7	3	6	4	2	0.19	4
Varicella	163	133	84	72	132	77	54	57	52	4.87	57
Vibriosis	NR	NR	3	2	0	2	8	14	2	0.19	2
West Nile Virus											

*Confirmed and probable cases only. †Conditions for which there were zero (0) cases in 2019 are not reflected in this table. ‡Rate = per 100,000. NR = Not Reportable. N/A = Not Applicable.

Appendix II: Cases of Reportable Communicable Diseases by Jurisdiction—Montana, 2019

JURISDICTION	Botulism, infant	Campylobacteriosis	Chikungunya virus	Chlamydia	Coccidioidomycosis	Colorado Tick Fever	Cryptosporidiosis	Cyclosporiasis	Dengue Fever	Giardiasis	Gonorrhea	*Haemophilus influenzae*, invasive	Hepatitis A	Hepatitis B, acute	Hepatitis B, chronic	Hepatitis C, acute	Hepatitis C, chronic	HIV/AIDS	Lead poisoning	Legionellosis	Leptospirosis	Lyme disease	Meningococcal disease (*Neisseria meningitidis*)	Mumps	Pertussis	Q fever, Acute	Rabies, animal	Rabies, post-exposure prophylaxis (rPEP)	Salmonellosis (excluding paratyphoid and typhoid)	Shiga toxin-producing *Escherichia coli* (STEC)	Shigellosis	Spotted Fever Rickettsiosis	Streptococcal toxic shock syndrome	*Streptococcus pneumoniae*, invasive	Syphilis, primary and secondary	Tetanus	Transmissible Spongiform Encephalopathies (TSE)	Tuberculosis	Tularemia	Varicella (Chickenpox)	Vibriosis (non-cholera Vibrio species infections)	West Nile Virus
BEAVERHEAD	--	13	--	48	--	--	7	--	--	1	1	--	--	--	--	--	4	--	--	--	--	--	--	--	4	--	--	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--
BIG HORN/CROW	--	10	--	206	--	--	--	--	--	2	110	1	--	--	--	3	27	--	2	--	--	--	--	--	12	1	--	1	1	4	--	--	--	1	--	--	--	--	1	1	--	--
BLAINE/FT. BELKNAP	--	4	--	54	--	--	--	--	--	--	28	--	1	--	--	--	22	--	--	--	--	--	--	--	13	--	--	--	1	--	--	--	--	1	--	--	--	1	--	--	--	--
BROADWATER	--	3	--	15	--	--	--	--	--	1	--	--	--	--	--	--	6	--	1	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--
CARBON	--	3	--	20	--	--	--	--	--	1	4	--	--	--	--	--	4	--	6	--	--	--	--	--	--	--	--	5	--	1	--	--	--	3	--	--	--	--	--	--	--	--
CARTER	--	6	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CASCADE	--	23	--	529	6	--	3	--	--	2	166	2	1	--	2	--	109	6	10	1	--	--	1	--	2	--	--	19	13	10	1	--	--	6	33	--	--	1	--	1	--	--
CHOUTEAU	--	2	--	8	--	--	1	--	--	--	1	--	--	--	--	--	2	--	--	--	--	--	--	--	1	--	--	--	2	1	--	--	--	--	--	--	--	--	--	--	--	--
CUSTER	--	2	--	46	--	--	--	--	--	--	5	1	--	--	--	1	22	1	--	--	--	--	--	--	--	--	--	2	--	1	--	--	1	--	--	--	--	--	3	--	1
DANIELS	--	2	--	2	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DAWSON	--	--	--	14	--	--	--	--	--	--	2	--	--	--	--	--	10	--	1	--	--	--	--	--	1	--	--	1	2	--	--	--	--	2	--	--	--	--	--	--	--	--
DEER LODGE	--	4	--	33	--	--	--	--	--	--	7	--	--	1	--	--	14	--	2	--	--	--	--	4	--	--	--	--	2	1	--	--	--	--	--	--	--	--	1	--	--
FALLON	--	1	--	9	--	--	--	--	--	--	--	--	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FERGUS	--	6	--	16	--	--	1	--	--	1	3	--	--	--	1	--	7	1	5	--	--	--	--	--	--	--	--	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
FLATHEAD	1	36	--	254	4	--	4	--	--	15	72	2	2	--	2	--	86	1	4	2	--	1	--	--	85	--	4	58	16	12	1	2	1	11	--	--	--	--	8	1	--
GALLATIN	--	38	--	482	2	--	18	1	5	13	48	1	2	--	1	--	50	4	6	3	1	3	1	12	75	--	4	5	15	4	2	--	--	7	3	--	--	--	--	5	--	--
GARFIELD	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GLACIER/BLACKFEET	--	3	--	149	--	--	--	--	--	1	58	--	--	--	--	--	66	--	--	--	--	--	--	--	1	--	1	3	3	3	--	--	--	1	--	--	--	--	1	--	--	--
GOLDEN VALLEY	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--
GRANITE	--	2	--	12	--	--	1	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
HILL/ROCKY BOY	--	1	--	222	--	--	--	--	--	--	30	--	--	--	--	1	24	--	2	1	--	--	--	--	2	--	1	2	2	1	--	--	--	5	--	--	--	--	--	--	--	--
JEFFERSON	--	6	--	19	1	--	2	--	--	2	3	--	--	--	--	--	9	1	--	1	--	1	--	--	5	--	--	--	1	1	--	--	--	2	--	--	--	--	--	2	--	--
JUDITH BASIN	--	4	--	1	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--
LAKE/CSKT	--	18	--	174	3	--	2	--	--	2	50	1	--	--	--	--	33	1	1	--	--	2	--	--	32	--	--	7	3	4	--	--	--	8	--	1	1	--	--	4	--	--
LEWIS AND CLARK	--	15	--	237	--	--	2	1	--	2	27	--	1	--	2	--	63	1	2	2	--	--	--	--	30	--	1	4	20	2	2	1	--	8	6	--	--	--	--	5	--	1
LIBERTY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LINCOLN	--	7	--	39	1	--	--	--	--	3	2	--	--	--	1	--	27	--	--	--	--	--	--	--	1	--	--	6	2	3	--	--	--	2	--	--	--	--	--	--	1	--
MADISON	--	4	--	10	1	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	2	--	1	--	--	--	1	--	--	--	--	--	--	--	--

MEAGHER	--	6	--	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINERAL	--	1	--	6	--	--	--	--	--	--	--	--	--	--	--	--	5	--	1	--	--	--	--	--	--	--	1	7	--	1	--	--	--	--	--	--	--	--	1	--	--
MISSOULA	--	33	1	520	1	1	10	--	1	15	119	3	--	--	6	1	129	8	4	2	--	1	1	--	174	--	2	28	12	2	2	--	--	18	4	--	--	--	--	3	--	--
MUSSELSHELL	--	1	--	7	--	--	--	--	--	--	5	--	--	--	--	--	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PARK	--	6	--	27	--	--	5	--	--	--	12	--	1	--	--	--	22	--	3	--	--	--	--	--	17	--	1	5	3	--	1	--	--	4	--	--	--	--	--	--	--	--
PETROLEUM	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHILLIPS	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
PONDERA	--	5	--	6	--	--	--	--	--	--	2	--	1	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--
POWDER RIVER	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
POWELL	--	5	--	65	--	--	1	--	--	--	5	1	--	--	1	--	123	1	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	2	--	--	--	--	5	--	--
PRAIRIE	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RAVALLI	--	14	--	76	2	--	2	--	--	--	13	--	1	--	1	1	24	--	1	--	--	--	--	1	12	--	--	21	6	2	--	--	--	5	1	--	1	--	--	1	--	--
RICHLAND	--	--	--	40	--	--	4	--	--	3	3	--	--	--	--	--	8	1	--	--	--	--	--	--	--	1	--	2	1	--	--	--	--	--	--	--	--	--	2	--	--
ROOSEVELT/FT. PECK	--	--	--	171	--	--	1	--	--	--	144	2	--	--	--	1	67	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	3	--	--	--	--	--	--	--
ROSEBUD/N. CHEY-ENNE	--	1	--	154	--	--	--	--	--	--	115	--	--	--	--	1	31	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--
SANDERS	--	5	--	26	--	--	1	--	--	--	8	--	--	--	1	--	18	--	--	--	--	--	--	--	2	--	--	1	--	--	--	--	--	1	--	--	--	--	--	4	--	1
SHERIDAN	--	2	--	4	--	--	--	--	--	--	1	1	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SILVER BOW	--	10	--	154	2	--	--	--	--	1	78	1	--	--	--	--	69	--	9	--	--	--	--	--	4	--	--	2	9	1	--	--	--	15	--	--	--	--	1	--	--
STILLWATER	--	10	--	18	--	--	--	--	--	--	5	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
SWEET GRASS	--	--	--	2	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--
TETON	--	5	--	14	--	--	--	--	--	--	1	1	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	1	1	--	1	--	--	1	--	--	--	--	--	--	--
TOOLE	--	1	--	8	--	--	--	--	--	--	6	--	--	--	1	--	23	--	1	--	--	--	--	--	--	--	--	1	4	--	--	--	--	--	1	--	--	--	--	--	--
TREASURE	--	1	--	2	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VALLEY	--	1	--	12	--	--	--	--	--	1	--	1	--	--	--	--	2	--	1	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
WHEATLAND	--	3	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
WIBAUX	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
YELLOWSTONE	--	50	--	825	2	--	4	--	--	11	436	8	7	--	6	9	202	2	16	1	--	--	--	--	15	--	2	14	10	9	--	--	--	20	11	--	--	--	--	4	--	--
MONTANA	**1**	**374**	**1**	**4752**	**25**	**1**	**72**	**2**	**6**	**79**	**1571**	**27**	**17**	**1**	**25**	**19**	**1335**	**28**	**80**	**14**	**1**	**8**	**3**	**17**	**494**	**2**	**18**	**208**	**136**	**69**	**11**	**3**	**2**	**131**	**59**	**1**	**2**	**2**	**2**	**52**	**2**	**3**

Appendix III: Montana Demographic Profile, 2019

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 ≥60,000 residents.*,±

CHARACTERISTIC	POPULATION	PERCENT±
	1,068,778	100
GEOGRAPHIC CLASSIFICATION		
Urban	161,300	15.1
Rural	619,178	57.9
Frontier	288,300	27.0
SEX		
Male	538,066	50.3
Female	530,712	49.7
AGE GROUP (YEARS)		
<1	11,659	1.1
1-4	49,497	4.6
5-14	129,305	12.1
15-24	135,891	12.7
25-39	207,083	19.4
40-64	328,906	30.8
65+	206,437	19.3
RACE		
White	967,929	90.6
American Indian and Alaska Native	77,993	7.3
Black or African American	10,632	1.0
Asian	12,224	1.1
ETHNICITY		
Not Hispanic or Latino	1,025,489	95.9
Hispanic or Latino	43,289	4.1

*The Montana Infectious Disease Information System (MIDIS) generated report of 2019 data. The six counties are Yellowstone, Missoula, Gallatin, Flathead, Cascade, and Lewis and Clark.

±Based on 2019 population estimates from the National Center for Health Statistics. Bridged-race postcensal Vintage 2019 population estimates for April 1, 2010—July 1, 2019. 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: Bridged-Race Population Estimates - Data Files and Documentation (cdc.gov) as of August, 9, 2021.

Appendix IV: Diseases Reportable to Public Health in Montana, 2019

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

MONTANA
COMMUNICABLE
DISEASE EPIDEMIOLOGY