



COMMUNICABLE DISEASE IN **MONTANA**

COMBINED ANNUAL REPORT **2021 AND 2022**



MONTANA
COMMUNICABLE
DISEASE EPIDEMIOLOGY

Prepared by the Communicable Disease Epidemiology Section

Public Health and Safety Division

Montana Department of Public Health and Human Services (DPHHS)

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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 infectious diseases reported by the State of Montana in 2021 and 2022. These reportable conditions met the 2021 and 2022 case definitions provided by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). Reportable conditions 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](#)). Infectious 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 infectious disease statistics are found in Appendices I-V. Small numbers are suppressed in some places to protect patient confidentiality. 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 DPHHS Public Health Physician

As we resume more traditional public health activities following expiration of the federal COVID-19 Public Health Emergency, the Montana public health workforce emerges with enhanced skills for preventing and controlling communicable disease.

The prevention and control of communicable disease is one of the most important aspects of public health practice in the United States and is necessary to ensure the health and well-being of Montana citizens. Core public health activities include:

- Responding to and tracking outbreaks of infectious diseases, such as influenza, foodborne and vector-borne illnesses, and newly emerging diseases;
- Testing for and treating infectious diseases;
- Preparing communities for disease outbreaks of all scales; and
- Providing education and key messaging to prevent transmission of disease.

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

Over the past two years, the Montana Department of Public Health and Human Services (DPHHS) has worked closely with local and tribal health jurisdictions as we collectively exercised our outbreak response skills to effectively manage the Montana mpox outbreak by promoting prevention through readily available vaccination, and supporting efficient disease recognition, diagnosis, and treatment, when necessary. We also worked together in new ways to raise awareness and provide education on the persistent threat of syphilis and congenital syphilis in Montana through education and outreach during community events.

The Montana Communicable Disease Annual Report summarizes and highlights the diseases and outbreaks investigated by DPHHS Public Health and Safety Division partners and local and tribal health jurisdictions and partners during 2021 and 2022. Data trends and public health events of importance are described and analyzed in order to understand the impact of specific communicable diseases on the health of people living in Montana.

We thank the public health staff who have demonstrated inspiring resiliency following a pandemic response as we pivot to resume the traditional public health activities that keep our Montana communities safe and healthy!



Maggie Cook-Shimanek, MD, MPH

Montana Department of Public Health and Human Services



Who We Are & What We Do

Preventing and controlling the spread of disease is the heart of public health work. In coordination with local health agencies, the Communicable Disease Epidemiology Section (CDEpi) keeps that mission in mind as we work each day to improve and protect the health of all Montanans. CDEpi works closely with the Sexually Transmitted Disease Prevention Section, Montana Infectious Disease Information System (MIDIS), Infection Control and Prevention/Healthcare-associated Infections Section (ICP/HAI), and many other programs at DPHHS to protect the health and well-being of Montanans.

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 at DPHHS 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 used 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.

VECTOR-BORNE AND ZOO NOTIC DISEASES

Vector-borne and Zoonotic Epidemiology monitors and provides assistance with investigating vector-borne diseases, such as those caused by ticks, mosquitoes, and animals. This program manages the response to potential

rabies exposures, including dog bites and bat exposures.

INFLUENZA, COVID-19, AND OTHER RESPIRATORY DISEASES

The Respiratory Disease Section in CDEpi manages the surveillance for influenza, COVID-19, and other seasonal respiratory illness such as respiratory syncytial virus (RSV), as well as prevention messaging for respiratory diseases.

INFECTION CONTROL AND PREVENTION/HEALTHCARE-ASSOCIATED INFECTIONS SECTION (ICP/HAI)

The ICP/HAI section manages the healthcare-associated infections program in Montana by monitoring outbreaks of HAI and providing education on infection prevention in healthcare settings and congregate settings. This program also has oversight of antibiotic stewardship programs in the state.

MONTANA INFECTIOUS DISEASE INFORMATION SYSTEM (MIDIS)

The Montana Infectious Disease Information System (MIDIS) is 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 (CDC). Epidemiologists use this database daily to investigate cases, monitor trends in diseases, and identify outbreaks.

SEXUALLY TRANSMITTED DISEASES (STD) PREVENTION SECTION

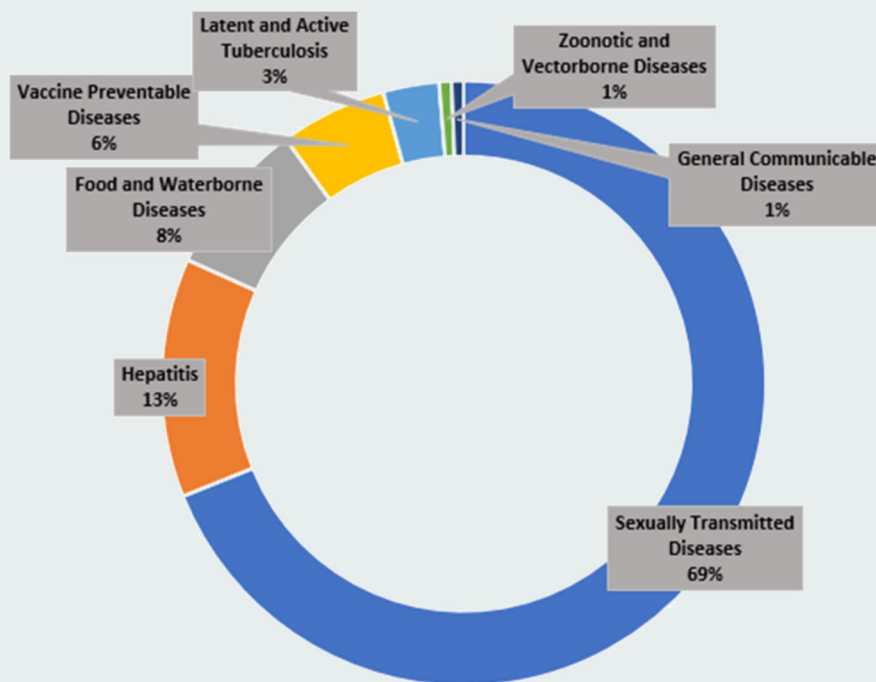
The STD program manages the STD surveillance and prevention of sexually transmitted infections (STIs) in Montana. Surveillance data is used to identify common risk factors and guide prevention messaging and activities to reduce the transmission of STIs. This program also reimburses local clinics for STI testing for uninsured people at high risk for STIs.

Preface

The *Communicable Disease in Montana Combined Annual Report for 2021 and 2022* contains data for notifiable diseases and conditions reported to Montana DPHHS in both 2021 and 2022. Data are collected from local and tribal public health jurisdictions, laboratories, healthcare providers, hospitals, and other healthcare facilities as described by the Administrative Rules of Montana (ARM) 37.114.201. In 2021 and 2022, Montana DPHHS tracked more than 8,000 non-COVID-19 communicable disease cases each year. The COVID-19 pandemic continued to cause disease and outbreaks during 2021 and 2022, with 116,257 and 122,903 cases reported per year, respectively. Each reported case of a reportable condition is investigated by local and tribal public health jurisdictions, and includes application of control measures to prevent further spread of disease. The distribution of reportable disease cases in 2021 and 2022 is depicted in Figure 1.

The Notable Events section presents information on noteworthy reports from 2021 and 2022 for selected diseases that were above expected values or were newly emerging. Incidence and historical five-year

FIGURE 1. REPORTED NON-COVID COMMUNICABLE DISEASES BY CATEGORY, MONTANA, 2021 AND 2022



medians are presented in Appendices I and II.

In addition, the Montana Demographic Profile is presented in Appendices III and V. Cases are counted by the week and year in which they occurred as determined by the Morbidity and Mortality Weekly Report (MMWR) assigned by the CDC.

Notable Events, 2021 and 2022

Wound Botulism

One case of wound botulism was diagnosed in Montana in 2021. Wound botulism is a rare and potentially fatal paralytic illness that occurs when a wound is contaminated by *Clostridium botulinum* spores that germinate and produce neurotoxins inside the wound. A treatment called antitoxin can stop the toxin from causing more harm, but cannot undo the damage already done. Injection drug use is the leading cause of wound botulism in the United States. The Montana case diagnosed in 2021 had a recent history of injecting black tar heroin. Symptoms of infection include double or blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, muscle weakness, difficulty breathing, or paralysis. The Montana case was hospitalized for the illness, and survived after the administration of antitoxin.

Multi-drug Resistant TB

In 2022, there were 6 cases of tuberculosis (TB) reported in Montana. One of the cases identified was a multi-drug resistant tuberculosis (MDR TB) case, the first case of MDR TB in the state since 2015. Treatment for MDR TB is expensive, complicated, and requires extensive collaboration with TB experts, state and local public health, pharmacists, and attending infectious disease physicians. Direct costs, mostly covered by the public sector, average \$134,000 per MDR TB case. In comparison, estimated costs per non-MDR TB patient are \$17,000. The 2022 case is still on treatment as of the end of 2023, as it takes 18 months or more, on



average, of daily treatment to treat MDR TB. A multistate contact investigation was conducted, with over 50 individuals identified as contacts. Fortunately, no contacts were determined to be infected by the source case. Active tuberculosis cases can be prevented by performing appropriate latent tuberculosis infection testing on anyone who has been exposed to an active case, was born outside of the United States in a high TB incidence country, or plans to begin or is on immunosuppression therapy.

Mpox*

In May 2022, large outbreaks of mpox emerged in multiple countries worldwide that do not normally report mpox. The mpox outbreak affected Montana later that year. Seven cases of mpox were reported in Montana residents between August and October 2022. All seven cases were males in their 20s to 50s. During the 21 days prior to symptom onset, six cases reported male-to-male sexual contact and six reported out-of-state travel. Two cases were persons living with HIV, and two had other STI infections identified at the time of diagnosis. Four cases were treated with Tecovirimat (TPOXX), a smallpox treatment that was authorized for the treatment of mpox cases during the outbreak of 2022. There was one hospitalization and no deaths.

As of the publishing date of this report in December 2023, there is an available vaccine and treatment option for mpox infection. The JYNNEOS vaccine is available for protection against mpox for all Montanans who self-identify as being at increased risk for infection. TPOXX is available to eligible patients to treat mpox under the STOMP (Study of Tecovirimat for Mpox) trial or under the investigational new drug (IND) protocol.

*formerly known as monkeypox

Waterborne *Campylobacter* Outbreak

In the spring of 2022, a large campylobacteriosis outbreak was reported and investigated in Sanders County. Nineteen *Campylobacter* cases were identified as

part of the outbreak; one case was hospitalized, and there were no deaths. All infected persons reported drinking water from a watering point near Paradise, Montana. The water was accessed through a built-up watering point that was locally perceived as a spring, but pulled surface water directly from a nearby creek. The local community had used this watering point as a drinking water source for many decades.

As part of the outbreak investigation, Sanders County Environmental Health staff collected a water sample from the suspect outbreak source. The Montana Public Health Laboratory (MTPHL) isolated *Campylobacter jejuni* from the water sample. Whole genome sequencing (WGS) showed that two of the clinical samples and the water sample were highly genetically related. The combination of laboratory testing and epidemiologic investigation provided confirmatory evidence that the outbreak was the result of drinking water directly from the watering point.

An unoccupied bird's nest was found inside the box where the water sample was collected. Birds are a known source of *Campylobacter*, and although no birds were present at the time of sample collection, the presence of the nest indicates birds may have been the primary contamination source that led to the outbreak.

Due to the strong evidence supporting the watering point as the source of the outbreak, public access to the watering point was removed in late spring 2022 by rerouting the creek water so that it remained underground. Persons drinking water from outdoor sources, including creeks, rivers, and streams, should always treat the water before drinking it. Boiling water is the most reliable way to kill germs, but treatment including filtration will also reduce the risk of illness from drinking water from outdoor sources.

An MMWR article about the outbreak was published in April 2023: <https://www.cdc.gov/mmwr/volumes/72/wr/mm7215a6.htm>.

COVID-19

COVID-19 is an infectious respiratory disease that was discovered in December 2019 in Wuhan, China. COVID-19 is caused by the SARS-CoV-2 virus. This virus is part of the coronavirus family, which includes common viruses that cause a variety of diseases. Occasionally, this family of viruses can cause more severe and rare diseases such as severe acute respiratory syndrome (SARS), Middle East Respiratory Syndrome (MERS), and COVID-19. Symptoms of this virus include fever, chills, cough, shortness of breath, sore throat, congestion, and headache. Similar to other respiratory viruses, coronaviruses spread through droplets that are secreted when someone breathes, coughs, sneezes, or speaks.

Montana reported 239,160 cases of COVID-19 between 2021 and 2022. From August to November of 2021, the Delta variant of COVID-19 was the dominant circulating variant, and caused the most COVID-related hospitalizations and deaths in Montana compared to any other variant. Beginning in January 2022, Omicron became the dominant circulating variant and has remained the dominant circulating variant as of this report’s publishing (December 2023).

- Of the 239,160 cases of COVID-19 that were reported between January 2021 and December 2022, 9,890 (4.1%) resulted in hospitalization and 2,218 (0.9%) resulted in death.
- 25% of all COVID-19 cases reported in 2021 and 2022 occurred in January 2022, when the Omicron variant first emerged in Montana.

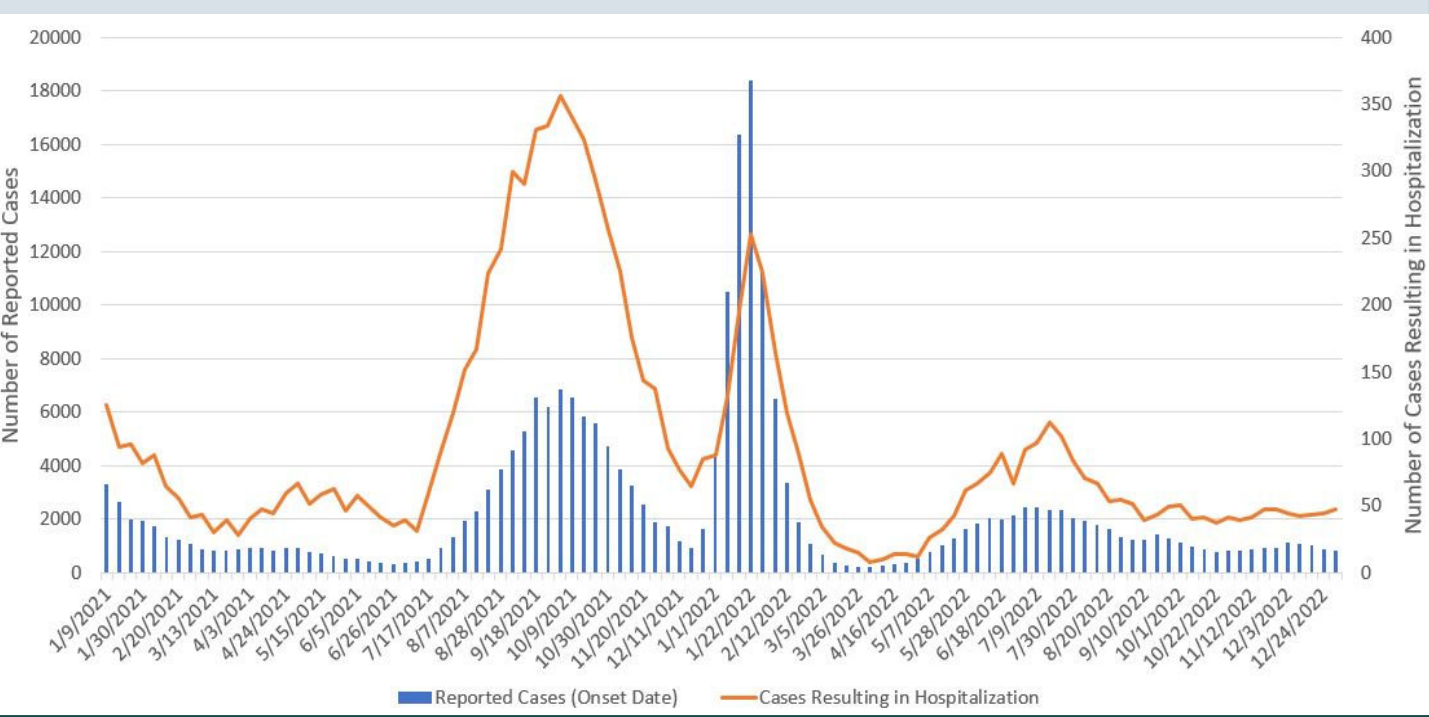
TABLE 1. TOTAL CASES, HOSPITALIZATIONS, AND DEATHS DUE TO COVID-19, MONTANA, 2021-2022

Year	Cases	Hospitalizations	Deaths
2021	116,257	6,516	1,655
2022	122,903	3,374	563

TABLE 2. COVID-19 CASES BY MONTH AND YEAR, MONTANA, 2021-2022

Month	2021	2022
January	10,868	59,097
February	5,249	11,025
March	3,913	1,540
April	3,917	1,547
May	2,908	5,452
June	1,713	9,152
July	3,401	10,162
August	13,122	7,185
September	25,845	5,509
October	24,781	3,865
November	12,087	4,082
December	8,453	4,287

FIGURE 2. COVID-19 CASES AND HOSPITALIZATIONS BY DATE OF DISEASE ONSET, MONTANA 2021-2022

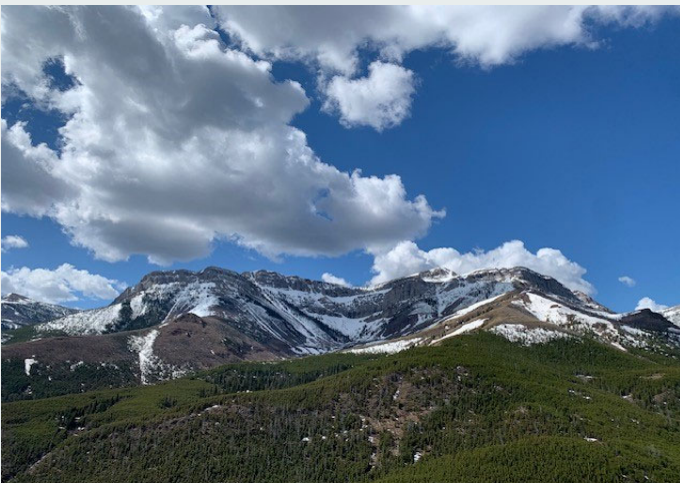
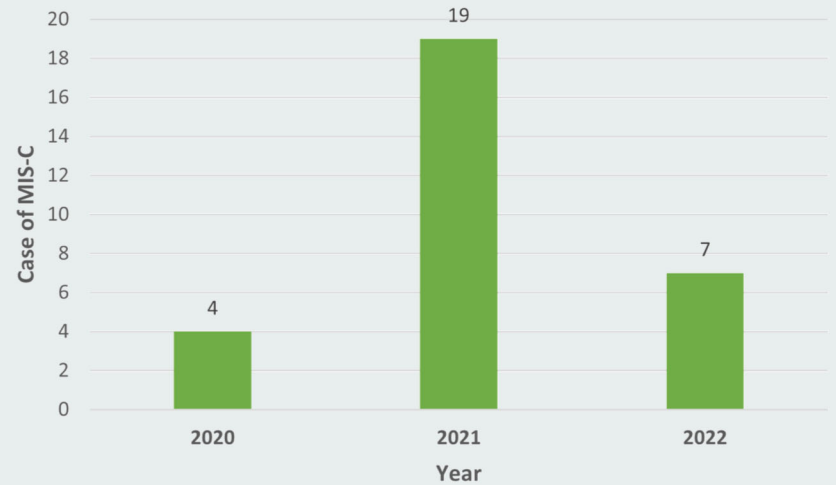


MIS-C

Multisystem inflammatory syndrome in children, or MIS-C, is a severe post-COVID-19 condition that causes inflammation to multiple body parts, including the heart, brain, skin, eyes, gastrointestinal tract, lungs, and kidneys. Symptoms can be similar to Kawasaki disease, and require hospital care. Research is ongoing worldwide to understand the full effects of MIS-C.

The first case of MIS-C in Montana was reported in August 2020. In 2021, there were 19 reported cases of MIS-C in Montana. In 2022, there were 7 cases reported, including one death. The median age of patients between both years was 6 years with a range of < 1 – 18 years. None of the patients with MIS-C had received a vaccination for the SARS-CoV-2 virus. Vaccination against SARS-CoV-2 is recommended for protection against MIS-C.

FIGURE 3. MIS-C CASES BY YEAR, MONTANA, 2020-2022



Healthcare-Associated Infections

In December 2021, the Healthcare-Associated Infection program, historically embedded in the Communicable Disease Epidemiology Section, became its own section, called the Infection Control and Prevention/Healthcare-Associated Infections Section (ICP/HAI). The section consists of a section supervisor, four infection prevention specialists, one contracted infection preventionist, two pharmacy experts, and one epidemiologist.

Carbapenem-Resistant Organisms (CROs)

The ICP/HAI section monitored for multi-drug resistant organisms (MDROs) of concern, including Carbapenem-Resistant Organisms (CROs) in 2021 and 2022. CROs are organisms that are resistant to the antibiotic class of carbapenems. The most common CROs are within the Enterobacterales order (CRE), *Acinetobacter baumannii* (CRAB), and *Pseudomonas aeruginosa* (CRPA). CROs are required to be sent to the Montana Public Health Laboratory (MTPHL) for confirmation as dictated in Rule 37.114.313. In 2021, Montana saw a 41.7% increase in CREs and a 9.8% increase in CRPAs compared to 2020. In 2022, Montana saw a 23.5% increase in CREs and a 15.6% increase in CRPAs from 2021. CRAB was detected in Montana in 2022; this was only the second time since 2019 that CRAB had been identified by the MTPHL.

Table 3. Total number of positive specimens for CREs, CRPAs, and CRAB sent to the MTPHL, 2021 and 2022

	2020	2021	2022
CRE	12	17	21
CRPA	41	45	52
CRAB	0	0	1

Table 4. CP-CROs identified in Montana by Year, Organism, and Mechanism, 2021 and 2022

Year	CP-CRO	Mechanisms
2021	<i>Enterobacter cloacae</i> complex	NDM
2022	<i>Klebsiella pneumoniae</i>	KPC
2022	<i>Klebsiella pneumoniae</i> and <i>Acinetobacter baumannii</i>	NDM (CP-CRE) and OXA-235 (CRAB)
2022	<i>Enterobacter cloacae</i> complex	IMI-1

CP-CRO

CROs that produce carbapenemases, enzymes that break down the antibiotic class of carbapenems, are considered Carbapenemase-Producing Carbapenem-Resistant Organisms (CP-CROs). The carbapenemase gene can be easily shared between bacteria, leading to the rapid spread of resistance. These organisms can be spread within the healthcare setting through contaminated healthcare worker hands or through contaminated equipment. In 2021, one CP-CRO was identified in Montana with the carbapenemase gene of New Delhi Metallo-beta-lactamase (NDM). In 2022, three CP-CROs were identified in Montana. The first was identified with the *Klebsiella pneumoniae* carbapenemase (KPC) gene, which is the first detection of this gene in Montana. The second CP-CRO was identified as a combination of a CP-CRO with the carbapenemase gene of NDM as well as CRAB with the carbapenemase gene of oxacillinase 235 (OXA-235). The final CP-CRO in 2022 was identified with the carbapenemase gene of IMI-1. Since the first CP-CRO case was identified in 2019, Montana has had six confirmed CP-CROs.

Healthcare-Associated Outbreaks

Between 2021 and 2022, the ICP/HAI section investigated 1,340 COVID-19 outbreaks in healthcare settings. In December 2021, the section began to monitor other types of communicable disease outbreaks, in addition to COVID-19, in healthcare settings. In 2022, Montana saw a 48.6% increase in COVID-19, an 18.2% increase in norovirus and acute gastrointestinal illness (AGI), a 900% increase in influenza, no change in Respiratory Syncytial Virus (RSV), and a 200% increase in CP-CRO healthcare-associated outbreaks compared to 2021.

Table 5. Healthcare-Associated Outbreaks, 2021 and 2022

	2021	2022
COVID-19	539	801
Norovirus/AGI	11	13
Influenza	1	10
RSV	2	2
Scabies	*	3
<i>Clostridioides difficile</i>	*	1
MRSA	*	1
CP-CRO	1	3

* Data unavailable

Enteric Diseases



Enteric diseases are diseases that affect the gastrointestinal (GI) system in humans. Symptoms of enteric diseases often include diarrhea (sometimes bloody), abdominal pain, vomiting, or nausea. Enteric pathogens are commonly transmitted through contaminated food or water, contact with animals, or close contact with a sick person. Handwashing after contact with animals, proper food handling, and drinking treated water and pasteurized milk can help reduce the risk of acquiring an enteric disease.

TABLE 6. ENTERIC ILLNESSES IN MONTANA, 2021 AND 2022

Condition	2021 Cases	2021 Incidence (per 100,000)	2022 Cases	2022 Incidence (per 100,000)
Campylobacteriosis	273	24.7	358	31.9
Salmonellosis	108	9.8	165	14.7
Shiga-toxin producing <i>E.coli</i> (STEC)	104	9.4	118	10.5
Giardiasis	60	5.4	65	5.8
Cryptosporidiosis	56	5.1	56	5.0
Shigellosis	7	0.6	15	1.3

CAMPYLOBACTERIOSIS

Campylobacteriosis is a diarrheal illness caused by the bacteria *Campylobacter*. The incidence of campylobacteriosis in Montana decreased for the third year in a row in 2021 (24.7 cases per 100,000 population), but increased again in 2022 to 31.9 cases per 100,000 population. The 2022 incidence is 59.5% higher than the national average of 20 cases per 100,000 population. Common sources of transmission of the bacteria include exposure to cattle or live poultry, and consumption of raw milk, untreated water, and undercooked foods such as chicken. A large outbreak including 19 cases of campylobacteriosis was reported in 2022 after individuals consumed water from an untreated water source in Sanders County.

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 2021, 108 cases of sal-

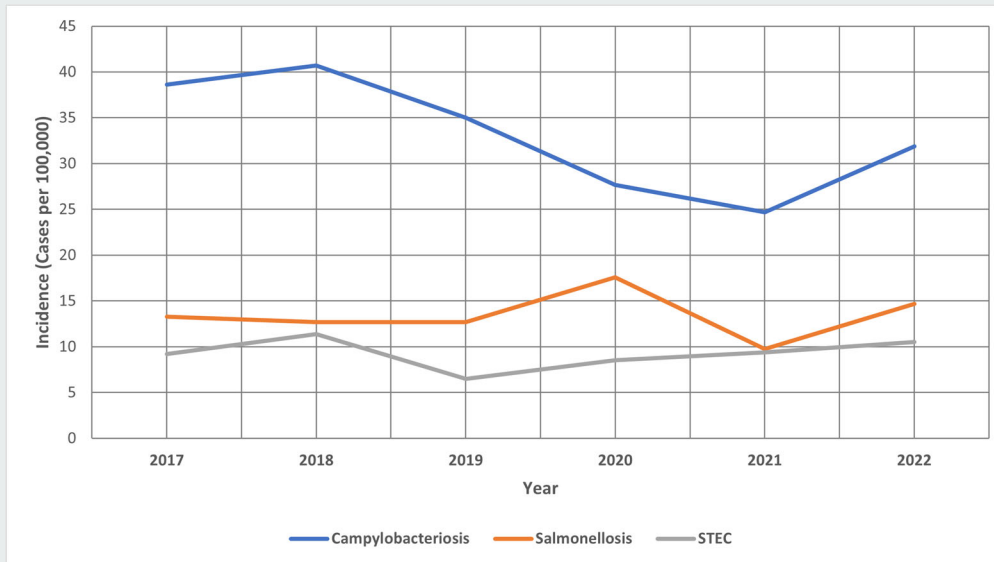
monellosis were reported in Montana. This increased to 165 cases reported in the state in 2022. The 2022 incidence of *Salmonella* cases, 14.7 per 100,000 population, is higher than the five-year average of 13.2 salmonellosis cases per 100,000 population between 2017 and 2021. Common risk factors for *Salmonella* infection include exposure to live poultry and ingestion of contaminated food.

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

STEC is an enteric disease characterized by abdominal pain and diarrhea that is often bloody. Some severe STEC infections can result in hemolytic uremic syndrome (HUS), a rare but serious kidney disease. Similar to recent years, there were 104 STEC cases reported in 2021 and 118 STEC cases reported in 2022, in Montana. Cattle are a common reservoir for STEC and are a primary source of infection in Montana. Consumption of undercooked beef and other contaminated foods are also risk factors for illness. There were no reported cases of HUS in Montana in 2021, and 3 cases of HUS reported in 2022. All HUS cases survived.

CYCLOSPORIASIS

Cyclosporiasis is an intestinal illness caused by the parasite *Cyclospora cayetanensis*. People are most likely to get sick with cyclosporiasis after consuming food or water contaminated with the parasite. Symptoms of cyclosporiasis include

FIGURE 4. SELECT ENTERIC ILLNESS RATES OVER TIME — MONTANA, 2017-2022

watery diarrhea, frequent bowel movements, loss of appetite, weight loss, and stomach cramps. There were four cyclosporiasis cases reported in Montana in 2021, and four in 2022.

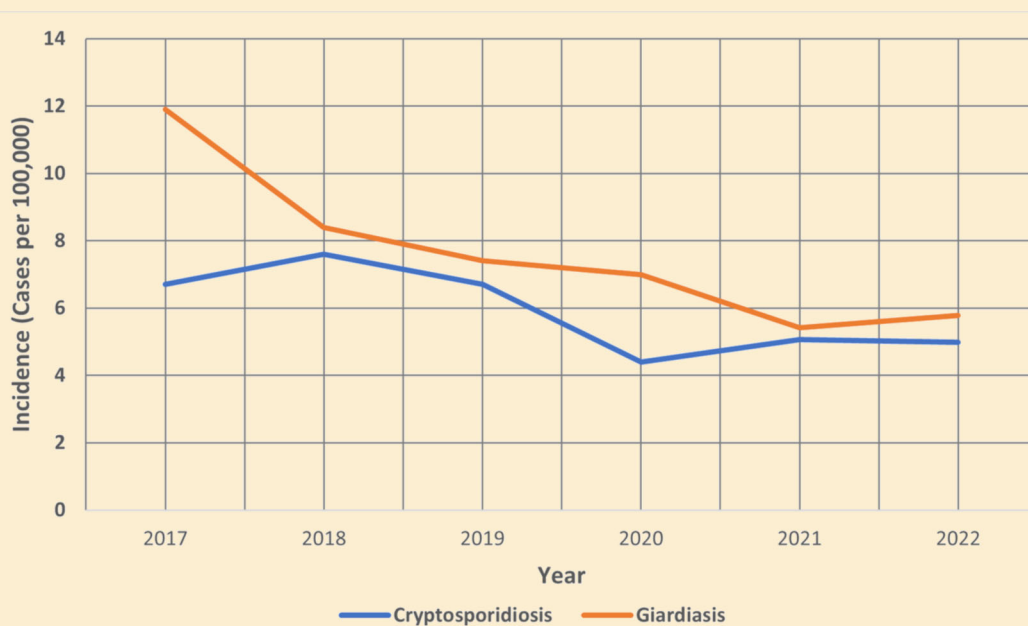
CRYPTOSPORIDIOSIS AND GIARDIASIS

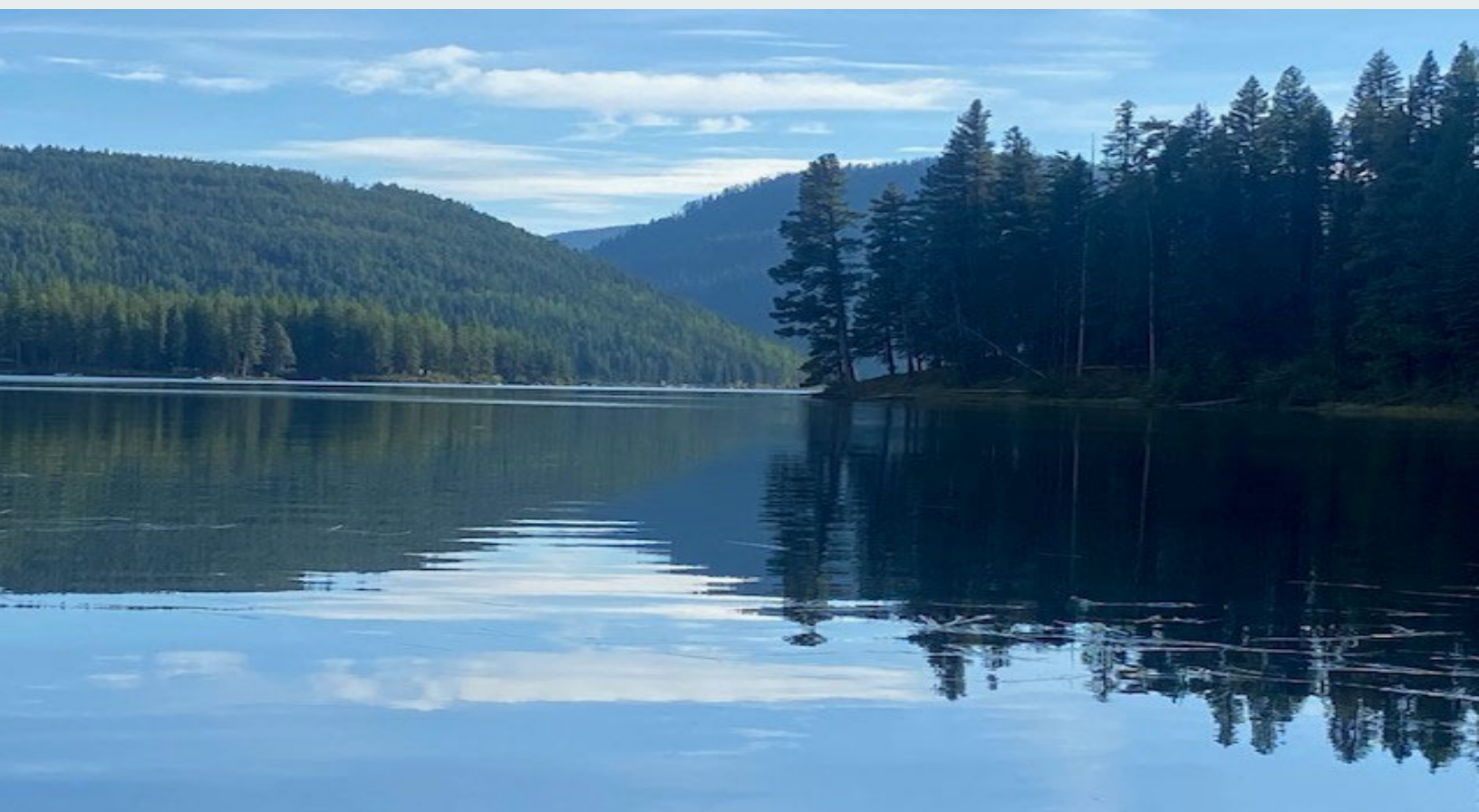
Giardia and *Cryptosporidium* are parasites that cause gastrointestinal illness and are often associated with waterborne exposures, including swimming in recreational waters and ingesting untreated drinking water. Cryptosporidiosis can also be caused by contact with cattle. In 2021, there were 60 cases of giardiasis reported, with a slight increase to 65 cases reported during 2022. Of the giardiasis cases reported in those two years, 32% drank untreated water and 46% had recreational

water exposure prior to illness onset. The incidence of giardiasis increased in 2022 for the first time since 2017, but remains lower than the five-year average incidence of 8.0 cases per 100,000 population from 2017 to 2021. There were 56 reported cases of cryptosporidiosis in both 2021 and 2022. Of those, 31% drank untreated water or had recreational water exposure prior to illness, and 26% had contact to cattle. The incidence of cryptosporidiosis has fluctuated over the past five years, but the 2022 incidence of 5.8 cases per 100,000 population is lower than the five-year average of 6.1 cases per 100,000 population from 2017 to 2021.

SHIGELLOSIS

Shigellosis is a bacterial illness caused by *Shigella*, and the only significant reservoir is humans. In Montana, 7 cases of shigellosis were reported in 2021 and 15 cases of

FIGURE 5. SELECT PARASITIC ILLNESS RATES OVER TIME — MONTANA, 2017-2022



shigellosis were reported in 2022. This pathogen is transmitted via the fecal-oral route, and those most at risk of infection are young children, travelers to developing countries, men who have sex with men, and individuals with weakened immune systems.

LISTERIOSIS

Listeriosis is a rare but 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 two cases of listeriosis reported in 2021 and four cases reported in 2022. Among these six cases, ages ranged from 30-94 years old, and all but one case was hospitalized. No one died due to their illness.

VIBRIOSIS

Vibriosis is an enteric illness caused by many different species of *Vibrio*, most often *Vibrio parahaemolyticus* and non-toxicogenic *V. cholerae*. Vibriosis infections occur after consuming raw or undercooked seafood (most often 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 four cases of vibriosis reported in Montana in 2021 and eight cases of vibriosis reported in 2022. Of the cases reported 2021-2022, four ate raw oysters, and one case had an infected wound.

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. There was one case of wound botulism reported in Montana in 2021, and one case of foodborne botulism reported in 2022.

TYPHOID FEVER AND PARATYPHOID FEVER

Typhoid fever and paratyphoid fever are serious diseases caused by *Salmonella* serotypes Typhi and Paratyphi, respectively. Most cases of typhoid and paratyphoid fever in the United States become infected through international travel. Montana has an average of less than one case per year of each disease. There were no reported cases of typhoid fever or paratyphoid fever in Montana in 2021 or 2022.

ENTERIC OUTBREAKS

Montana reported 25 enteric illness outbreaks in 2021 that sickened 480 people, and 30 enteric outbreaks in 2022 that sickened 697 people. There were 9 hospitalizations and no deaths as part of those outbreaks in 2021, and 13 hospitalizations and no deaths in 2022. Of the 55 enteric disease outbreaks reported from 2021 to 2022, 24 (44%) were caused by norovirus. Norovirus is a very contagious virus that causes vomiting and diarrhea, and is sometimes referred to as the 'stomach bug'. The other outbreaks were caused by a variety of pathogens, including *Campylobacter*, Shiga toxin-producing *E. coli*, and *Cryptosporidium*.

Vaccine Preventable Diseases

Some of the most common vaccine preventable diseases (VPD), excluding COVID-19, 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 fever¹. Many of these conditions are rarely reported in Montana (see Appendix I and II). On average, VPDs, excluding COVID-19, comprise approximately 6% of reportable disease cases in Montana. The most frequently reported non-COVID VPD in Montana in 2021 and 2022 was varicella (chickenpox).



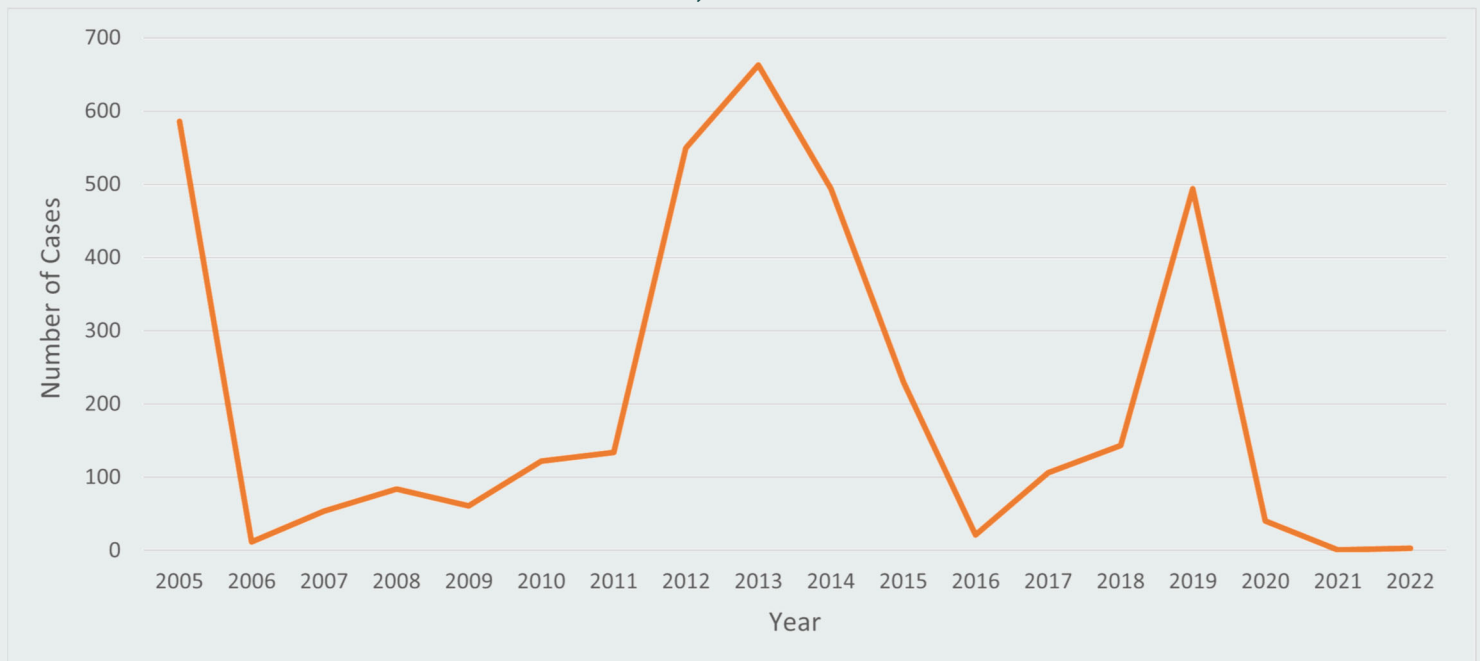
PERTUSSIS

Pertussis, also known as whooping cough, is a highly contagious bacterial respiratory disease caused by *Bordetella pertussis*, and is characterized by extended periods of uncontrollable coughing usually 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. 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 3.5 times higher than the number of reported cases in 2018 (n=143). In 2021, Montana reported

just a single pertussis case, with an incidence of 0.09 cases per 100,000 population. In 2022, Montana had three reported cases of pertussis, with an incidence of 0.3 cases per 100,000 population. It is thought that COVID-19 non-pharmaceutical interventions (NPIs), such as mask wearing, increased handwashing, and social distancing, also limited the transmission of pertussis, thus limiting the reported case counts.

The age range of 2021 and 2022 pertussis cases in Montana was 4 – 44 years. None of the cases were hospitalized, and none died. Three of the four cases were either unvaccinated, or not up to date with vaccine recommendations based on age.

FIGURE 6. REPORTED PERTUSSIS CASES — MONTANA, 2005-2022



VARICELLA

Varicella-zoster virus is the causative agent of chickenpox. Over the past 15 years, the number of varicella cases reported in Montana has declined from a peak of 437 cases in 2007 to 21 cases in 2021 and 22 cases in 2022 (Figure 7), largely due to the implementation of two-dose varicella vaccination in 2006, and varicella vaccine requirement for school attendees starting in 2015.

In 2021, 5 (24%) cases occurred in children under one year of age who were too young to receive vaccine. The median age of cases was 9 years (range: <1 month—65 years). Of the ten cases less than 18 years old who were eligible for vaccine and had vaccination status available, 70% had not received a varicella vaccination.

In 2022, 3 (14%) cases were children under one year of age who were too young to receive vaccine. The median age of cases was eight (range: <1 month—80 years). Of the eight cases less than 18 years old who were eligible for vaccine and had vaccination status available, 37.5% had not received a varicella vaccination.

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, the incidence of mumps has steadily declined since the introduction of mumps-containing vaccine in 1967 (now given as the measles, mumps, and rubella [MMR] vaccine, starting in 1971).

Pre-COVID-19, cases of mumps were increasing in the United States, with multiple reports of outbreaks on college campuses. An increase was noted in Montana during that time frame as well, with 26 reported cases linked to an outbreak in 2016, six cases reported each year in 2017 and 2018 (although most were in non-college-aged individuals), and 17 cases reported in 2019. Prior to the increase in cases starting in 2016, there was a five-year average of less than one case of mumps reported per year in Montana. In 2021, only 1 case of mumps was reported, in an unvaccinated individual. There were 0 reported cases of mumps in 2022. The low number of mumps cases reported in recent years could be a factor of the COVID-19 pandemic and the disease prevention measures that were taken to prevent COVID-19 infection.

FIGURE 7. REPORTED VARICELLA CASES — MONTANA, 2007–2022

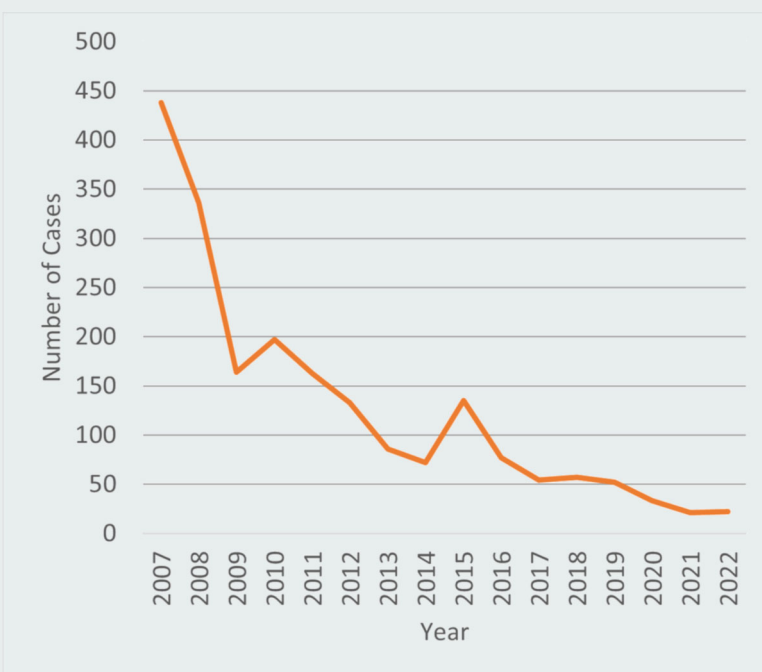
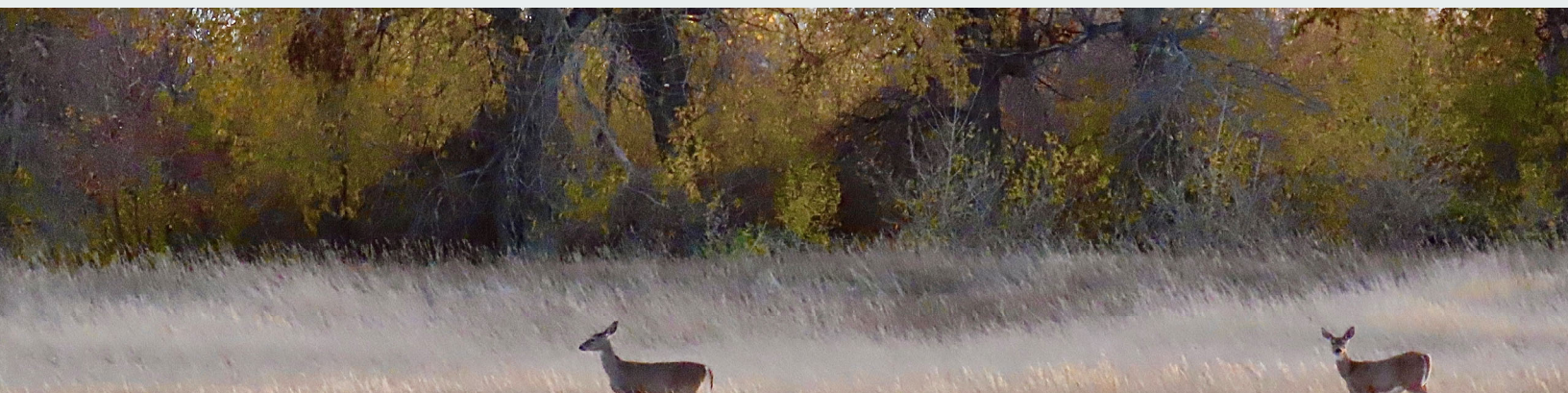
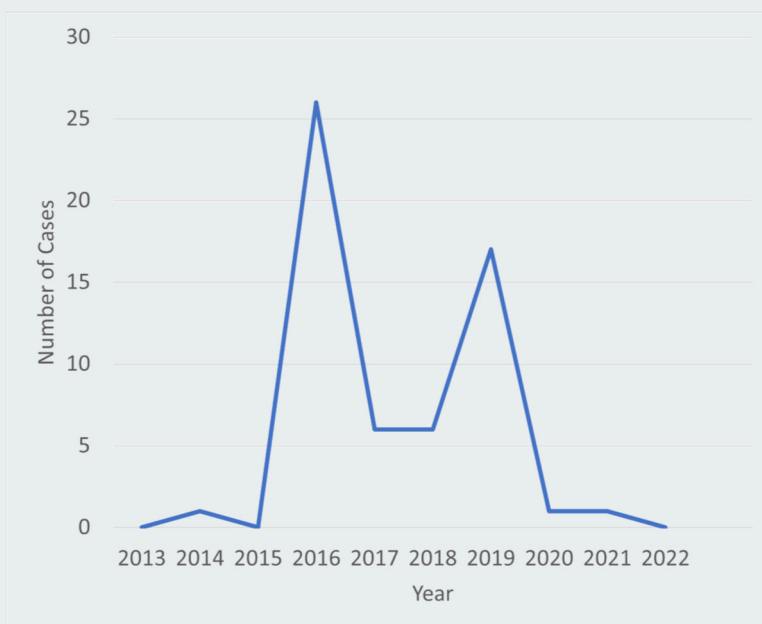


FIGURE 8. REPORTED MUMPS CASES — MONTANA, 2013–2022



INFLUENZA

Seasonal influenza (flu) is a respiratory illness caused by influenza viruses (types A and B) that can result in serious complications, including hospitalization and death. The flu season extends from October through May, typically peaking in January and February in Montana. During the 2020-2021 influenza season, there were no laboratory-confirmed influenza cases reported in Montana. Activity was likely influenced by the COVID-19 pandemic, and the disease prevention measures taken to avoid COVID-19 infection.

Both the 2021-2022 and 2022-2023 influenza seasons experienced peak activity many weeks earlier than Montana has observed in recent years (Figure 9). The 2022-2023 season peaked early and tapered off quickly, and the total number of reported cases (n=10,924) was higher than the average yearly reported cases from 2015-2020* (n=9,572). The 2022-2023 influenza season resulted in a sharp spike in hospitalizations early in the season compared with the preceding influenza seasons

(Figure 10). The total number of hospitalizations for the 2022-2023 season (n=550) were lower than the average yearly reported hospitalizations between 2015-2020 (n=700), but increased from the 242 hospitalizations reported during the 2021-2022 influenza season, as well as the zero influenza cases, hospitalizations, and deaths reported during the 2020-2021 influenza season.

There was a combined total of 792 hospitalizations due to influenza infection reported during the 2021-2022 and 2022-2023 seasons. Figure 11 below shows the proportion of hospitalizations due to influenza by age group between the 2021-2022 and 2022-2023 seasons. A total of 30 deaths due to influenza infection occurred during the 2021-2022 and 2022-2023 seasons, including three pediatric deaths.

Influenza A(H3N2) remained the dominant circulating influenza type during the 2021-2022 and 2022-2023 influenza seasons. Of subtyped influenza specimens in the 2021-2022 season, 97% were A(H3N2), <1% were A(H1N1), and 3% were influenza B. During the 2022-2023 season, 60% of subtyped specimens were A(H3N2), 32% were A(H1N1), and 8% were influenza B.

FIGURE 9. REPORTED INFLUENZA CASES BY MMWR WEEK — MONTANA, 2021-2022 AND 2022-2023

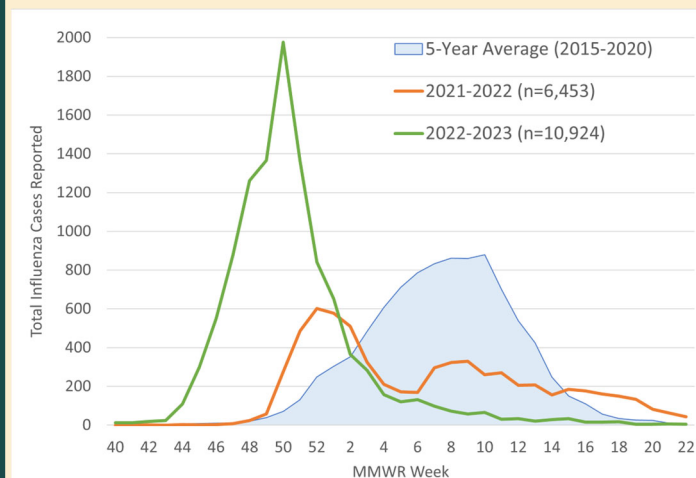


FIGURE 10. REPORTED INFLUENZA HOSPITALIZATIONS BY MMWR WEEK — MONTANA, 2021-2022 AND 2022-2023

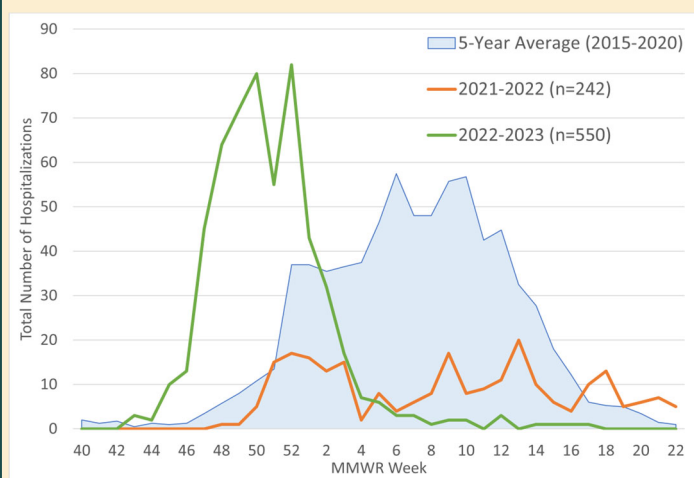
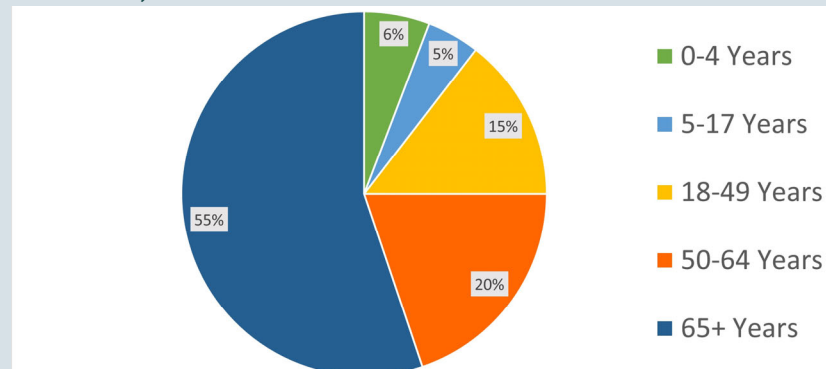


FIGURE 11. INFLUENZA HOSPITALIZATIONS BY AGE GROUP (N=792), MONTANA, 2021-2022 AND 2022-2023 SEASONS



*the 2020-2021 influenza season has been excluded from seasonal average because there were no influenza cases reported that season



Select 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, etc.). For example, pneumococcal bacteria can invade the bloodstream, causing bacteremia, or 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. There are vaccines available to protect against these serotypes. In 2021, two meningococcal disease cases were reported in Montana, caused by serogroups C and B. Neither patient had record of vaccination against meningococcal disease. Cases were aged less than five and over 80 years old, and both cases survived their illness. In 2022, zero cases were reported in Montana.

STREPTOCOCCUS PNEUMONIAE

Pneumococcal disease is an infection caused by *Streptococcus pneumoniae* bacteria. There are multiple vaccines available that protect against many common serotypes of *S. pneumoniae*. In 2021, 113 cases (10.2 per 100,000 population) of invasive *S. pneumoniae* were

reported in Montana. The median age of patients was 56 years (range: <1 – 91 years). In 2022, 104 cases (9.3 per 100,000 population) were reported in Montana. The median age was 59.5 years (range: <1—92 years).

HAEMOPHILUS INFLUENZAE

Sixteen cases of invasive *Haemophilus influenzae* were reported (1.4 per 100,000 population) in Montana in 2021. The median age of patients was 58 years (range: 1—88 years). Most cases were non-typeable. In 2022, there were 18 cases (1.6 per 100,000 population) reported in Montana. The median age was 58.5 years (range: <1—88 years). Most cases were non-typeable. There were no cases of invasive *H. influenzae* type B, the type that is vaccine preventable, reported either year.

STREPTOCOCCAL TOXIC SHOCK SYNDROME

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 can lead to death. One and two cases of streptococcal toxic shock syndrome were reported in 2021 and 2022, respectively. There were no deaths.

Sexually Transmitted Infections

Sexually transmitted infections (STIs) continue to be some of the most frequently reported communicable diseases in Montana. All Montana counties reported at least one STI case in 2021 or 2022.

CHLAMYDIA

Chlamydia is caused by the bacterium *Chlamydia trachomatis* and was the most commonly reported STI in Montana and the United States in 2021 and 2022.

Chlamydia infections are often asymptomatic and may go unnoticed. In women, chlamydia infection can result in pelvic inflammatory disease (PID), a major cause of infertility, ectopic pregnancy, and chronic pelvic pain; as well as facilitate the transmission of HIV². Pregnant women infected with chlamydia can pass the infection to their infants during delivery, potentially resulting in neonatal ophthalmia or pneumonia.

There were 4,033 chlamydia cases reported in Montana in 2021 and 4,088 cases reported in 2022. Since 2012, case rates for chlamydia have generally increased in Montana but starting in 2018 and into 2022 there has been a downward trend (Figure 12). In 2021, the incidence was 364.9 chlamydia cases per 100,000 population and in 2022 the incidence was 370.2 cases per 100,000 population in Montana, compared to 495.5 cases per 100,000 population for the US in 2021. More chlamydia cases were diagnosed

among persons aged 20–24 years (35%) than any other age group (Figure 13). In 2021–2022, 8,121 chlamydia cases (68%) were reported in females. The greater proportion of cases among females may be attributed to screening recommendations for females, resulting in healthcare providers offering females testing more often than males.

FIGURE 13. CHLAMYDIA CASES BY SEX AND AGE — MONTANA, 2021-2022

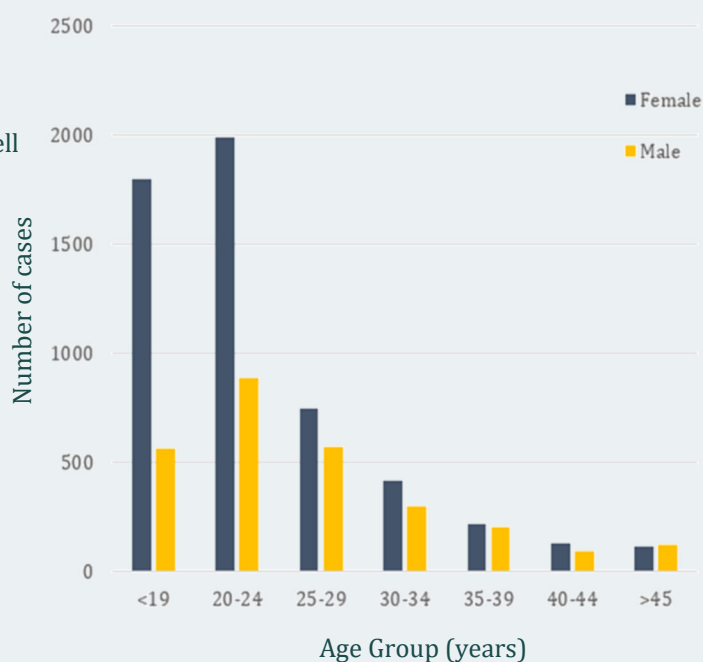


FIGURE 12. CHLAMYDIA CASES — MONTANA, 2012-2022

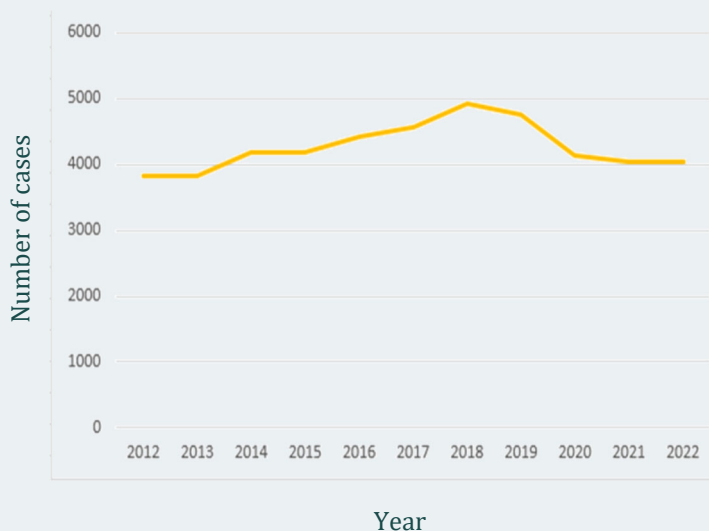
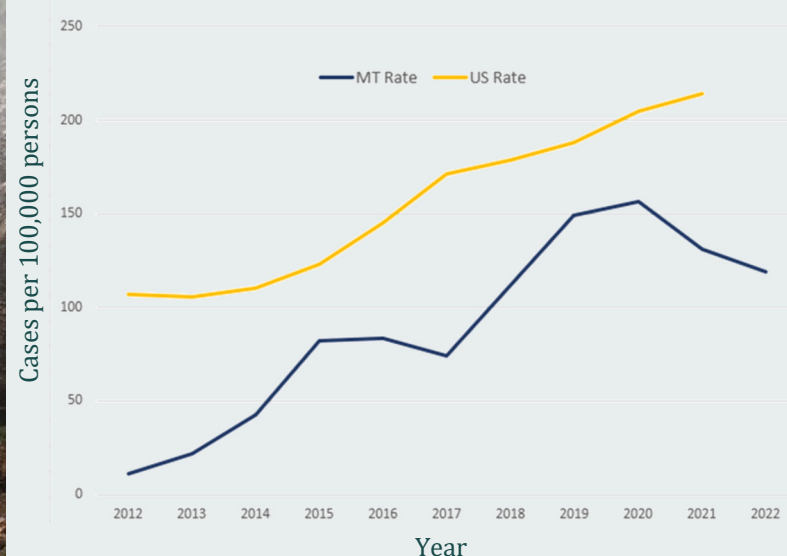




FIGURE 14. GONORRHEA INCIDENCE — MONTANA VS US, 2012-2022



GONORRHEA

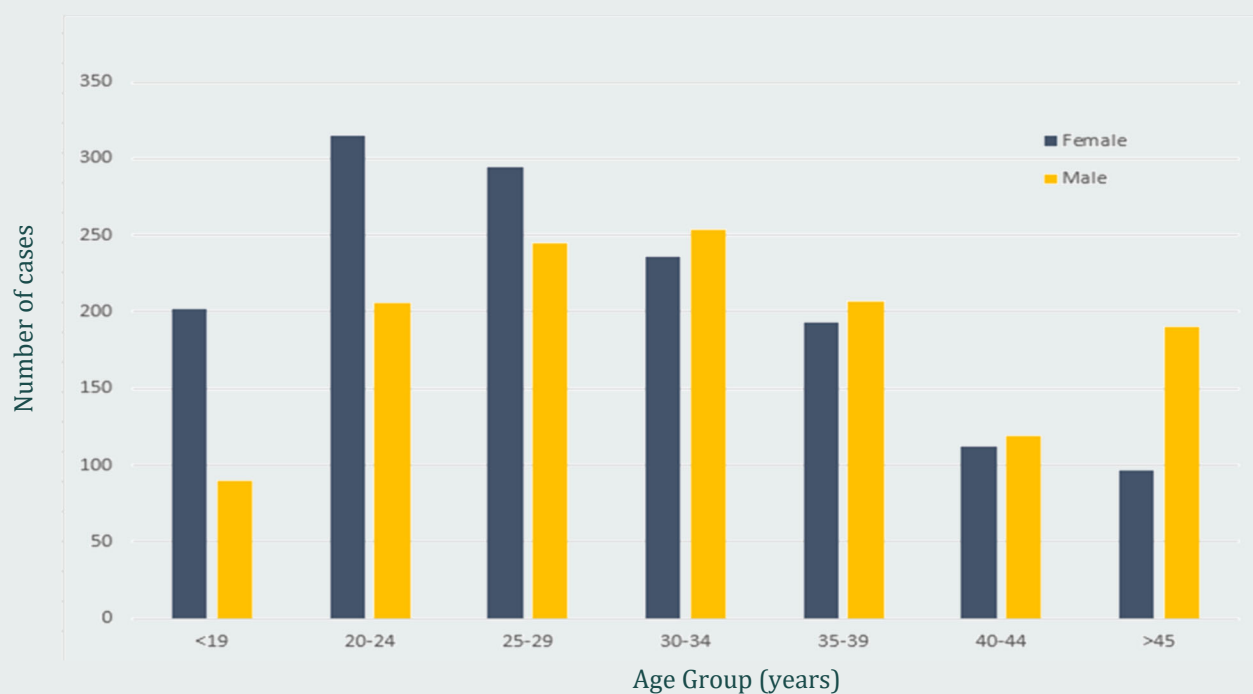
Gonorrhea is an infection caused by the bacterium *Neisseria gonorrhoeae*. It was the second most commonly reported STI in Montana in 2021-2022. Incidence has been increasing nationwide for the last decade. In Montana, the incidence increased from 2017-2020 but has decreased since 2020 (Figure 14). Gonorrhea 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 HIV². Given the large burden of disease and risks associated with infection, the CDC recommends annual gonorrhea screening for all sexually active women aged less than 25 years, women 25 years and older at increased risk, all women during pregnancy, and at least annually for men who have sex with men.

In 2021-2022, 2,762 gonorrhea cases were reported in Montana. The incidence of gonorrhea in Montana in 2021 was 131.4 gonorrhea cases per 100,000 population and in 2022 the rate was 118.7, compared to 214.0 cases per 100,000 population for the US in 2021.



Figure 15 displays the distribution of gonorrhea incidence by sex and age group in Montana in 2021-2022. In Montana, 887 gonorrhea cases (52%) were reported among females. Incidence is highest in the 20-24 and 25-29 year age groups, which account for 38% of the cases reported in Montana during 2021-2022.

FIGURE 15. GONORRHEA CASES BY SEX AND AGE —MONTANA, 2021-2022



SYPHILIS

Syphilis is a systemic STI caused by the bacterium *Treponema pallidum*. It has often been called "the great imitator" because the signs and symptoms are similar to other diseases. Syphilis is primarily passed from person to person through sexual contact, though infected pregnant women can vertically transmit to their fetus, resulting in congenital syphilis. 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 tertiary syphilis 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

FIGURE 16. TOTAL SYPHILIS CASES BY STAGE—MONTANA, 2017–2022

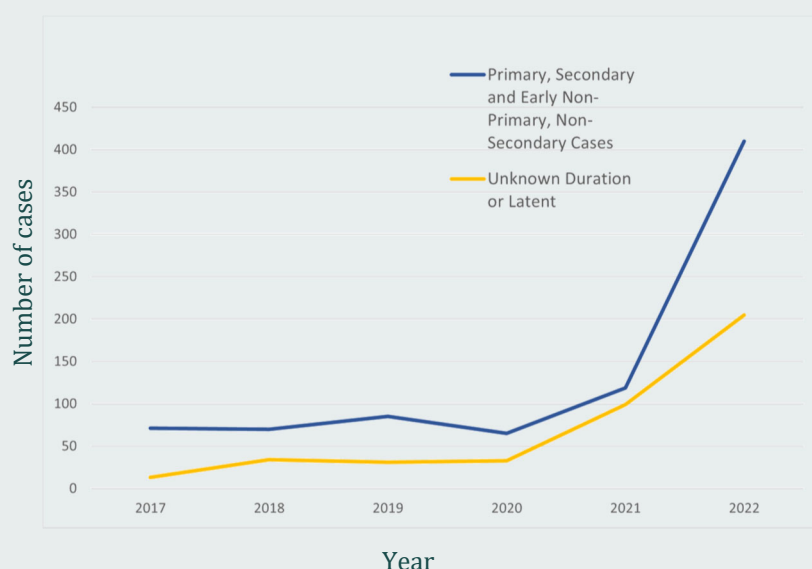
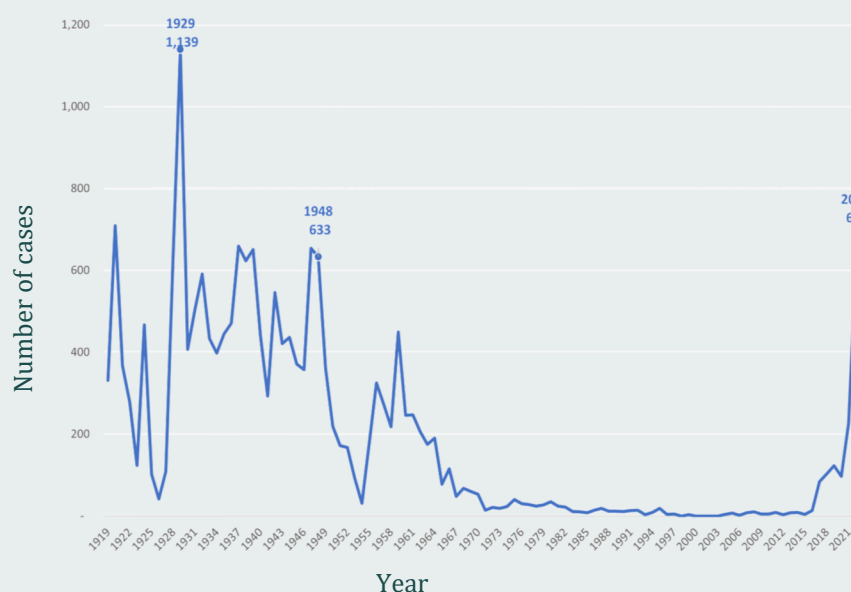


FIGURE 17. TOTAL SYPHILIS CASES ALL STAGES—MONTANA, 1919–2022



(primary, secondary and early non-primary, non-secondary) represent recent infection and pose an increased risk of transmission to others. Staging syphilis correctly is critical to appropriate treatment and partner management.

From 2017 to 2022, the number of cases dramatically increased from 84 to 218 in 2021 and 615 in 2022 (Figure 16). This is the highest case count of syphilis that Montana has reported since 1948 (Figure 17). The incidence of total syphilis cases per 100,000 population in Montana increased from 8.5 per 100,000 population in 2017 to 56.9 cases per 100,000 population in 2022. The last year that Montana had >55.0 total syphilis cases per 100,000 population was 1959 (76.0 cases per 100,000).

Demographic characteristics are noted in Table 7, showing that most syphilis cases in Montana in 2021–2022 were females (52%); this is a dramatic change from 2017 when 17% of syphilis cases were among females.

Between 2013–2017, 9% of reported primary and secondary syphilis cases in Montana were reported among American Indians and Alaska Natives (AI/AN). This increased to 38% of Montana's total primary and secondary syphilis cases reported among AI/AN from

TABLE 7. TOTAL SYPHILIS CASES DIAGNOSED BY SELECT CHARACTERISTICS (N=833) — MONTANA, 2021–2022

Characteristics	Number
Sex	
Male	401
Female	432
Age at diagnosis (years)	
≤19	63
20–24	108
25–29	171
30–34	185
35–39	124
40–44	73
45+	109
Ethnicity and race	
American Indian or Alaska Native	379
White	251
Black or African American	13
Asian	<5
Multi-race	174
Unknown race	<15
Hispanic or Latino, any race	34

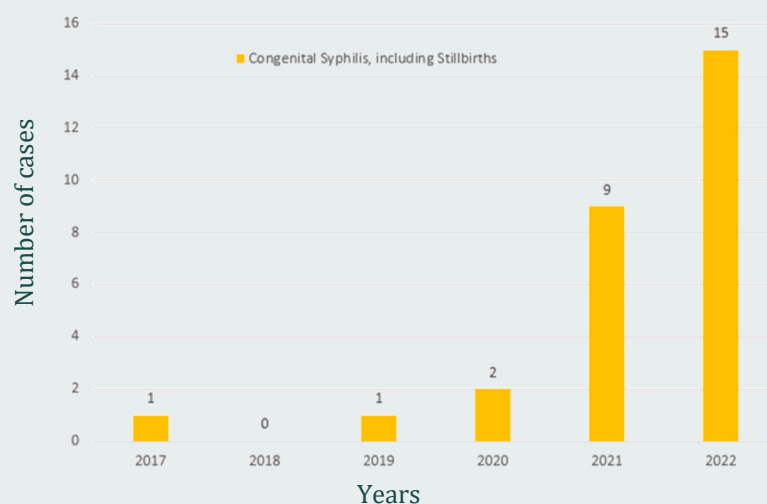
2018-2022. The incidence of primary and secondary syphilis cases was 5.3 times higher for AI/AN than the incidence in Montana as a whole from 2018-2022. Disparities in syphilis rates by race are not explained by differences in sexual behaviors, but rather reflect access to sexual health care, differences in sexual networks, and persistent and systemic racism in medical care³.

CONGENITAL SYPHILIS

Congenital syphilis occurs when *T. pallidum* is transmitted from a pregnant woman with syphilis to her fetus. Less often, perinatal transmission of *T. pallidum* can occur at the time of the delivery if the newborn has contact with maternal genital lesions. Transmission to the fetus in pregnancy can occur during any stage of syphilis.

The effective prevention and detection of congenital syphilis depends on identifying syphilis in pregnant women through

FIGURE 18. CONGENITAL SYPHILIS CASES — MONTANA, 2017-2022

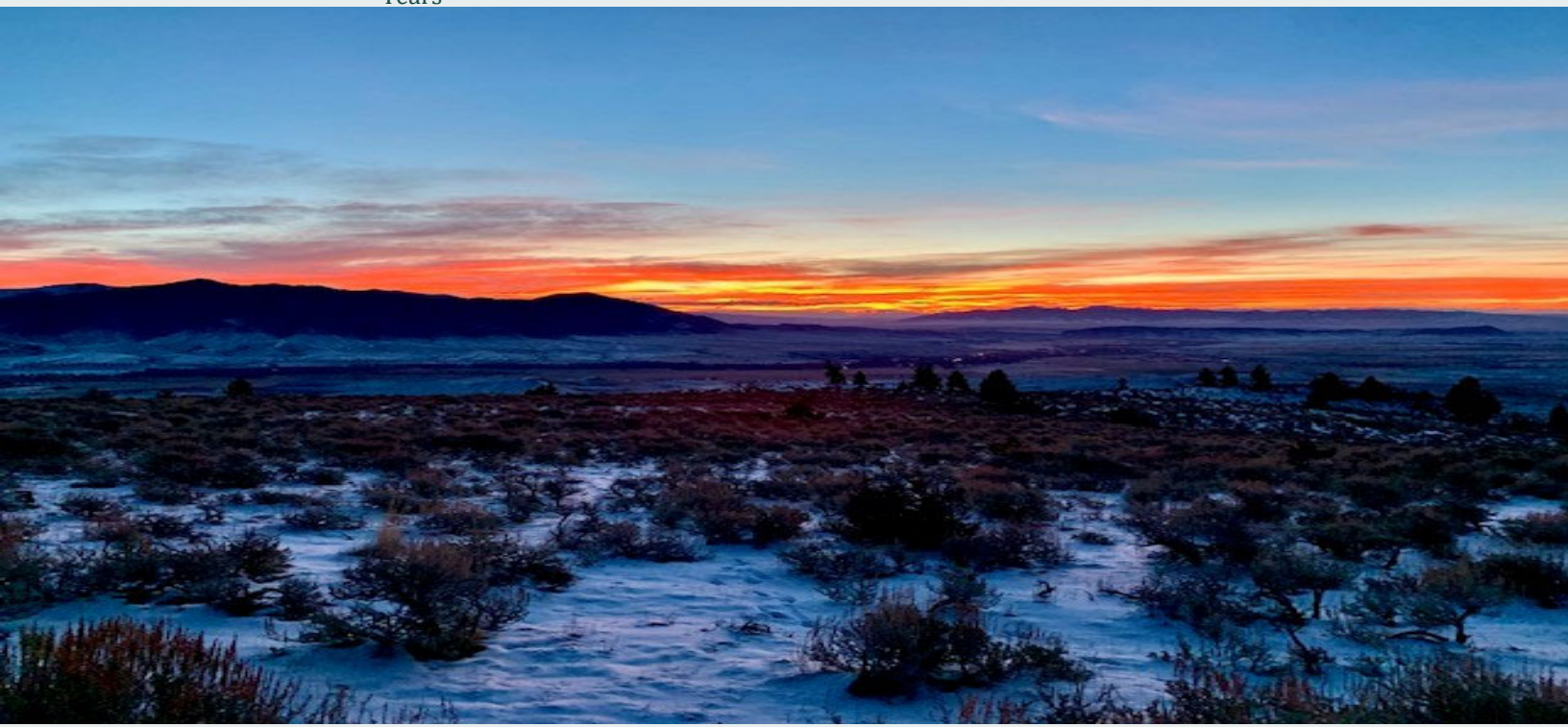


the routine serologic screening of all pregnant women during the first prenatal visit, and of those at higher risk of syphilis acquisition at 28 weeks gestation and at delivery. Maternal risk factors for syphilis during pregnancy include sex with multiple partners, sex in conjunction with drug use or transactional sex, late entry into prenatal care or no prenatal care, drug use, incarceration of the pregnant woman or her partner, and unstable housing.

Congenital syphilis can have long-term health impacts on the infant including: deformed bones, abnormal tooth development, severe anemia, enlarged liver and spleen, jaundice, brain and nerve problems, meningitis, and skin rashes.

Congenital syphilis cases have been increasing nationwide since 2012. Until 2020, Montana had a low incidence of congenital syphilis, averaging less than 1 case per year. Cases dramatically increased in 2021 when nine cases were reported, including two stillbirths and one infant death. In 2022, 15 cases of congenital syphilis were reported, including 3 stillbirths (Figure 18). The increase in congenital syphilis cases closely mirrors the increase in syphilis cases among females aged 15-44 years.

From 2013 to 2017, no cases of congenital syphilis were reported among AI/AN in Montana. During the next five-year timeframe, from 2018-2022, 22 (81%) of Montana's 27 congenital syphilis cases were reported among AI/AN. Given what is known about disparities in syphilis rates by race and ethnicity, it is likely the observed disparities in congenital syphilis cases by race in Montana also reflect maternal access to sexual health care, differences in maternal sexual networks, and the persistent and systemic racism in medical care, rather than differences in maternal sexual behavior.



HIV/AIDS

HIV (human immunodeficiency virus) is spread through many body fluids and targets parts of 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 during sexual contact. Left untreated, opportunistic infections or cancers take advantage of the weakened immune system, indicating that the person has entered stage 3 disease, also known as Acquired Immune Deficiency Syndrome (AIDS).

There were 20 newly diagnosed HIV cases reported in Montana in 2021, and 15 newly diagnosed cases reported in 2022. Since 2012, 14 to 30 new cases have been reported each year. Figure 19 shows that the rate of new cases has remained stable during this time. Most of the new cases are reported from the most populous counties in Montana: Yellowstone, Missoula, Cascade, Gallatin, and Flathead.

The leading transmission categories are male-to-male sexual contact (MSM) and injection drug use (IDU) (Table 8). When comparing 2021 with 2022, there has been little difference in risk factor percentages aside from a decrease in the risk factor of IDU when not in conjunction with MSM. Because of the small number of events, Table 8 presents aggregate data for 2018-2022.

FIGURE 19. REPORTED NEWLY DIAGNOSED HIV CASES PER 100,000 — MONTANA, 2012-2022

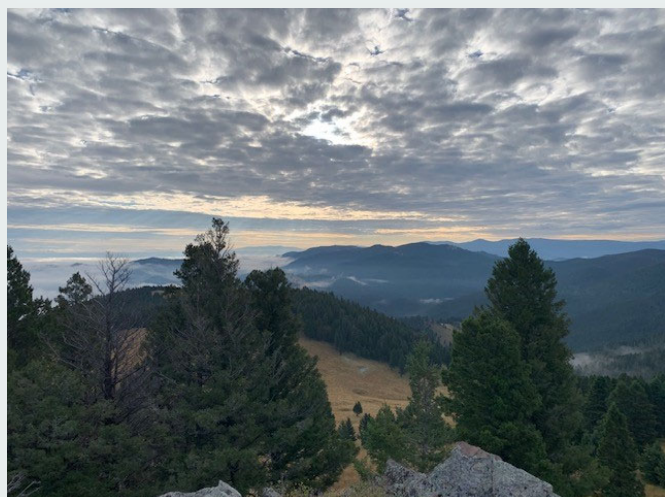
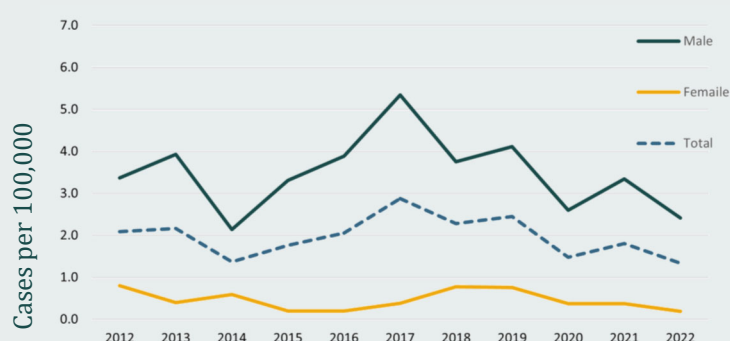


TABLE 8. PERSONS NEWLY DIAGNOSED WITH HIV BY SELECT CHARACTERISTICS (N=102) — MONTANA, 2018-2022

Characteristics	Number
Sex	
Male	89
Female	13
Age at diagnosis (years)	
<15	0
15-24	18
25-34	38
35-44	22
45-54	14
≥55	10
Ethnicity and race	
American Indian or Alaska Native, non-Hispanic	5
White, non-Hispanic	81
Black, non-Hispanic	<10
Asian, non-Hispanic	<5
Hispanic, any race	9
Transmission category by sex†	
Male Only	
Male sexual contact w/ another male (MSM)	56
Injection drug use (IDU)	4
MSM & IDU	15
High-risk heterosexual contact‡	3
No identified risk	11
Female Only	
Injection drug use (IDU)	6
High-risk heterosexual contact‡	3
No identified risk	4

†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 (latent TB) can develop active disease at any time during their lifetime. Without treatment of 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 three decades. Figure 20 presents the number of TB cases over time by foreign-born persons and by race for U.S.-born persons. TB persists in specific high-risk populations, including foreign-born persons, persons previously exposed to TB, persons with compromised immune systems, and American Indians. These populations are considered higher risk due to the high prevalence of endemic TB outside of the US, the risk of being exposed to TB, the risk of converting to active TB disease, and the historically high numbers of active TB within American Indian populations. Overall, TB rates have steadily declined from an average of 20 cases per year in the 1990s to an average of 4 cases per year in the last 5 years (Figure 20).

TB cases among American Indians have declined from an average of 10 cases per year in the 1990s to an average of two cases per year during the last 10 years. In the last five years, an average of 1.4 cases per year among American Indians were reported in Montana.

Three cases of active TB were reported in Montana in 2021, and six cases were reported in 2022. Counties of residence included Big Horn, Missoula, Ravalli, Roosevelt, Rosebud, and Yellowstone. The 2021 and 2022 Montana TB incidence was 0.3 and 0.6 cases per 100,000 population, respectively. The average incidence over those two years is 5.5 times lower than the 2022 U.S. rate (2.5 cases per 100,000 population) (Figure 21).

From 2018-2022, six reported TB cases were foreign born, seven were U.S.-born American Indian, and seven were

FIGURE 20. REPORTED ACTIVE TUBERCULOSIS CASES BY RACE — MONTANA, 1993–2022

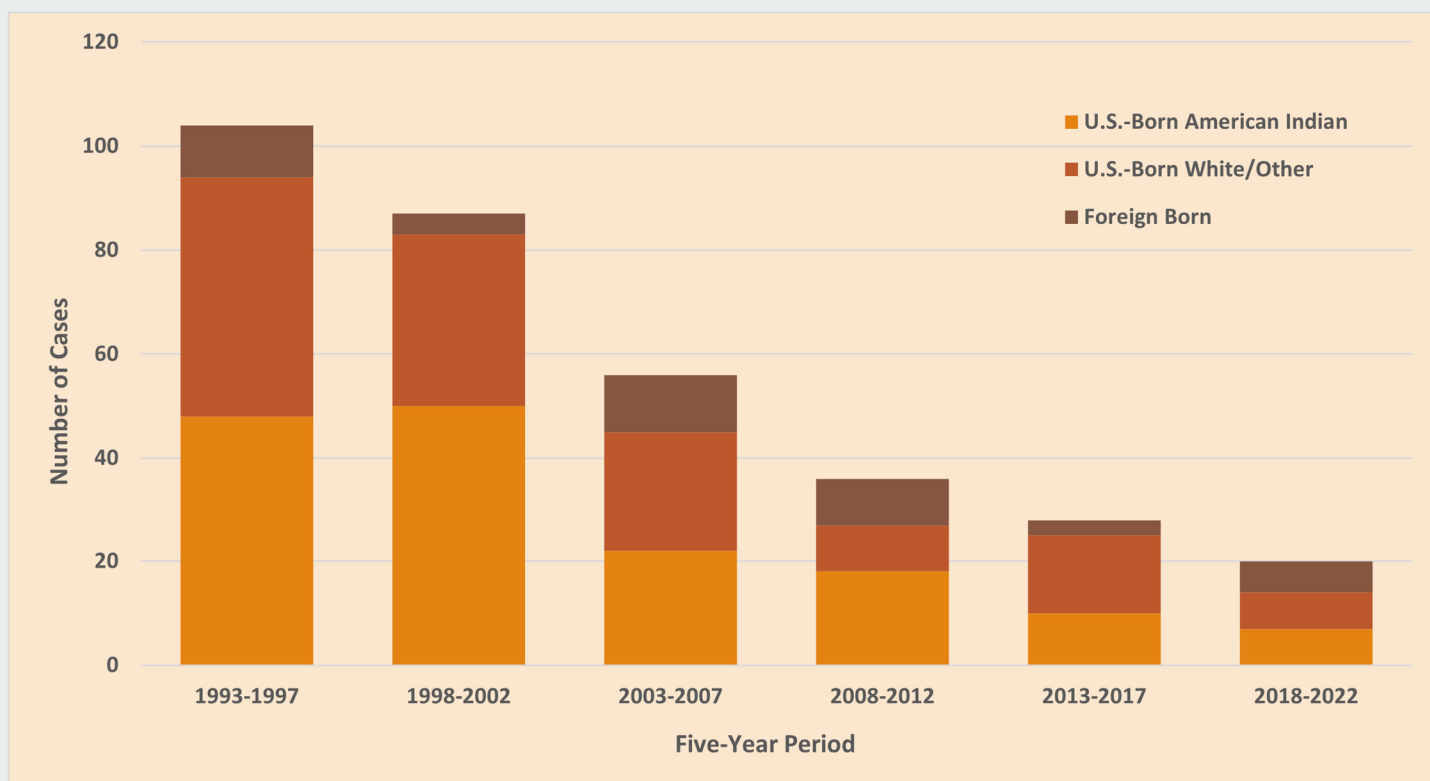
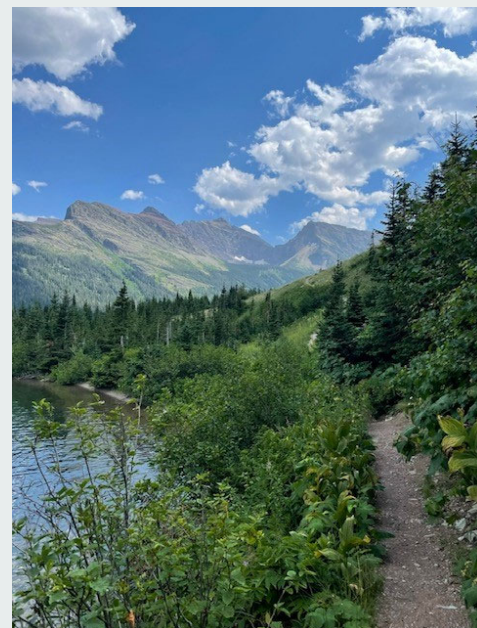
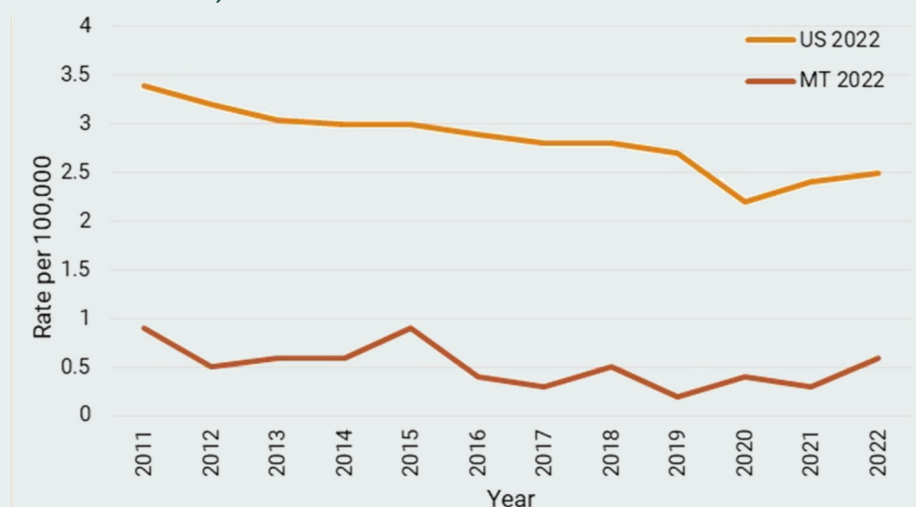


FIGURE 21. TUBERCULOSIS INCIDENCE RATE — MONTANA AND UNITED STATES, 2011-2022



U.S.-born white/other. Seven of the nine patients had pulmonary/pleural disease, one had ocular TB, and one patient had pulmonary/pleural disease and extrapulmonary TB of the spine. Risk factors of note for these cases included birth or travel in TB endemic countries, contact to an infectious TB case, untreated latent TB infection, diabetes, and immunosuppression (not HIV/AIDS). Six of the nine cases were found incidentally and very early in disease.

No contacts were found to be infected by the nine cases. Contact investigations were extensive and involved over 100 contacts. Multiple states were involved with the follow up of these contacts.

One of the cases in 2022 was infected with a multidrug-resistant (MDR) TB organism. Drug-resistant TB is rare, and the cost and challenge of treating this case was unprecedented. During 2021, isoniazid-resistant TB caused 536 cases out of 7,874 cases in total in the United States (6.4%) while multi-drug resistant TB caused 77 cases in the United States (0.78%).

Despite the low numbers of TB cases reported in Montana and nationally, a number of challenges remain that slow the progress toward TB elimination. 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. One of the main causes of hepatitis are viruses; the most common types of viruses that cause hepatitis are hepatitis A, B, and C. Symptoms of hepatitis include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, grey colored stools, joint pain, and jaundice. Symptoms of acute viral 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 a vaccine-preventable liver infection. It is a very contagious condition, and the virus is found in the blood and stool of people who are infected. It spreads when someone ingests the virus, either through close contact with an infected person or through eating contaminated food or beverages. Symptoms of hepatitis A infection include fatigue, nausea, stomach pain, and jaundice, and can last up to two months. Hepatitis A does not progress to a chronic infection. There were 3 cases of hepatitis A infection reported in Montana in 2021, and 5 in 2022.

HEPATITIS B

Hepatitis B is a liver infection caused by the hepatitis B virus (HBV). Hepatitis B is commonly spread as a bloodborne or sexually-transmitted disease. This can happen through sexual contact, injection drug use (IDU), or from mother to baby at birth. Symptoms of infection include fatigue, poor appetite, stomach pain, nausea, and jaundice. HBV infection can be an acute, or short-term,

illness or 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. There were 22 chronic HBV infections reported in Montana in 2021, and 30 in 2022. It's possible that some of these cases may have had the disease for years but were only identified in 2021 or 2022. The median age of cases was 44 years and 56% of cases were male. There were two acute HBV cases reported in Montana in 2021 and two in 2022, indicating recent infection. There were no perinatal hepatitis B infections reported in 2021 or 2022. Eight infants who were born to females with hepatitis B infection at the time of birth were prophylaxed to prevent infection in 2021 and 2022.

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. There were 1,033 cases of chronic hepatitis C reported in Montana in 2021, and 1,011 in 2022. Not all cases were newly acquired; some may have been infected years prior to their diagnosis. While there is no vaccine for HCV, treatment can cure more than 90% of cases. However, CDC estimates that 40% of people with hepatitis C in the US are unaware of their infection⁴. The incidence of chronic HCV infections in Montana between 2016 and 2022 is shown in Figure 22.

FIGURE 22. INCIDENCE OF CHRONIC HEPATITIS C INFECTIONS — MONTANA, 2016-2022

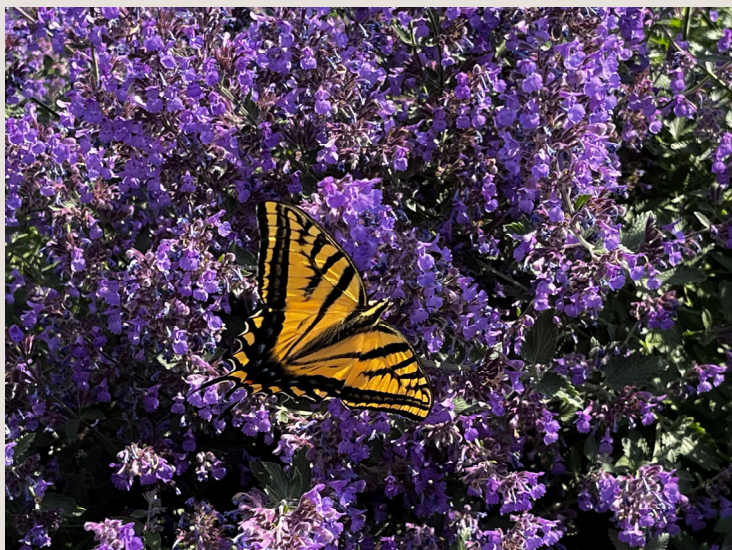
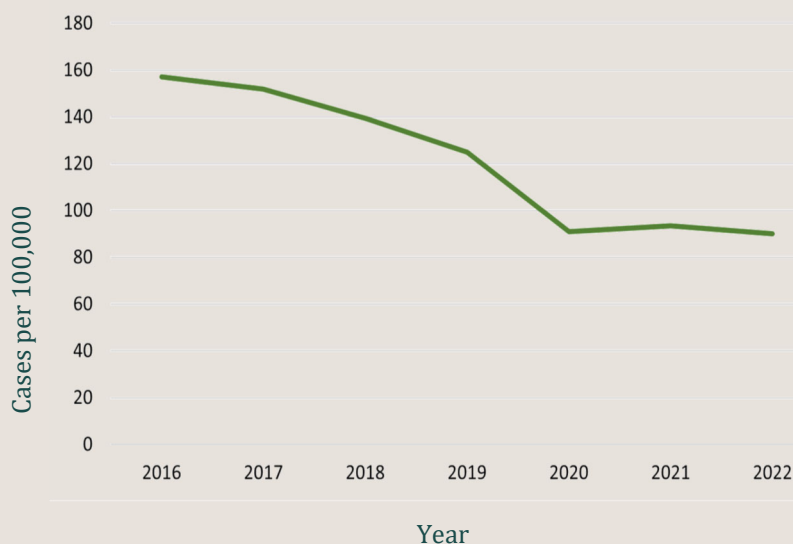
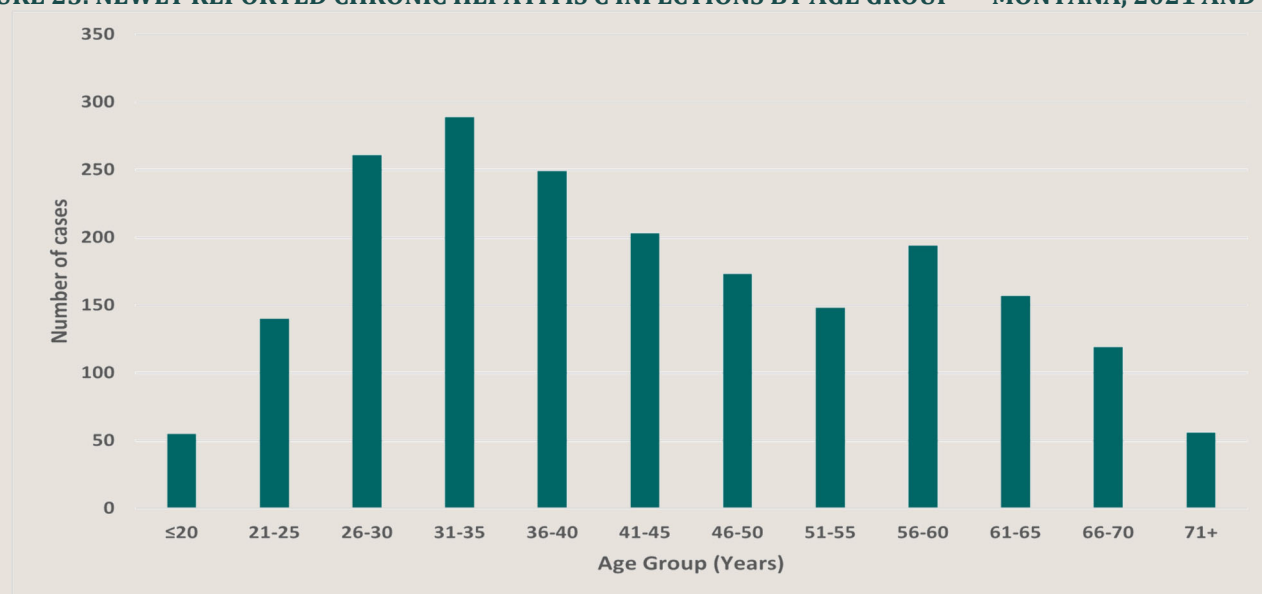


FIGURE 23. NEWLY REPORTED CHRONIC HEPATITIS C INFECTIONS BY AGE GROUP — MONTANA, 2021 AND 2022**TABLE 9. DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH CHRONIC HEPATITIS C — MONTANA, 2021 AND 2022**

SEX			White	1133	55%
			American Indian or Alaska Native	463	23%
Male	1180	58%	Black or African American	23	1%
Female	850	42%	Asian	5	<1%
Other/Unknown	14	<1%	Multiple Races	293	14%
			Unknown	127	6%

The Centers for Diseases Control and Prevention recommends that all women in pregnancy be screened for HCV and all adults ≥ 18 years be tested at least once.

Acute hepatitis C is a short-term viral infection caused by the hepatitis C virus. After being infected with acute HCV, more than half 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.

Before 2021, an average of 16 cases of acute HCV cases were reported to DPHHS each year. Case counts increased to 30 reported cases in Montana in 2021, and 40 in 2022. The most common risk factor identified among cases was injection drug use (IDU). Of the 70 cases reported in 2021 and 2022, 43 (61%) were male and 27 (39%) were female. Of the cases reported during those two years, 30 (43%) were white, 19 (27%) were American Indian or Alaska Native, 3 (4%) were Black or Asian, 13 (19%) were multiple races, and 5 (7%) were unknown race. The increase in rates of acute HCV in 2021 and 2022 may have been influenced by the COVID-19 pandemic. The disruptions to health care usage and screening events in 2020 likely led to an underdiagnosis of acute hepatitis C cases that year, with

FIGURE 24. ACUTE HEPATITIS C INFECTIONS — MONTANA, 2016-2022

increased testing and diagnosis the following two years. Additionally, an increase in substance use during the height of the pandemic may have led to increased transmission of acute hepatitis C and increased diagnosis in 2021 and 2022.

Zoonotic & Vector-borne 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. The last cases of human rabies in Montana were reported in 1996 and 1997; both were associated with bat exposures.

In 2021, 463 animals were tested for rabies at the Montana Veterinary Diagnostic Laboratory (MVDL), resulting in fourteen bats, three skunks, one horse, one canine, and one feline positive for the rabies virus (Figure 25).

Rabies in humans is preventable through prompt and appropriate medical care and use of rabies post-exposure prophylaxis (rPEP). In 2021, 279 Montana residents received the recommendation to pursue rPEP to prevent disease after exposure to an animal that is capable of transmitting rabies.

FIGURE 26. TYPES OF EXPOSURES THAT LED TO rPEP RECOMMENDATIONS (N=279) — MONTANA, 2021

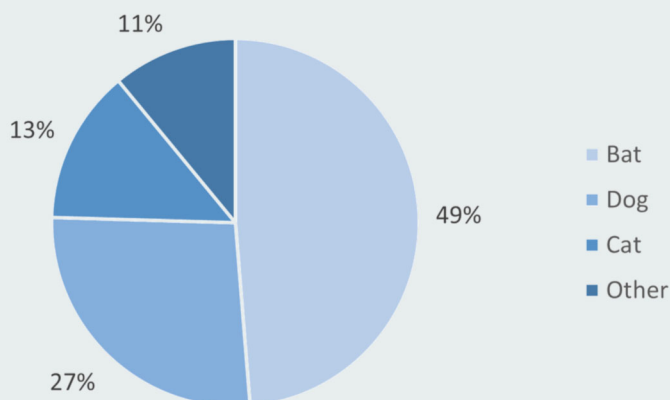
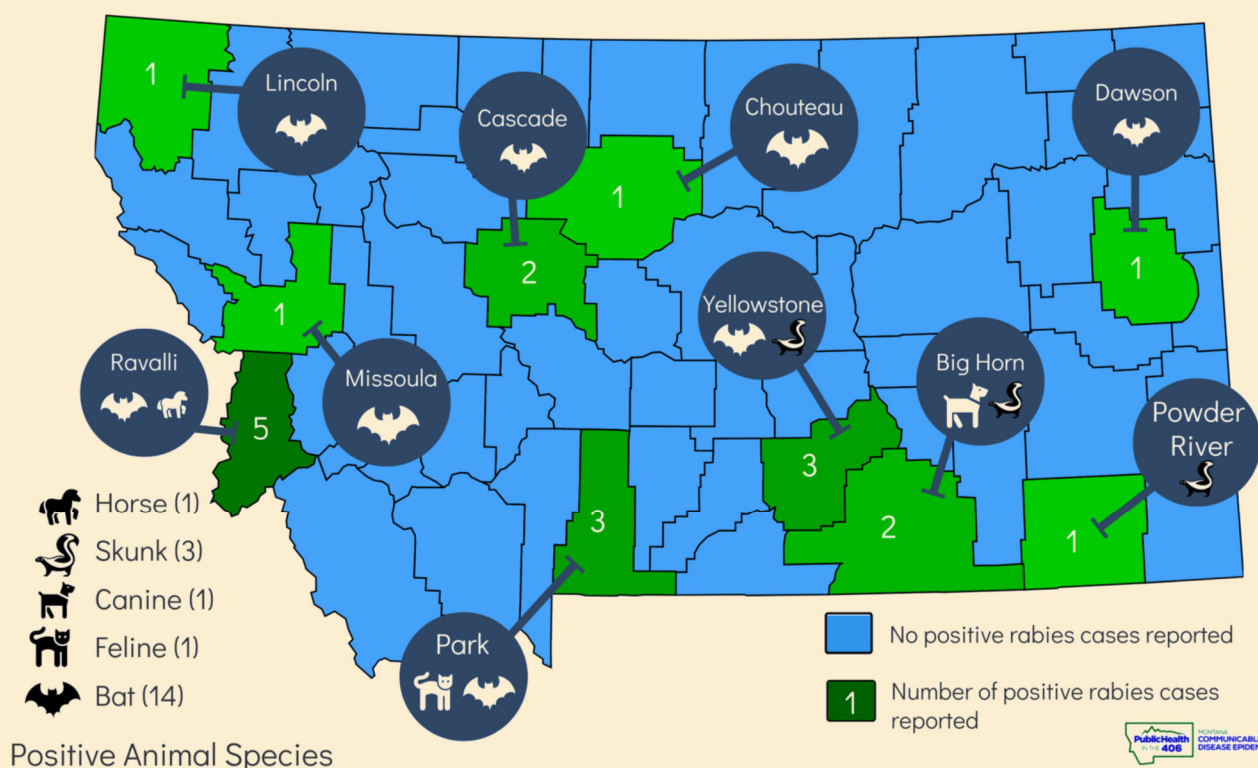


FIGURE 25. ANIMALS THAT TESTED POSITIVE FOR RABIES VIRUS (N=20) — MONTANA, 2021



In 2022, 489 animals were tested for rabies at the MVDL. Of those, thirteen were found to be positive for the rabies virus (nine bats, three skunks, and one canine) (Figure 27).

In 2022, 210 Montana residents were recommended to receive rabies post-exposure prophylaxis following an exposure to an animal capable of transmitting rabies. These animal exposures are summarized in Figure 28.

FIGURE 27. TYPES OF EXPOSURES THAT LED TO rPEP RECOMMENDATIONS (N=210) — MONTANA, 2022

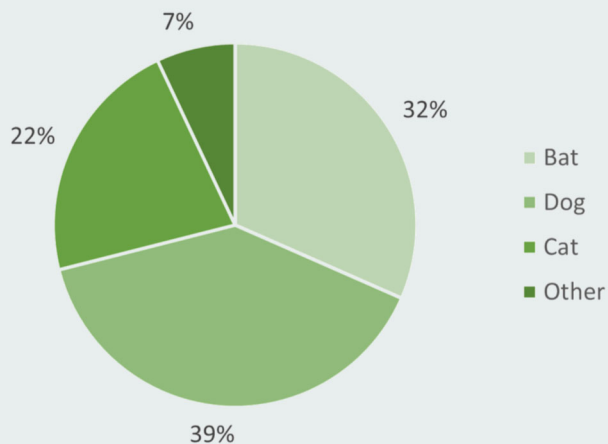
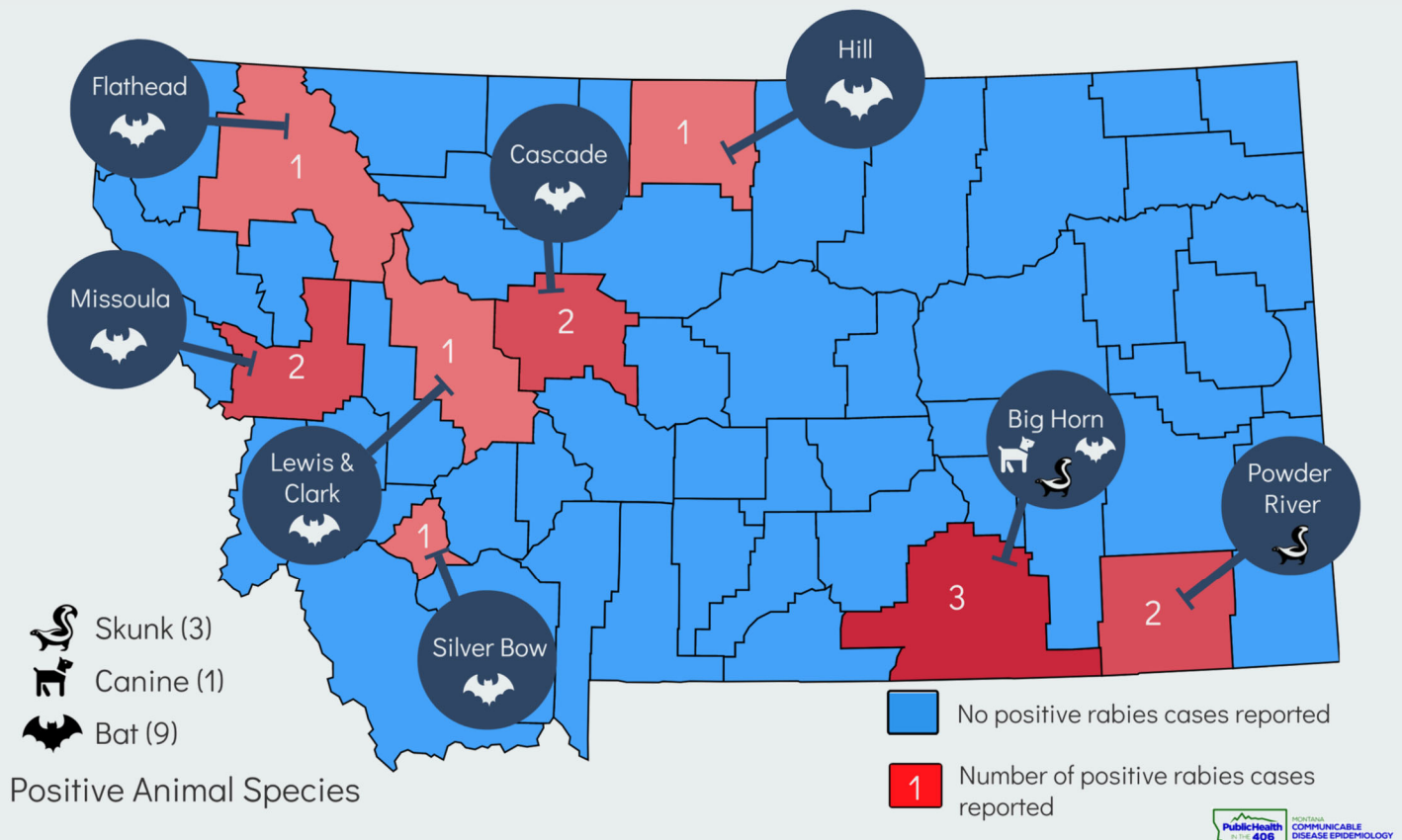


FIGURE 28. ANIMALS THAT TESTED POSITIVE FOR RABIES VIRUS (N=13) — MONTANA, 2022

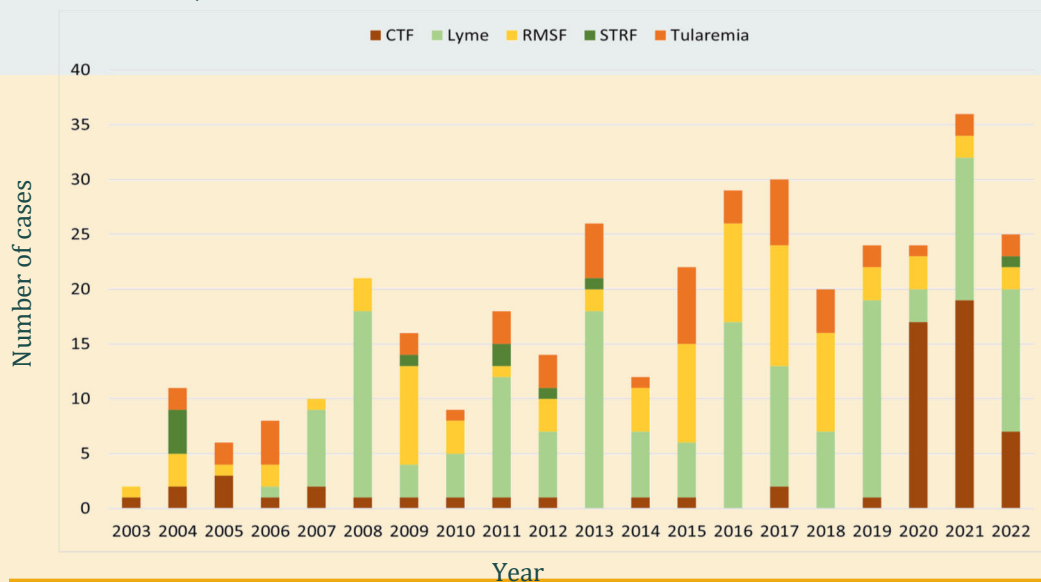




TICKBORNE DISEASES

Pathogens present in Montana that can be transmitted to humans by ticks include those that cause Colorado tick fever, Rocky Mountain spotted fever (RMSF, *Rickettsia rickettsii*), soft tick relapsing fever (STRF, *Borrelia hermsii*), and tularemia (*Francisella tularensis*). The number of reported cases from each of the last twenty years is shown in Figure 29. The most commonly reported tickborne disease acquired in Montana in recent years is Colorado tick fever (CTF), which is carried by the established tick species *Dermacentor andersoni*. While CTF can be acquired throughout the state, exposures frequently occur along Montana's western border. Reported cases of CTF increased sharply in 2020 and remain elevated through 2022. Lyme disease is the most frequently acquired condition in Montana residents associated with out of state travel. *Ixodes* species ticks

FIGURE 29. REPORTED CASES OF TICKBORNE DISEASES — MONTANA, 2003–2022



associated with Lyme transmission (including *I. pacificus* and *I. scapularis*) have not been detected in Montana.

In addition to tickborne transmission, tularemia can be acquired through other types of exposures, including: inhalation of contaminated soil, ingestion of contaminated water or raw milk, deer fly bites, and contact with an infected animal (most frequently rabbits, hares, and rodents).

OTHER VECTOR-BORNE DISEASES

Out-of-state travel was associated with three cases of anaplasmosis, one case of babesiosis, and one case of ehrlichiosis in Montana residents from 2021—2022. Travel out of state can result in exposure to vector-borne illnesses not endemic to Montana, and tick and mosquito prevention techniques are still highly encouraged—especially during outdoor recreation.

Four cases of malaria and one case of African tick bite fever (*Rickettsia africae*) were reported in Montana during 2021—2022; all were associated with international travel. Before traveling, it's advised to research what vector-borne diseases are endemic or causing outbreaks in the destination region. In many cases, vaccination (e.g., yellow fever) and/or prophylaxis (e.g. malaria) are available and highly encouraged.

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. However, less than one percent of infected persons develop West Nile neuroinvasive disease (WNND), a serious and potentially life threatening condition.

In 2021, only two counties in Montana, Richland and Lewis & Clark, reported a human case of WNV. No cases of WNV in humans were identified in 2022. There were no reported viremic blood donors and no reported deaths from 2021—2022. Both cases reported in 2021 were over 60 years of age and hospitalized as a result of their illness. One case reported travel out of state prior to symptom onset.

Since the introduction of WNV into Montana in 2002, the number of cases in Montana has varied from year to year. Fourteen of the twenty-one 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 2021, there were 27 counties that submitted mosquitoes for WNV testing. Out of 516 pools of mosquitoes tested, WNV was detected in 9 pools across 7 counties: Blaine, Gallatin, McCone, Prairie, Richland, Rosebud, and Sheridan. In 2022, mosquito pools were collected from 26 different counties, with 538 pools tested for WNV. Sixty-three (63) positive mosquito pools were positive across 4 counties: Blaine, Dawson, Lewis & Clark, and Phillips. Most (85.7%) positive pools were

sampled from Dawson County. Despite a high number of positive pools, no human cases were reported there, likely due to limited human exposure given the rurality of this sample location.

Given the difficulty in predicting the severity of a WNV season ahead of time and the potential severity of WNV infection, which can lead to long-term body pain and fatigue, encephalitis, meningitis, paralysis, and blindness, preventing mosquito exposures and bites is recommended each summer. WNV cannot be transmitted person to person.

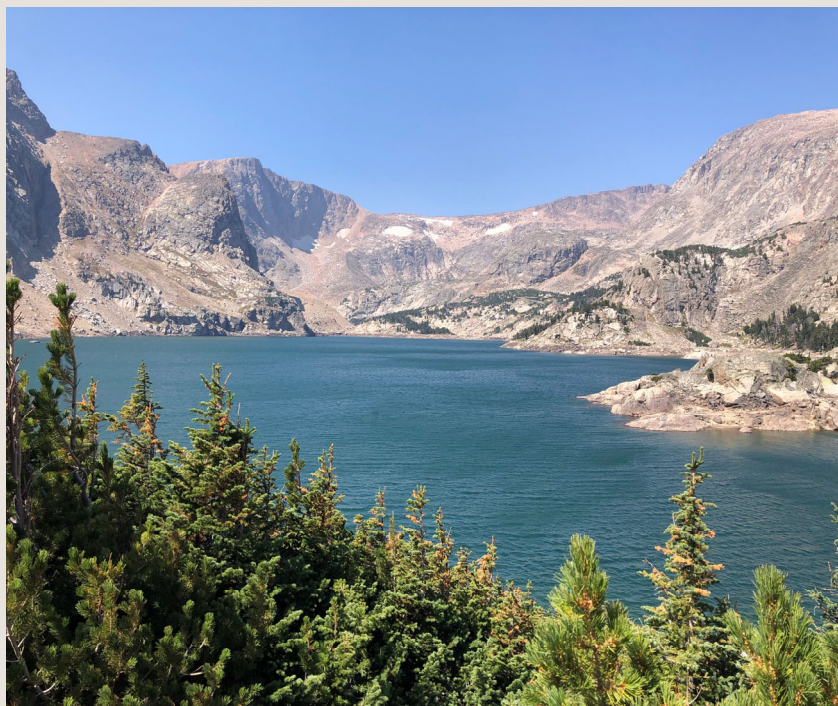


FIGURE 30. WEST NILE VIRUS ACTIVITY BY COUNTY - MONTANA, 2021

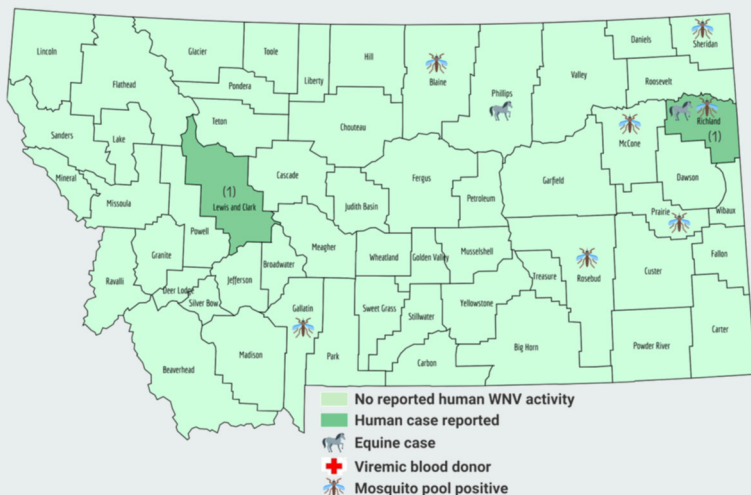
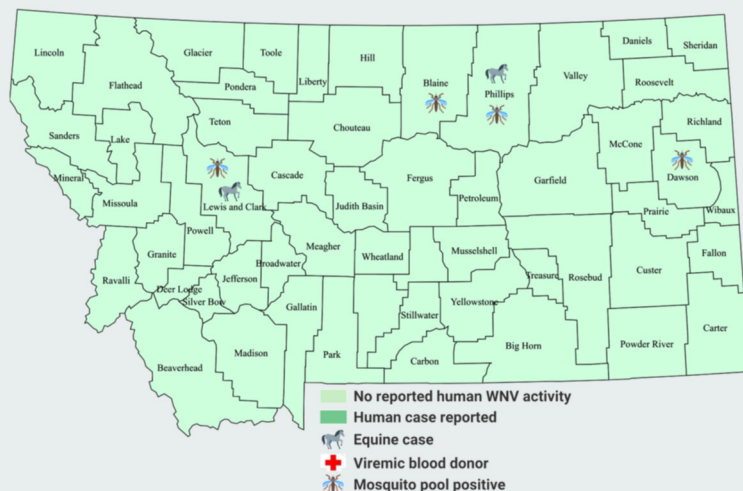
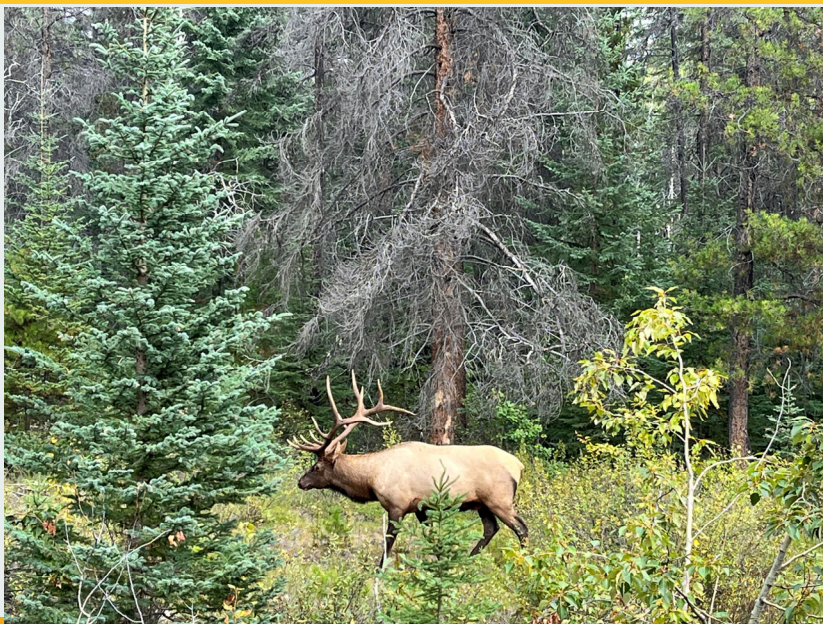


FIGURE 31. WEST NILE VIRUS ACTIVITY BY COUNTY - MONTANA, 2022





HANTAVIRUS

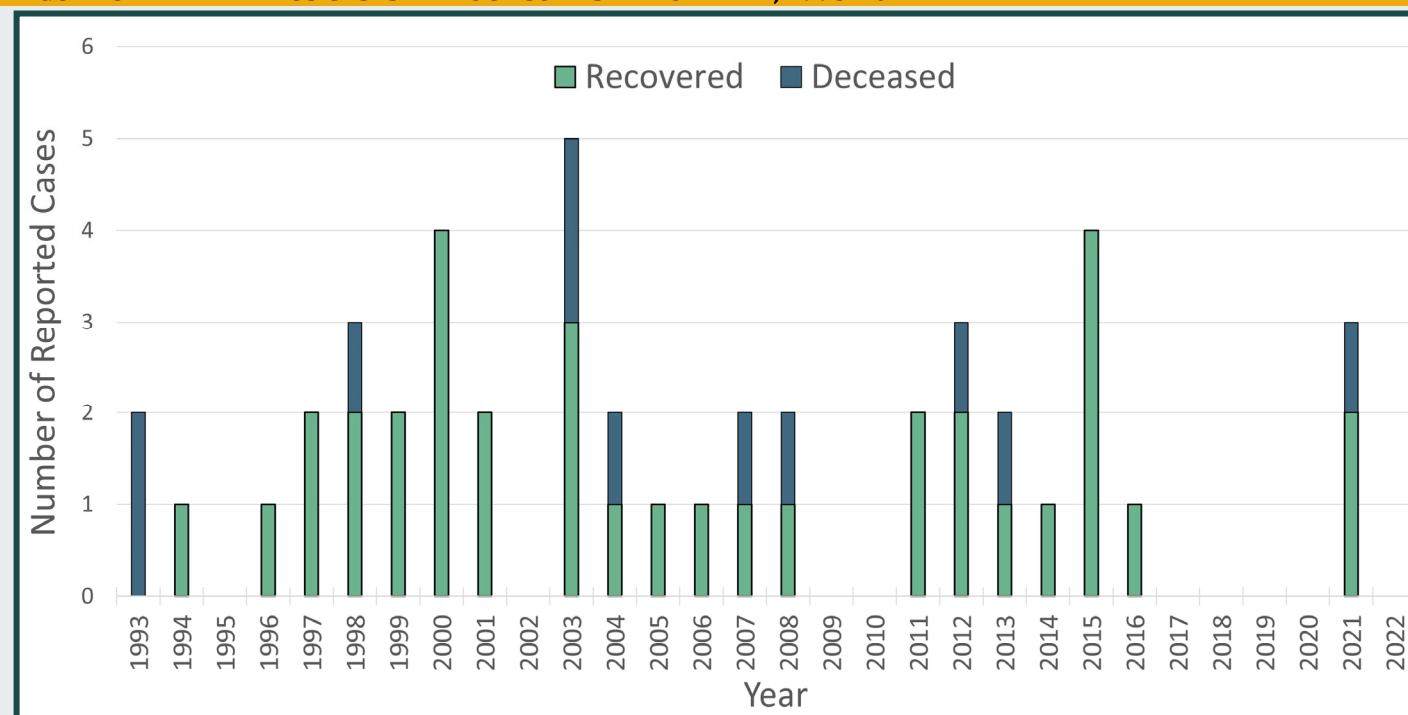
Hantaviruses are a family of viruses found worldwide that are spread primarily by the urine, droppings, and saliva of rodents. Hantavirus pulmonary syndrome (HPS) became a notifiable condition in 1993. Hantavirus infections that do not result in HPS (non-HPS hantavirus infections) became nationally notifiable in 2016. The deer mouse is the most common host of the virus and is widespread in Montana.

Since 1993, Montana has reported 46 cases of hantavirus infection, including 11 deaths (Figure 32). No cases of hantavirus were reported in Montana between 2017 and 2020. Four cases of hantavirus infection have been reported in Montana since 2016. Of these, 3 were classified as hantavirus infection (non-HPS) and one was classified as HPS.

Twenty-six counties in Montana have reported at least one case of hantavirus infection since 1993. The majority of cases have occurred in the Western and Southwestern regions of Montana.

Reducing potential exposures to rodents is key to preventing hantavirus. Montanans can do this by sealing up, trapping up, and cleaning up. Examples include sealing up holes and gaps in homes and garages, trapping and disposing of rodents, and carefully cleaning areas with mouse infestation.

FIGURE 32. HANTAVIRUS CASES AND OUTCOMES — MONTANA, 1993-2022



Q FEVER

Q fever is a zoonotic disease caused by the bacteria *Coxiella burnetii*. The bacteria naturally infects some animals such as cattle, sheep, and goats. The bacteria may be found in the birth products, urine, feces, and milk of infected animals. Exposures may occur if the bacteria are inhaled, such as if dust contaminated with birthing products is disturbed, or if the bacteria are consumed, such as during the consumption of unpasteurized or raw milk and milk products. Direct contact with animals is not required to become infected with Q fever.

Q fever often causes mild, flu-like illness, with symptoms such as fever, fatigue, muscle aches, and nausea, vomiting, or diarrhea. A portion of individuals infected with *C. burnetii* bacteria may develop a more serious condition called chronic Q fever. Chronic Q fever develops many months after initial Q fever infection. People with chronic Q fever will often develop an

infection in one or more of their heart valves. This condition is called endocarditis. Q fever can be serious and fatal if the patient is not treated properly.

Q fever became a nationally notifiable condition in 2008. Since then, Montana has reported 44 cases (Figure 33). Thirty-four individuals were classified as having acute Q fever while 10 were classified as having chronic Q fever (Figure 34). Montana has reported one death due to Q fever. This death occurred in 2015.

A multi-state outbreak that occurred in 2011 resulted in 15 Montana residents contracting Q fever from a farm in Washington State. Since then, Montana has reported 1-5 cases of Q fever annually, with an average of 2 cases annually. Two acute Q fever cases were reported in both 2021 and 2022. All cases were over 40 years old.

FIGURE 33. Q FEVER CASES AND OUTCOMES— MONTANA, 2008-2022

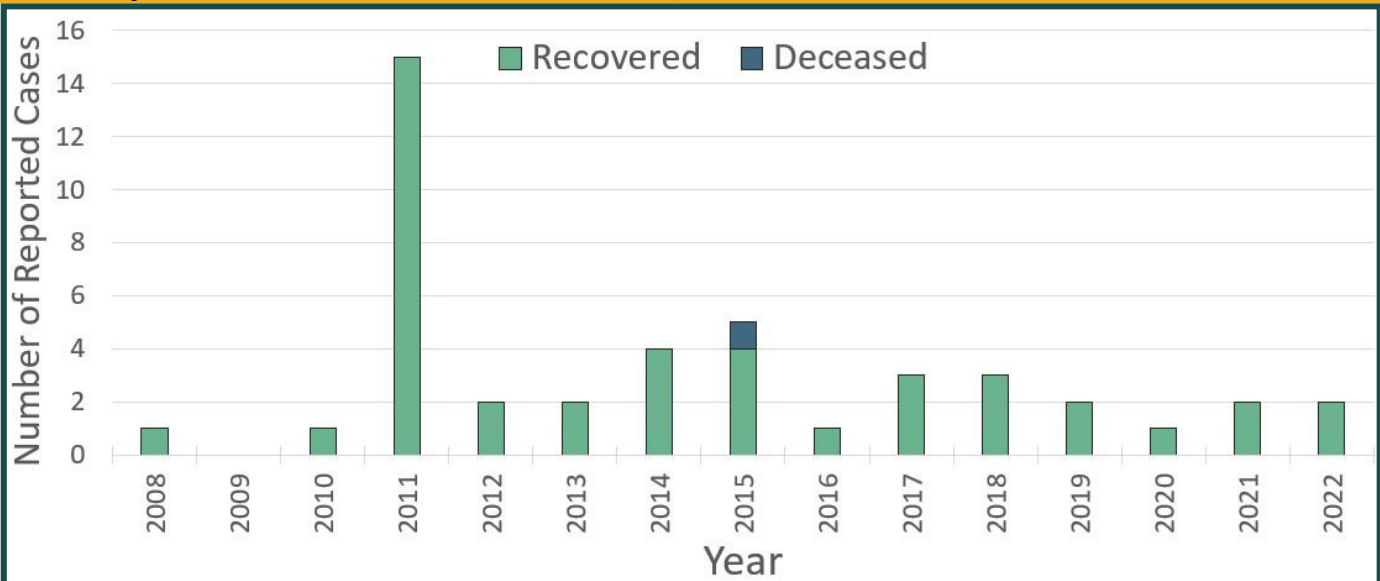
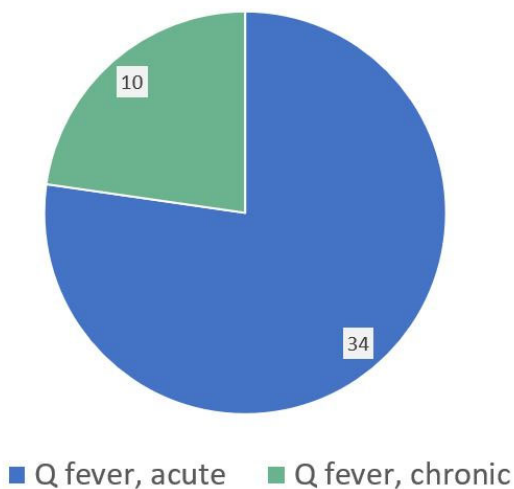
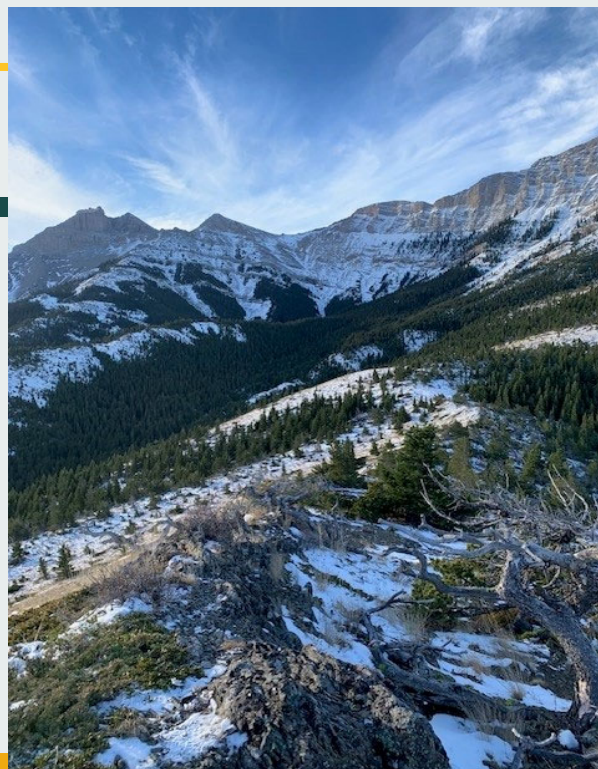
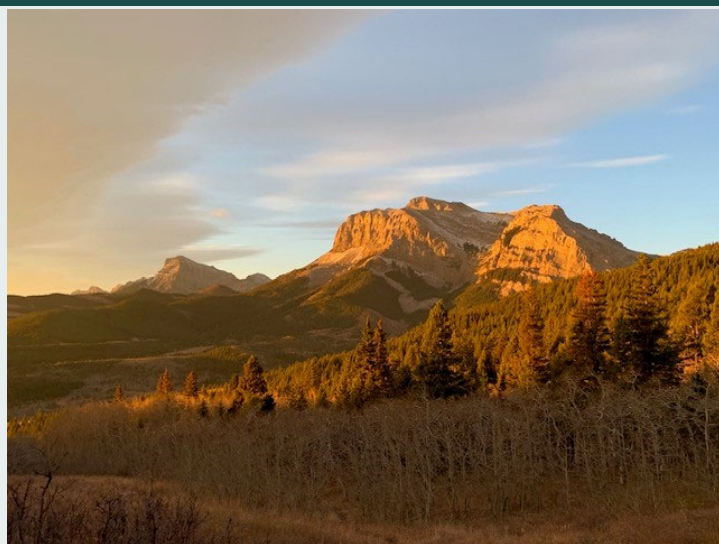


FIGURE 34. Q FEVER CASES BY CASE CLASSIFICATION— MONTANA, 2008-2022



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 primarily 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 become infected by breathing in dust from disturbed soil 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 residents that spend their winters in endemic areas. The remainder of cases are in individuals that previously lived or worked in areas where coccidioidomycosis

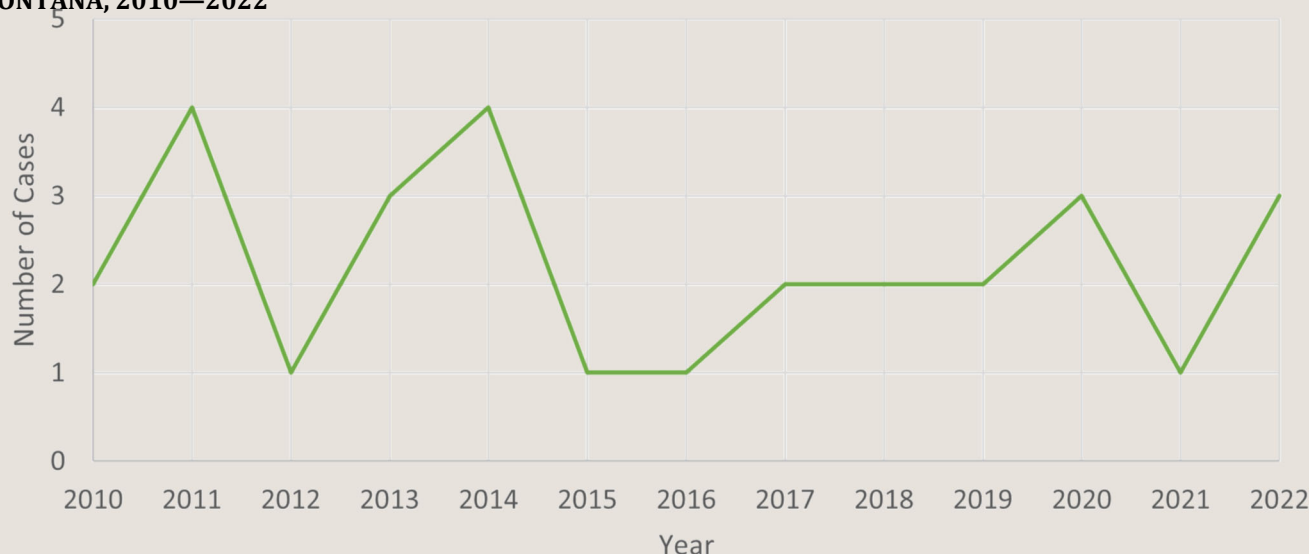
is endemic.

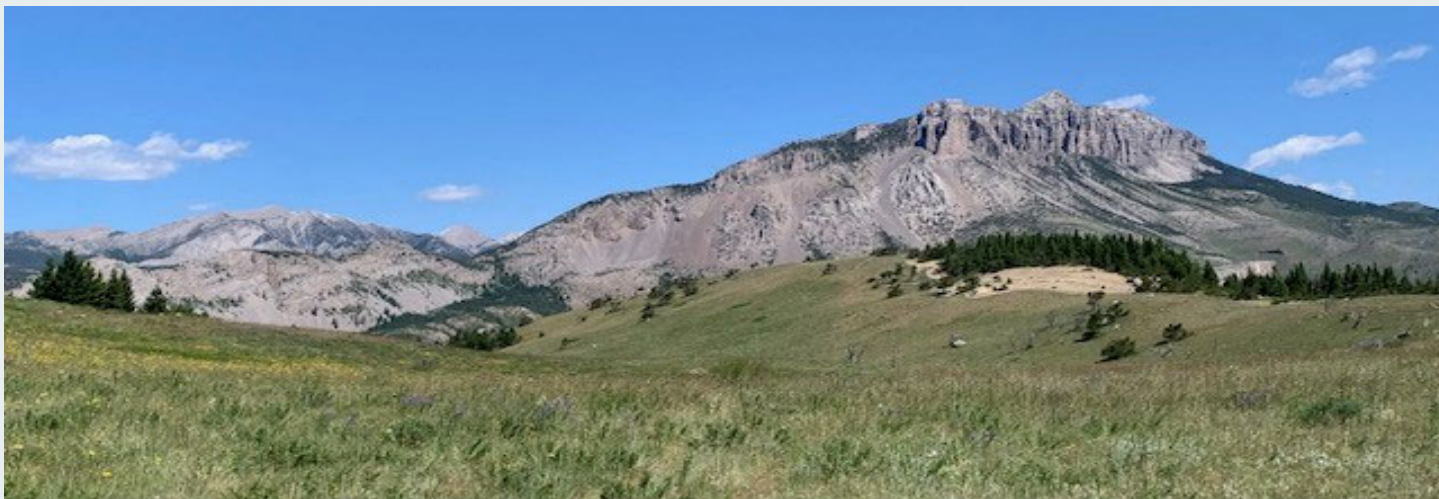
In 2021, there were 22 cases of coccidioidomycosis, 13 of whom were aged 60 years and older. In 2022, there were 18 cases, 13 of whom were over 60 years of age. Most cases reported spending time in states endemic for *C. immitis*, most commonly Arizona.

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

FIGURE 35. CREUTZFELDT-JAKOB DISEASE CASES—MONTANA, 2010—2022





Montana, cases range between one to four over the last 10 years. In 2021, one case of CJD was reported, a male in his 40s. In 2022, three cases of CJD were reported, two females and one male, aged between 50-80 years.

LEGIONELLOSIS

Legionellosis is an infection caused by the bacterium *Legionella*. *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. The disease presents as either a mild febrile illness (Pontiac fever), a form of pneumonia called Legionnaires' disease (which can become severe), or extrapulmonary legionellosis (a very rare condition where *Legionella* cause disease at sites outside the lungs). Most legionellosis cases reported in Montana are cases of Legionnaires' disease (LD). The case fatality rate of LD is about 10%, and those who are over the age of 50, are smokers, and/or have chronic diseases are most at risk for infection. From 2018 to 2022, there was a five-year average of 11 Legionnaires' disease cases per year in Montana, which is 10% higher than the previous five-year average. There were 15 Legionnaires' disease cases reported in MT in 2021, and 11 reported in 2022. Of those, 24 were hospitalized (92%) and there were no deaths. Additionally, an outbreak of 10 legionellosis cases was reported in 2021; the cases became sick after using a hot tub at a hotel in Montana. The outbreak cases were out-of-state residents, and all cases survived their illness.

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 36. LEGIONNAIRES' DISEASE CASES — MONTANA, 2000-2022

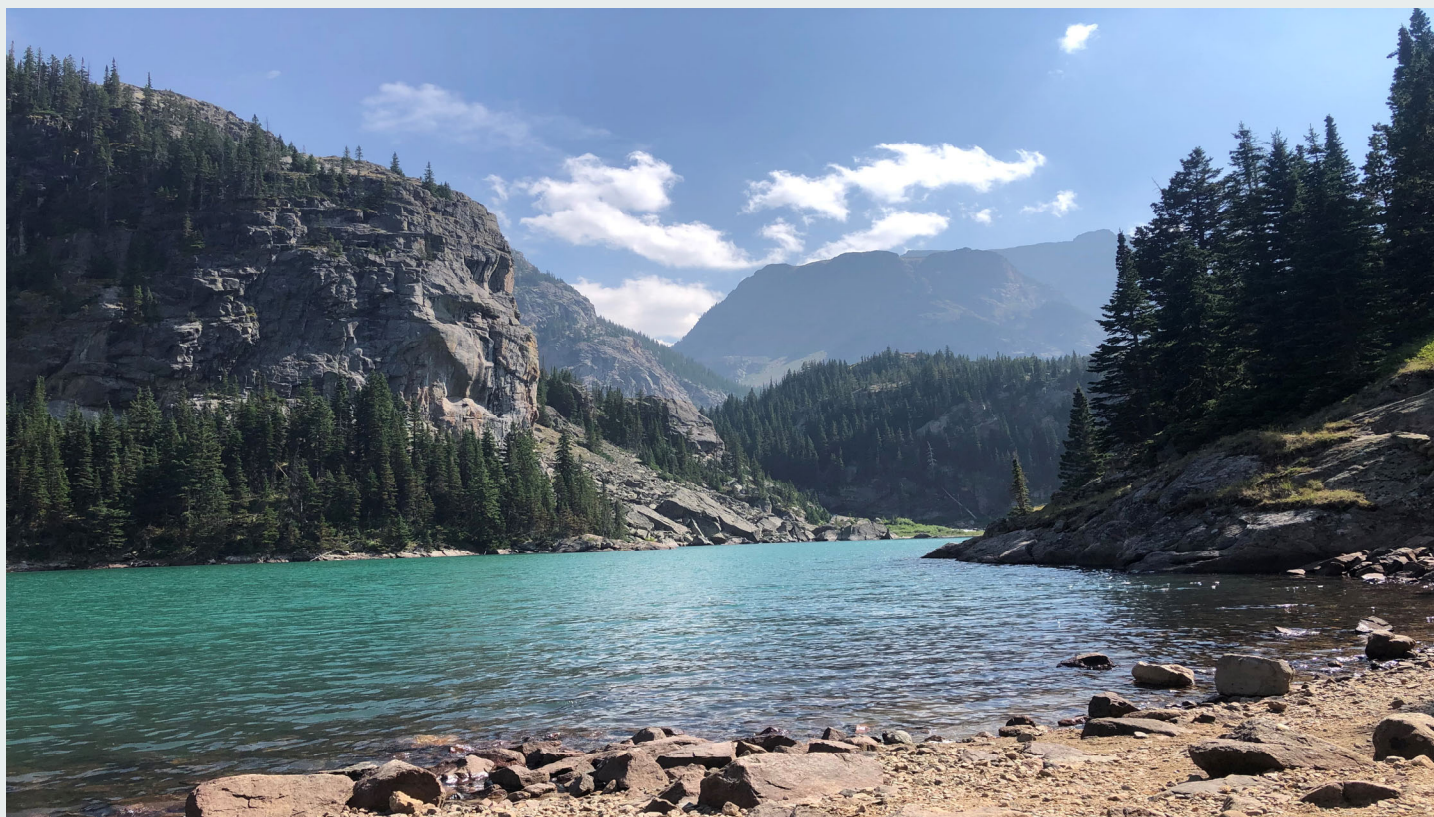


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Appendix I: Comparative Statistics for Reportable Communicable Diseases— Montana, 2016–2021†

CONDITION	Reported Cases						2021 Incidence (per 100,000 people)	Previous 5 year median (2016 2020)
	2016	2017	2018	2019	2020	2021		
Anaplasmosis	0	4	1	0	0	1	0.1	0
Botulism, wound	0	0	0	0	0	1	0.1	0
Campylobacteriosis	372	406	432	374	300	273	24.7	374
Chlamydia	4423	4552	4901	4752	4138	4033	364.6	4552
Coccidioidomycosis	13	18	28	25	15	22	2.0	18
Colorado tick fever	0	2	0	1	21	19	1.7	1
COVID-19	0	0	0	0	85195	116257	10509.3	NA
Cryptosporidiosis	62	70	81	72	48	56	5.1	70
Cyclosporiasis	0	3	10	2	1	4	0.4	2
Ehrlichiosis, <i>chaffeensis</i>	1	0	0	0	0	1	0.1	0
Giardiasis	120	125	89	79	76	60	5.4	89
Gonorrhea	868	782	1176	1571	1696	1451	131.2	1176
<i>Haemophilus influenzae</i> , invasive	19	19	17	27	13	16	1.4	19
Hantavirus infection	1	0	0	0	0	2	0.2	0
Hantavirus pulmonary syndrome	0	0	0	0	0	1	0.1	0
Hepatitis A, acute	3	3	0	17	8	3	0.3	3
Hepatitis B, acute	1	3	1	1	5	2	0.2	1
Hepatitis B, chronic	21	35	20	25	21	22	2.0	21
Hepatitis C, acute	21	15	13	19	17	30	2.7	17
Hepatitis C, chronic	1664	1665	1530	1335	982	1033	93.4	1530
HIV/AIDS	22	30	23	26	16	20	1.8	23
Latent TB Infection (LTBI)	NR	NR	NR	NR	188	265	24.0	NA
Legionellosis	10	17	10	14	7	15	1.4	10
Listeriosis	2	2	0	0	2	2	0.2	2
Lyme disease	17	11	7	8	3	13	1.2	8
Malaria	5	3	3	0	2	2	0.2	3
Meningococcal disease (<i>Neisseria meningitidis</i>)	2	1	0	3	0	2	0.2	1
MIS-C	0	0	0	0	4	19	1.7	NA
Mumps	26	6	6	17	1	1	0.1	6
Pertussis	21	106	143	494	40	1	0.1	106
Q fever, Acute	1	3	3	2	1	2	0.2	2

†Conditions for which there were zero (0) cases in 2021 are not reflected in this table. NR = Not Reportable. NA = Not Applicable.

Appendix I: Comparative Statistics for Reportable Communicable Diseases— Montana, 2016–2021†, Continued

CONDITION	Reported Cases						2021 Incidence (per 100,000 people)	Previous 5 year median (2016–2020)
	2016	2017	2018	2019	2020	2021		
Rabies, animal	10	13	17	18	13	20	1.8	13
Rabies, post-exposure prophylaxis (PEP)	NR	NR	223	208	178	279	25.2	208
Rocky Mountain Spotted Fever	9	11	9	3	2	2	0.2	9
Salmonellosis	177	140	135	136	190	108	9.8	140
Shiga toxin-producing <i>Escherichia coli</i> (STEC)	133	97	121	69	92	104	9.4	97
Shigellosis	8	10	12	11	15	7	0.6	11
Streptococcal toxic shock syndrome	3	3	2	2	0	1	0.1	2
<i>Streptococcus</i> <i>pneumoniae</i> , invasive	99	112	121	131	84	113	10.2	112
Syphilis, congenital	0	1	0	1	2	9	0.8	1
Syphilis, primary and secondary	14	48	45	59	44	97	8.8	45
Syphilis, total	13	84	103	123	97	218	19.7	97
Toxic-shock syndrome, non-streptococcal	0	1	0	0	0	1	0.1	0
Transmissible Spongiform Encephalopathies (TSE)	1	2	2	2	3	1	0.1	2
Tuberculosis	4	3	5	2	4	3	0.3	4
Tularemia	3	6	4	2	1	2	0.2	3
Varicella (Chickenpox)	77	54	57	52	33	21	1.9	54
Vibriosis	2	8	14	2	3	4	0.4	3
West Nile virus, neuroinvasive	3	3	25	3	1	2	0.2	3

†Conditions for which there were zero (0) cases in 2021 are not reflected in this table. NR = Not Reportable. N/A = Not Applicable.

Appendix II: Comparative Statistics for Reportable Communicable Diseases— Montana, 2017–2022†

CONDITION	Reported Cases						2022 Incidence (per 100,000 people)	Previous 5 year median (2017 2021)
	2017	2018	2019	2020	2021	2022		
African Tick Bite Fever	0	0	0	0	0	1	0.1	0
Anaplasmosis	4	1	0	0	1	2	0.2	1
Babesiosis	0	0	0	0	0	1	0.1	0
Botulism, foodborne	0	0	0	0	0	1	0.1	0
Campylobacteriosis	406	432	374	300	273	358	31.9	374
Chlamydia	4552	4901	4752	4138	4033	4088	364.1	4552
Coccidioidomycosis	18	28	25	15	22	18	1.6	22
Colorado tick fever	2	0	1	21	19	7	0.6	2
COVID-19	0	0	0	85195	116257	122903	10945.5	NA
Cryptosporidiosis	70	81	72	48	56	56	5.0	70
Cyclosporiasis	3	10	2	1	4	4	0.4	3
Giardiasis	125	89	79	76	60	65	5.8	79
Gonorrhea	782	1176	1571	1696	1451	1311	116.8	1451
<i>Haemophilus influenzae</i> , invasive	19	17	27	13	16	18	1.6	17
Hemolytic uremic syndrome (HUS)	2	1	0	1	0	3	0.3	1
Hepatitis A, acute	3	0	17	8	3	5	0.4	3
Hepatitis B, acute	3	1	1	5	2	2	0.2	2
Hepatitis B, chronic	35	20	25	21	22	30	2.7	22
Hepatitis C, acute	15	13	19	17	30	40	3.6	17
Hepatitis C, chronic	1665	1530	1335	982	1033	1011	90.0	1335
HIV/AIDS	30	23	26	16	20	15	1.3	23
Latent TB Infection (LTBI)	NR	NR	NR	188	265	235	20.9	NA
Legionellosis	17	10	14	7	15	11	1.0	14
Listeriosis	2	0	0	2	2	4	0.4	2
Lyme disease	11	7	8	3	13	13	1.2	8
Malaria	3	3	0	2	2	2	0.2	2
Mpox	0	0	0	0	0	7	0.6	0
MIS-C	0	0	0	4	19	7	0.6	NA
Pertussis	106	143	494	40	1	3	0.3	106
Q fever, Acute	3	3	2	1	2	2	0.2	2

†Conditions for which there were zero (0) cases in 2022 are not reflected in this table. NR = Not Reportable. N/A = Not Applicable.

Appendix II: Comparative Statistics for Reportable Communicable Diseases— Montana, 2017–2022†, Continued

CONDITION	Reported Cases						2022 Incidence (per 100,000 people)	Previous 5 year median (2017 2021)
	2017	2018	2019	2020	2021	2022		
Rabies, animal	13	17	18	13	20	13	1.2	17
Rabies, post-exposure prophylaxis (PEP)	NR	223	208	178	279	210	18.7	216
Rocky Mountain Spotted Fever	11	9	3	2	2	2	0.2	3
Salmonellosis	140	135	136	190	108	165	14.7	136
Shiga toxin-producing <i>Escherichia coli</i> (STEC)	97	121	69	92	104	118	10.5	97
Shigellosis	10	12	11	15	7	15	1.3	11
Soft Tick Relapsing Fever	0	0	0	0	0	1	0.1	0
Streptococcal toxic shock syndrome	3	2	2	0	1	2	0.2	2
<i>Streptococcus</i> <i>pneumoniae</i> , invasive	112	121	131	84	113	104	9.3	113
Syphilis, congenital	1	0	1	2	9	15	1.3	1
Syphilis, primary and secondary	48	45	59	44	97	326	29.0	48
Syphilis, total	84	103	123	97	218	615	54.8	103
Transmissible Spongiform Encephalopathies (TSE)	2	2	2	3	1	3	0.3	2
Tuberculosis	3	5	2	4	3	6	0.5	3
Tularemia	6	4	2	1	2	2	0.2	2
Varicella (Chickenpox)	54	57	52	33	21	22	2.0	52
Vibriosis	8	14	2	3	4	8	0.7	4

†Conditions for which there were zero (0) cases in 2022 are not reflected in this table. NR = Not Reportable. N/A = Not Applicable.

Appendix III: Montana Demographic Profile, 2021

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 59 public health jurisdictions within the state that include 51 individual counties, one health district composed of five rural counties, as well as seven tribal health departments. Fifty-eight percent of all case reports of reportable infectious diseases for Montana in 2021 were submitted from six counties, all with populations $\geq 60,000$ residents.*[‡]

CHARACTERISTIC	POPULATION	PERCENT [‡]
	1,106,227	100
SEX		
Male	561,704	51%
Female	544,523	49%
AGE GROUP (YEARS)		
<1	10,862	1%
1-4	47,208	4%
5-14	133,695	12%
15-24	144,726	13%
25-44	283,398	26%
45-64	268,052	24%
65+	218,286	20%
RACE		
White	982,261	89%
American Indian/Alaska Native	72,037	7%
Black or African American	6,887	1%
Asian	11,216	1%
Native Hawaiian or other Pacific Islander	994	<1%
Two or more races	32,832	3%
ETHNICITY		
Not Hispanic or Latino	1,058,151	96%
Hispanic or Latino	48,076	4%

*From the Montana Infectious Disease Information System (MIDIS) generated report of 2021 data. The six counties are Yellowstone, Missoula, Gallatin, Flathead, Cascade, and Lewis and Clark.

[‡]Data source: Annual County Resident Population Estimates by age, sex, race, and Hispanic origin for April 1, 2020 (estimates base) and July 1, 2020-July 1, 2022, for Montana. Population and Housing Units Estimates Program, U.S. Census Bureau.

Appendix IV: Montana Demographic Profile, 2022

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 59 public health jurisdictions within the state that include 51 individual counties, one health district composed of five rural counties, as well as seven tribal health departments. Fifty-eight percent of all case reports of reportable diseases for Montana in 2022 were submitted from six counties, all with populations $\geq 60,000$ residents.*[‡]

CHARACTERISTIC	POPULATION	PERCENT [‡]
	1,122,867	100
SEX		
Male	569,846	51%
Female	553,021	49%
AGE GROUP (YEARS)		
<1	11,201	1%
1-4	46,445	4%
5-14	134,082	12%
15-24	147,073	13%
25-44	291,080	26%
45-64	267,860	24%
65+	225,126	20%
RACE		
White	996,179	89%
American Indian/Alaska Native	72,451	7%
Black or African American	6,993	1%
Asian	12,084	1%
Native Hawaiian or other Pacific Islander	1,108	<1%
Two or more races	34,052	3%
ETHNICITY		
Not Hispanic or Latino	1,072,148	95%
Hispanic or Latino	50,719	5%

*From the Montana Infectious Disease Information System (MIDIS) generated report of 2022 data. The six counties are Yellowstone, Missoula, Gallatin, Flathead, Cascade, and Lewis and Clark.

[‡]Data source: Annual County Resident Population Estimates by Age, Sex, Race, and Hispanic Origin, Population and Housing Units Estimates Program, U.S. Census Bureau.

Appendix V: Diseases and Conditions Reportable to Public Health in Montana, 2021 and 2022

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)	Listeriosis
Anaplasmosis	Lyme disease
Anthrax	Lymphogranuloma venereum
Arboviral disease (including California serogroup, Eastern equine encephalitis, Powassan, St. Louis encephalitis, West Nile Virus, Western equine encephalitis)	Malaria
Arsenic poisoning (≥ 70 micrograms per liter total arsenic in urine; or ≥ 35 $\mu\text{g/L}$ methylated plus inorganic arsenic in urine)	Measles (<i>rubeola</i>)
Babesiosis	Meningococcal disease (<i>Neisseria meningitidis</i>)
Botulism (including infant botulism)	Mercury poisoning (≥ 200 $\mu\text{g/L}$ total mercury in urine; or 20 μg elemental mercury/g creatinine in urine; or ≥ 10 $\mu\text{g/L}$ elemental, organic, and inorganic blood mercury levels)
Brucellosis	Mumps
Cadmium poisoning (≥ 5 $\mu\text{g/L}$ total blood cadmium levels; or ≥ 3 $\mu\text{g/L}$ in urine)	Pertussis (whooping cough)
Candida auris	Plague (<i>Yersinia pestis</i>)
Campylobacteriosis	Poliomyelitis
Chancroid	Psittacosis
<i>Chlamydia trachomatis</i> infection	Q fever (<i>Coxiella burnetii</i>)
Coccidioidomycosis	Rabies, human and animal (including exposure to a human by a species susceptible to rabies infection)
Colorado Tick Fever	Rickettsiosis
Cryptosporidiosis	Rubella (including congenital)
Cyclosporiasis	Salmonellosis
Dengue virus	Severe Acute Respiratory Syndrome-associated coronavirus (SARS)
Diphtheria	Shigellosis
Ehrlichiosis	Smallpox
<i>Escherichia coli</i> , Shiga toxin-producing (STEC)	<i>Streptococcus pneumoniae</i> , invasive disease
Gastroenteritis outbreak	Syphilis
Giardiasis	Tetanus
Gonococcal infection	Tickborne relapsing fever
<i>Granuloma inguinale</i>	Toxic shock syndrome, non-streptococcal
<i>Haemophilus influenzae</i> , invasive disease 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) Lead poisoning (blood levels \geq than 5 micrograms deciliter for children ≤ 13 years of age)	Vibriosis
Legionellosis	Viral Hemorrhagic fevers
Leptospirosis	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 the State of Montana's 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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