Communicable Disease in Montana: 2015 Annual Report

Prepared by the Communicable Disease Epidemiology Section

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

November 2016

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This report was prepared by the Communicable Disease Epidemiology Section (CDEpi) at the Montana Department of Public Health and Human Services (DPHHS). It summarizes communicable diseases reported by the state of Montana in 2015. These reportable conditions met the 2015 case definitions provided by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE).[1] Communicable diseases that must be reported by diagnostic laboratories and health care professionals to public health authorities are specified by the Administrative Rules of Montana (ARM 37.114.203). Communicable disease data are maintained in the Montana Infectious Disease Information System (MIDIS), HIV data are maintained in the enhanced HIV/AIDS Reporting System (eHARS), and STD data are maintained in STD*MIS. Population data[2] as well as reportable communicable disease statistics are found in Appendix I. Small numbers of reported cases may result in unstable rates and should be interpreted with caution. Please contact CDEpi at 406-444-0273 or hhsepi@mt.gov with questions or comments.

Notable Events of 2015

Tuberculosis at a college campus

In early 2015, an active tuberculosis case was diagnosed in a foreign born student who had recently moved to Montana to attend college. Prior to completion of the tuberculosis risk-based screening process, the patient experienced chest pain, presented to the student health service and was transferred to the local hospital emergency department to rule out an immediate, acute medical condition. The x-ray was abnormal and consistent with possible TB and the tuberculin skin test was positive. The college reported the diagnosis of presumptive TB to the local health department, prompting isolation of the student until TB could be confirmed. To end the risk of transmission while the diagnosis was being confirmed bacteriologically, the patient was moved off campus. A TB case management team was quickly formed, consisting of appropriate college, and local and state health department staff to communicate findings, define roles, determine next steps, address patient needs, begin the contact investigation, and discuss the communication strategy within the college and community.

A respiratory specimen contained acid-fast bacilli (AFB) and the nucleic acid amplification test (NAAT) was positive, which confirmed active tuberculosis. Treatment was initiated for the patient using directly observed therapy (DOT) by the county public health department. Molecular drug susceptibility testing performed by CDC quickly confirmed resistance to isoniazid (INH), necessitating adjustment of the treatment regimen. The patient successfully completed treatment after six months.

During the contact investigation, 113 people were tested. In total, four persons had a positive test result for latent TB infection (LTBI), but no disease. Of these, three were foreign-born students from countries where TB is common; two of the students did not report a history of previous positive results and one had an unknown history. Two of the students were treated for LTBI, but the third returned to their home country prior to treatment. One staff member who had a positive tuberculin skin test with no history of prior testing refused treatment for LTBI.

The county health department assessed the process and outcomes associated with this case of TB and determined the team approach was critical for successful management of the case and contact investigation. They also noted the need for written internal TB policy development, consistent TB screening policies at the college, and for rapid and uniform messaging to students, parents, the community and the press.

Multi-drug resistant TB case (MDR-TB)

An MDR-TB case was diagnosed in the fall of 2015. A respiratory specimen sent to the Montana Public Health Laboratory was positive for AFB and was NAAT positive with rifampin resistance detected. The x-ray was abnormal, with cavitation. A records check revealed that the patient had been previously treated for MDR-TB many years ago. A specimen was immediately sent to CDC for molecular drug susceptibility testing, which confirmed resistance to numerous first- and second-line TB drugs. The patient was isolated first in a hospital and then at home until a safe and effective treatment regimen could be determined. Due to extremely complicated treatment options and exacerbation by an existing, immune-suppressive medical condition, DPHHS requested, with the support of CDC, the patient be admitted to the National Institutes of Health (NIH) to initiate therapy. The NIH accepted the patient, only one of three patients recently admitted with either Extensively Drug Resistant (XDR) or MDR tuberculosis. The patient remained at

NIH for five months until an effective treatment course was determined and until no longer infectious. The contact investigation yielded no evidence of transmission.

Unlike drug-susceptible tuberculosis, MDR-TB has a high rate of treatment failure because of disease relapse. To maximize treatment efficacy and safety for the patient, protect the public health of the community, and prevent further amplification of drug resistance, the MDR-TB patient is closely managed by the county health department. In addition, drug therapy complications are common with MDR-TB, requiring enhanced medical monitoring under the care of an infectious disease physician and an MDR-TB expert physician. The patient will remain on treatment using directly observed therapy (DOT) throughout the course of treatment, which is anticipated to be for a total of 20-26 months.

Since 2000, Montana has had three cases of MDR-TB or 1.8% of the total cases reported during that time frame. Of the three, one was foreign-born. Drug-resistant TB has a major human cost for patients: 73% are hospitalized, 37% require home isolation, 27% stop working, and 9% die during treatment. The direct costs of drugs and diagnostics are about nine times greater for MDR-TB than for susceptible TB.

Increase in incidence of Syphilis

After fifteen years of ten or fewer reported annual cases, an increase in the number of syphilis cases was reported in 2015. Seven cases of primary syphilis, six cases of secondary syphilis and five cases with early latent disease were reported, bringing the 2015 total to 22 cases.

Risk factors for all 13 infectious cases included five who reported having sex while high, and four were noted to have previous history of sexually transmitted disease. Nine infected men reported having sex with men (MSM); four of those reported anonymous sex partners. Three persons reported as having been incarcerated at some point in the last 12 months prior to diagnosis; of those, two reported MSM risk. Three (all males) of the 13 were previously reported as HIV positive.

Ages of 2015 cases ranged from 17 to 50 years. Twenty-three percent of cases identified as Native American and 77% as white. All but one were male. The population centers of Yellowstone, Missoula and Gallatin counties represented the majority (62%) of cases.

Foodborne Outbreaks

In 2015, foodborne outbreaks in Montana attracted media attention on more than one occasion. Three outbreaks caused by *Salmonella* and one caused by Shiga-toxin *E.coli* (STEC) sickened more than 60 people. In most outbreaks the culprit was identified and all persons affected have recovered from their illness. Local and state health officials responded with prompt investigations of foodborne threats within and beyond Montana.

One of the earliest outbreaks began when multiple ill persons reported eating at a restaurant on Valentine's Day. Local health officials quickly began investigating the source of illness and found a total of 39 persons who became ill after eating at the restaurant on the same day. Six of these were laboratory confirmed as *Salmonella* Braenderup. The outbreak appeared to be isolated to the facility, though the exact food items related to the outbreak was not identified.

During late summer months, cucumbers made headlines in Montana and the nation, sickening 15 Montanans who were part of a multi-state outbreak lasting multiple months. Overall, more than 900 persons became sick nationwide after eating imported cucumbers, which were subsequently removed from store shelves. The outbreak was over in Montana shortly after issuing the recall, but continued in other states. The Montana Public Health Laboratory was able to identify *Salmonella* Poona in 15 human samples and one cucumber sample collected from a store in Montana.

The year did not end quietly and before Thanksgiving, health department officials in Utah, Colorado, Montana and other states were able to identify that Costco rotisserie chicken salad was the likely source of an STEC O157:H7 outbreak that infected six Montanans, and hospitalized two of them. Once epidemiological evidence suggested the link between product and illness, the product was temporarily discontinued. Preliminary testing indicated the likely contributing factor in the salad causing illness was thought to be celery.

A fourth *Salmonella* outbreak in fall 2015 remained unsolved, despite multiple attempts to identify a source. Poultry products were suspected to be the most likely cause for this *Salmonella enteritidis* outbreak sickening seven Montanans and few in other states, but investigations have not been able to identify a single supplier or source.

Foodborne and Diarrheal Diseases

In 2015, 763 notifiable enteric conditions were reported in Montana, and increase of 23% compared to 2014. The most significant increases in rates compared to the previous year have been for Shiga-toxin *E.coli* (+118%) and campylobacteriosis (+50%) (Table 1). The increase is largely due to a change in case definition for campylobacteriois effective January 2015 that increased the sensitivity of the reporting system, and outbreak related salmonellosis cases in February and August of that year. Enteric illnesses are more commonly reported during spring and summer months. In 2015, nearly 47% of all reportable enteric conditions occurred between May through August (Figure 1).

Table 1. Enteric illnesses — Montana, 2015

Condition	Cases	Rate (per 100,000)	Change from 2014
Campylobacteriosis	323	31.3	+50%
Salmonellosis	195	18.9	+35%
Giardiasis	93	9.1	+5%
Shiga toxin producing *E. coli* (STEC)	85	8.2	+118%
Cryptosporidiosis	39	3.8	-40%
Shigellosis	14	1.4	-74%
Cyclosporiasis	3	0.3	+50%
Hemolytic Uremic Syndrome (HUS)	2	0.2	0
Listeriosis	1	0.1	0

Campylobacteriosis

Campylobacter spp. carries the greatest burden of enteric illnesses in Montana with an incidence rate of 31.3 cases per 100,000 population. Because of the change in case definition, cases with non-culture based results are now classified as probable. Nearly 23% of these cases are not confirmed by culture dependent methods. Confirmed case rates for 2015 were at 24.3 cases per 100,000, which is comparable to 2014, but continues to surpass the national average of confirmed campylobacteriosis of 13.5 cases per 100,000 population. Campylobacteriosis is often associated with farming and ranching, as cattle and poultry are the most common reservoirs for the bacteria which was the case for 23% of 323 reported cases. Other likely sources of transmission can include undercooked foods, unpasteurized milk, and non-chlorinated water. Pets are often likely sources of infection as well, even when pets show no signs of illness. Serious complications of campylobacteriosos can lead to Guillain-Barré Syndrome. In 2015, 14% of Montana cases were hospitalized and two died.

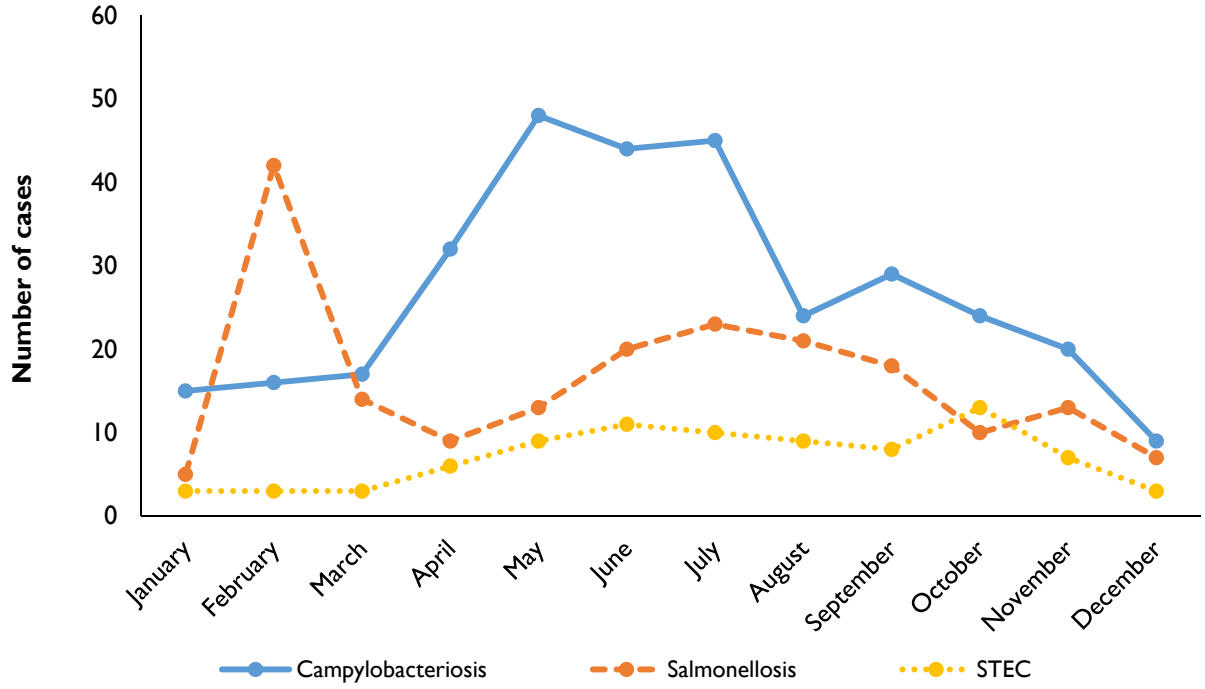
Salmonellosis

In 2015 194 cases of Salmonellosis were reported, which is the highest number of cases ever recorded in Montana since it was added to the reportable condition list in 1960. Of the 194 cases reported, 161 were laboratory confirmed and 21% were hospitalized. The rate of salmonellosis increased to 18.9 cases per 100,000 population in 2015, up by 35% from the previous year. Three significant salmonellosis outbreaks occurred in 2015 accounting for 30% of these cases. However, the rate of confirmed salmonellosis (15.7) is comparable to the most recently available U.S. rate of 15.1 per 100,000. Salmonellosis is most commonly acquired through ingestion of contaminated foods, which was the case for most outbreak related cases in 2015. Live poultry and reptiles are other common reservoirs of the organism.

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

Outbreak related cases (15%) cannot explain the significant increase of STEC reported in Montana in 2015. With an increase of118%, STEC rates (8.2 per 100,000) in Montana were more than triple the national average (2.4 cases per 100,000 population). Incidence of hemolytic uremic syndrome (HUS), a type of kidney failure that is often the result of STEC infection and can lead to death, remained low at 0.2 cases per 100,000 population in 2015, well below the average in the U.S. (2014: 0.79/100,000). STEC is most commonly found in cattle, and can cause severe illness in humans. Cases of STEC in Montana are often linked to consumption of undercooked beef, other contaminated foods and direct animal contact. Twenty-two percent of Montana STEC cases were hospitalized and two developed HUS.

Figure 1. Select enteric illness cases by month — Montana, 2015



Cryptosporidiosis and Giardiasis

Cryptosporidiosis and Giardiasis, caused by the parasites *Cryptosporidium* and *Giardia*, respectively, are often associated with waterborne exposures, usually in recreational waters and untreated natural waters. Both protozoan organisms are highly resistant to chlorine, allowing them to survive for extended time periods in swimming pools even after routine chemical treatment has been applied. The reservoir for these organisms is usually humans, but cattle and other animals can also serve as reservoirs. Giardiasis rates have slightly increased to 9.0 cases per 100,000 population in 2015. Cryptosporidiosis greatly reduced to 3.8 cases per 100,000 population.

Shigellosis

Shigellosis is caused by *Shigella* and is found only in humans. The organism has a very low infectious dose and is highly communicable. Outbreaks occur sporadically and often affect school-aged children and their families. In 2015, 14 cases of shigellosis were reported, which is average in Montana.

Cyclosporiasis

Cyclosporiasis, caused by the parasite *Cyclospora*, is most commonly found in tropical regions and has been associated with outbreaks linked to fresh produce, especially berries. In the United States, a median of two outbreaks are reported each year. Three unrelated cases were reported in Montana in June 2015, and included one hospitalization.

Listeriosis

Listeriosis can be a very serious condition especially for the elderly, pregnant women, and those with weakened immune systems. *Listeria* has been identified as the pathogen for several nationwide foodborne outbreaks. *Listeria* is commonly found in soil and water and can get into a variety of foods, including raw meat and vegetables, cheeses, milk, and fish. One case of listeriosis was reported in 2015. The person was hospitalized, but survived.

Enteric Outbreaks

There were 38 Montana enteric cases linked to several multistate outbreaks in 2015. Those caused by *Salmonella* were largely foodborne, but some were linked to live poultry exposures. The majority (15) of multi-state outbreak cases were linked to the *Salmonella* Poona outbreak linked to imported cucumbers. Another seven were linked to an outbreak that remained unsolved and the remainder were linked to outbreaks caused by frozen chicken products, live poultry and sushi. Two STEC cases were linked with a handful of others in the U.S., but a source could not be identified. Three of four outbreak related *Shigella sonnei* cases were also reported in Montana. Of those three were infected with a multi-drug resistant strain. CDEpi follows up on any clusters identified by pulsed-field gel electrophoresis (PFGE) to support multi-state efforts to identify and control the source of these outbreaks.

Montana reported 33 enteric illness outbreaks were in 2015, and for most a causative agent was identified (76%). The most common route of transmission was identified as person-to-person (67%), followed by foodborne (18%) and indeterminate (15%). Of the 25 outbreaks with a laboratory confirmed pathogen, 18 (47%) were caused by norovirus. Of the four norovirus outbreaks that were sequenced, the strain identified was GII.4 Sidney. Eight additional enteric outbreaks were caused by *Salmonella* (3), Rotavirus (2), *C.difficile, Shigella,* and STEC (1 each). More than 600 Montanans became ill as a result of diarrheal outbreaks, 13 were hospitalized and one died.

The majority of outbreaks (61%) occurred in long-term care facilities and assisted living centers. Other noteworthy locations included grocery stores & restaurants (12%) and child care (9%). Few outbreaks were reported in hospitals, hotels, and other public settings as well.

CDEpi continues to improve methods for state-wide surveillance and outbreak investigation. Reducing the burden of enteric illnesses in Montana continues to be a key focus. The majority (79%) of enteric illness outbreaks were reported within one day to local public health officials.

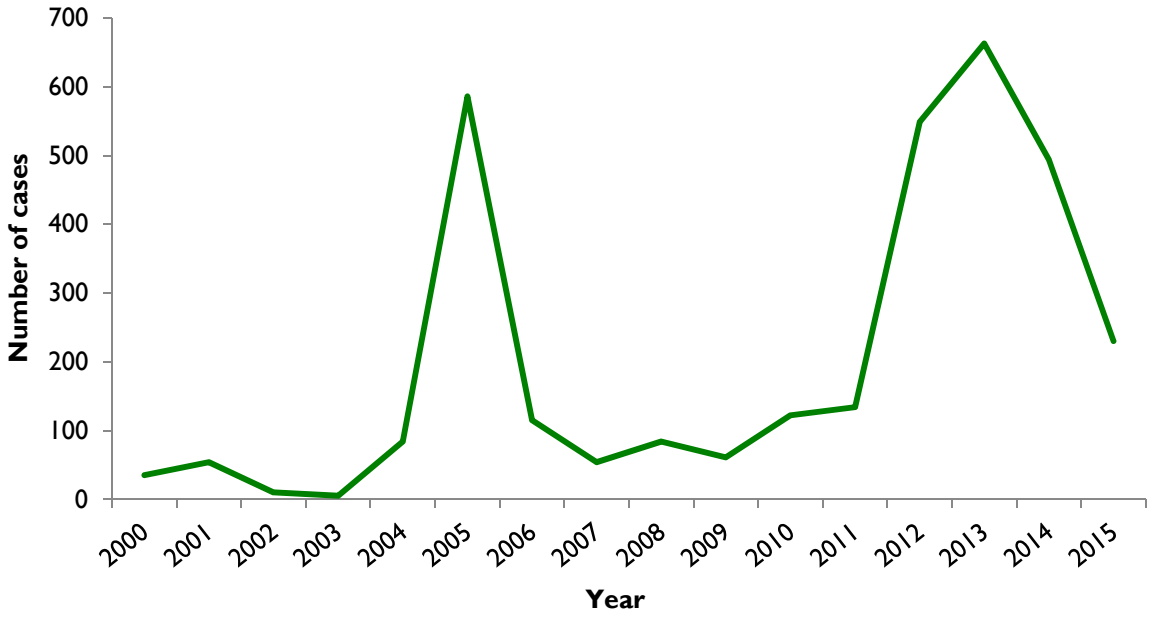
Vaccine Preventable Diseases

Some of the most common vaccine-preventable diseases (VPD) tracked by the World Health Organization (WHO) include diphtheria, *Haemophilus influenzae* serotype b, hepatitis B, measles, meningitis, mumps, pertussis, polio, rubella, tetanus, and yellow fever.[3] Many of these conditions are rarely reported in Montana (see Appendix I). On average, VPD comprise approximately 10% of reportable disease cases in Montana. In 2015, the most frequently reported vaccine preventable diseases in Montana were pertussis and chickenpox.

Pertussis

The number of reported pertussis cases varies from year to year and peaks in a 3–5 year cycle in the United States and Montana (Figure 2). In Montana, peaks occurred in 2005 and 2013, when 586 and 663 pertussis cases were reported, respectively. Following the peak in 2013, the number of reported cases of pertussis declined to 494 in 2014. This downward trend continued in 2015, when 21 jurisdictions reported 230 cases of pertussis. The median age of reported pertussis cases in Montana was 12 years (range: 1 month – 93 years). The incidence rate of pertussis in the U.S. was 5.7 per 100,000 in 2015. Montana reported the second highest pertussis incidence rate in 2015 at 22.3 per 100,000, exceeded only by Nebraska (31.1 per 100,000). This is likely due to increases in PCR testing capability as well as aggressive case finding.

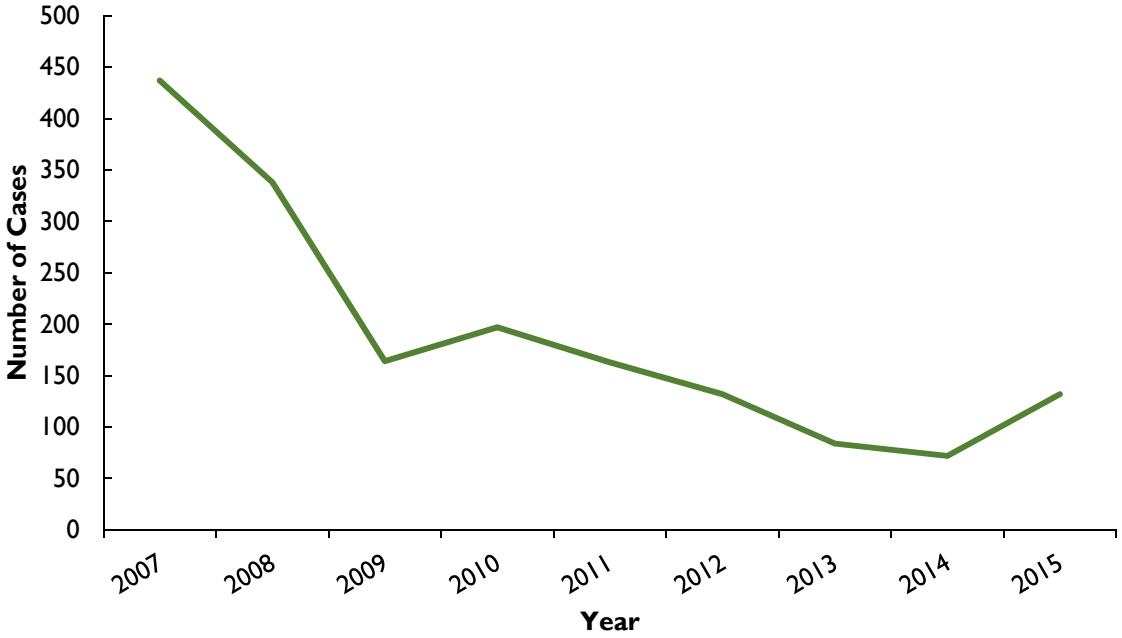
Figure 2. Reported pertussis cases — Montana, 2000–2015



Varicella

Varicella-zoster virus is the causative agent of chickenpox, which was the second most frequently reported vaccine preventable disease in 2015. The number of varicella cases reported in Montana decreased from a peak of 437 cases in 2007 to 72 cases in 2014 (Figure 3). In 2015, the number of reported varicella cases increased to 132. Cases were reported from 22 local health jurisdictions with a median age of 11 years.

Figure 3. Reported varicella cases by year — Montana, 2007–2015



Mumps

Mumps is an acute infection caused by a paramyxovirus and characterized by fever, swelling, and tenderness of the salivary glands (parotitis). Once a common childhood disease, incidence of mumps has steadily declined since the introduction of the measles, mumps and rubella (MMR) vaccine. One suspect case of mumps was reported in 2015. This case met the laboratory criteria for a case but did not have signs and symptoms or epi linkage to a confirmed case.

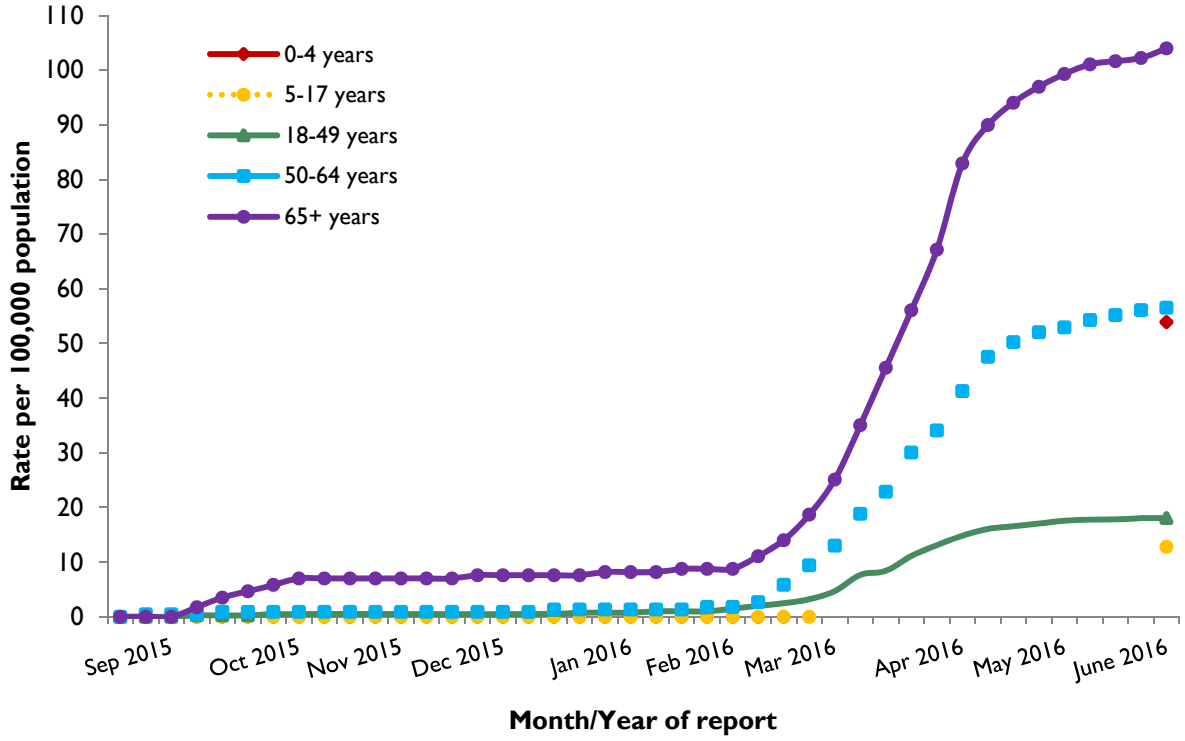
Influenza

Influenza season typically extends from October through June in Montana. During an average influenza season, the number of reported cases peaks in January. The 2015-2016 influenza season was unusual in that the peak of activity was later than average. Sporadic activity was reported from September 2015 through February 2016. Peak activity was recorded during the last week of March.

The reported number of influenza cases varied greatly across the state, including eight counties with fewer than 5 reported influenza cases (range: 0–736 cases). Influenza-related hospitalizations peaked in late March. By the end of the season, 433 Montanans were hospitalized due to influenza. The cumulative influenza-related hospitalization rate in Montana (42.3 per 100,000 population) was higher than that of the United States (31.6 per 100,000 population). The highest rate of hospitalizations was among adults aged 65 years or greater (104 per100,000 population, Figure 4). Of the 33 influenza-related deaths reported, 13 (39%) occurred among adults aged <65 years. Two pediatric (aged 0–17 years) deaths were reported.

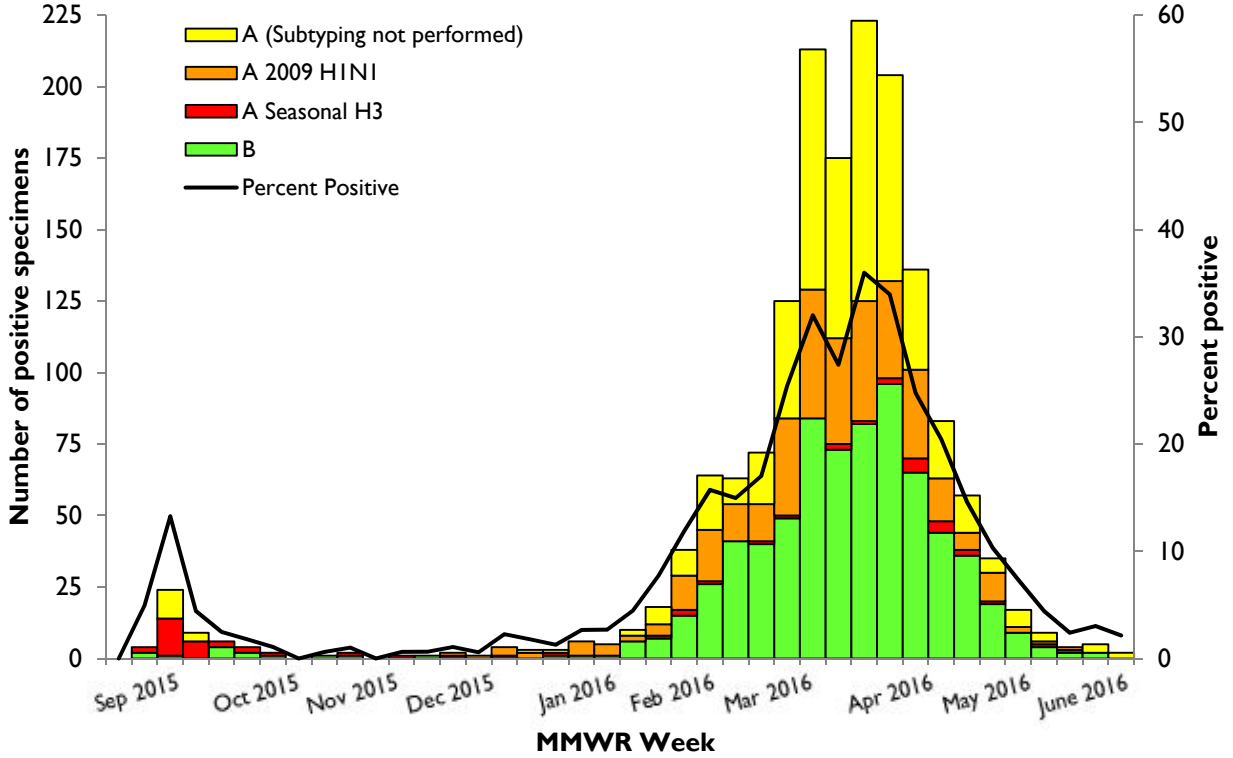
The most common comorbidities of individuals hospitalized for influenza were asthma, diabetes, and cardiovascular disease. Sixty-two percent of Montanans hospitalized due to influenza had not received a seasonal influenza vaccine.

Figure 4. Influenza hospitalization rates by age group — Montana, 2015–2016 Season



The Montana Public Health Laboratory (MTPHL) and eight partner laboratories reported the number of specimens tested for influenza by polymerase chain reaction (PCR) and the number positive by influenza virus type and influenza A virus subtype. The most commonly isolated influenza subtype this season in Montana as well as the United States was influenza A H1N1 [2009 pandemic strain](Figure 5).

Figure 5. Influenza positive tests reported by the Montana Public Health Laboratory and partners* — Montana 2015–2016



*Partner laboratories include: Barrett Hospital, Benefis Hospital, Billings Clinic Hospital, Bozeman Deaconess Hospital, Community Medical Center, Deer Lodge Medical Center, Great Falls Clinic, Holy Rosary Health Care, Kalispell Regional Medical Center, St. Patrick Hospital, St. Peter's Hospital, and St. Vincent Healthcare.

Invasive Diseases

Meningococcal Disease

Meningococcal disease is caused by the gram-negative bacterium *Neisseria meningitidis*. The bacteria reside primarily in humans on the surface of mucosal membranes such as those found in the respiratory tract. Occasionally, *N. meningitidis* invades the human blood stream, and may cross the blood-brain barrier, causing serious disease including meningitis and septicemia. There are 13 serotypes of *N. meningitidis*; 5 cause the most disease worldwide (A, B, C, W, Y). The most common serotypes isolated in the United States are B, C, and Y. In 2015, one meningococcal disease case was reported in Montana and was identified as serotype C.

Other Bacterial Invasive Diseases

During 2015, 61 cases of invasive *Streptococcus pneumoniae* were reported in Montana. The median age of patients was 58 years (range: 6–92 years). Fifteen cases of *Haemophilus influenzae* were reported. Thirteen percent of the *Haemophilus* cases (n=2) were in children aged less than 5 years. No cases of invasive *H. influenzae* type B, the type that is vaccine preventable, were reported in 2015.

Sexually Transmitted Diseases

Sexually transmitted diseases (STDs) continue to be the most frequently reported communicable diseases in Montana. Approximately 4,200 STD cases were reported in 2015. All Montana counties reported at least one STD case.

Chlamydia

Chlamydia is caused by the bacterium *Chlamydia trachomatis*. Chlamydia infections are usually asymptomatic. In women, infection can result in pelvic inflammatory disease (PID), a major cause of infertility, ectopic pregnancy, and chronic

pelvic pain. Chlamydia infection can facilitate the transmission of HIV.[4] In addition, pregnant women infected with chlamydia can pass the infection to their infants during delivery, potentially resulting in neonatal ophthalmia or pneumonia. Given the large burden of disease and risks associated with infection, CDC recommends annual chlamydia screening for all sexually active women aged less than 25 years, women 25 years and older with risk factors, and all pregnant women.

C. trachomatis infection is the most commonly reported communicable disease in Montana and the United States. Since 2004, cases and case rates have generally increased in Montana. In total, 10 fewer cases were reported in 2015 (4,183 cases) than in 2014, with a corresponding increase in the incidence rate (Figure 6). In Montana, 2,846 chlamydia cases (68%) were reported in females. The greater proportion of cases among females may be attributable to screening recommendations for females, resulting in females seeking medical care at greater rates than males, and therefore being tested more often. More chlamydia cases were diagnosed among persons aged 20–24 years (41%) than any other age group (Figure 7).

Figure 6. Chlamydia case rate — Montana, 2004–2015

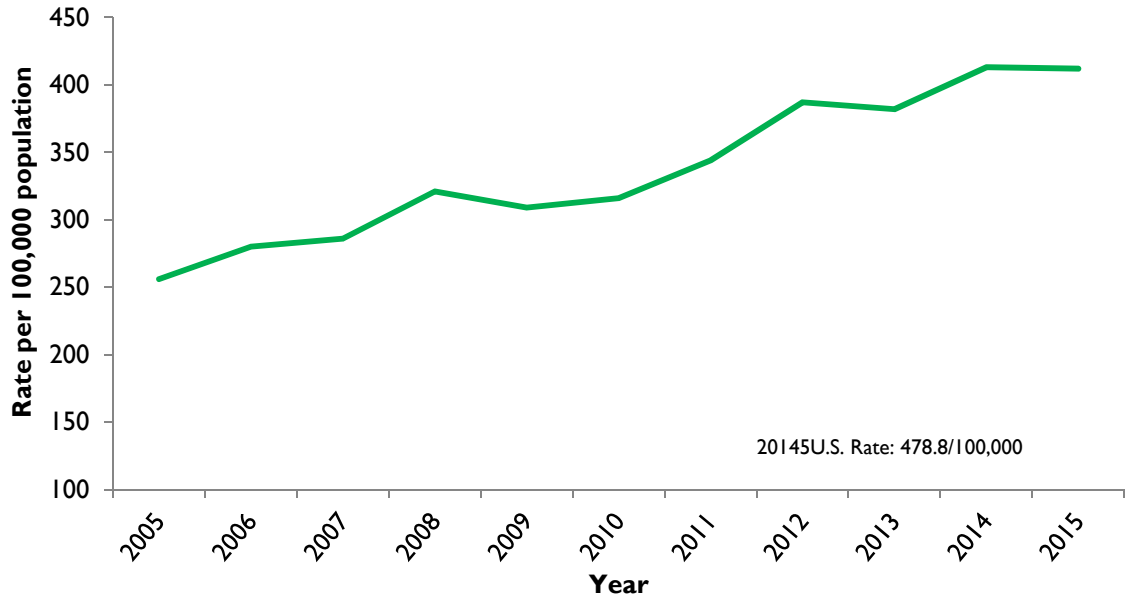


Figure 7. Chlamydia cases by sex and age — Montana, 2015

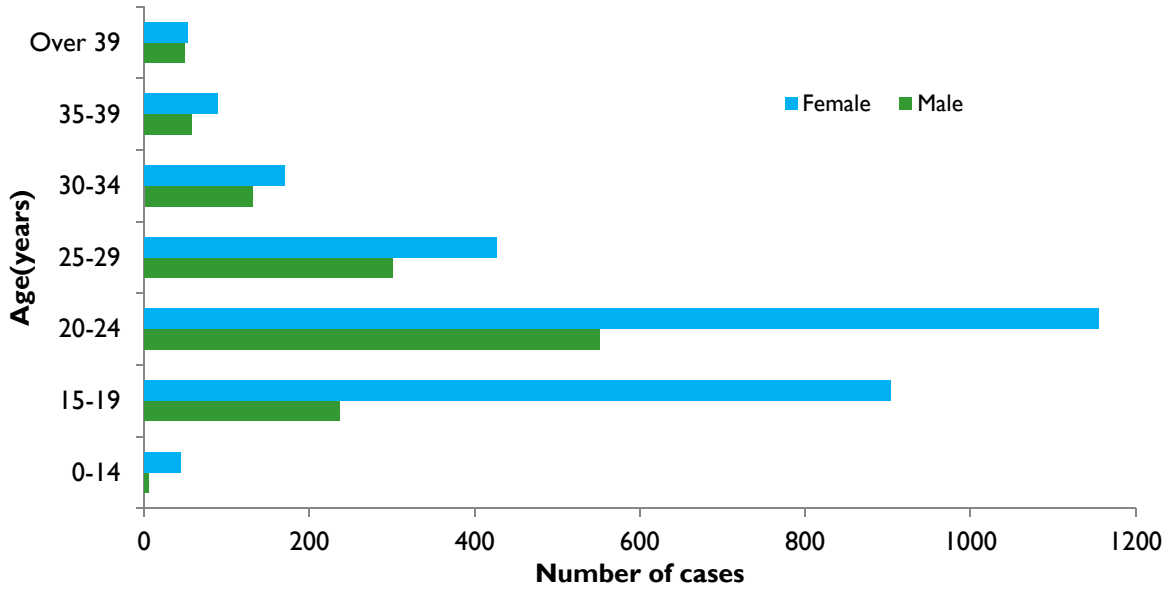


Figure 8 displays the age-specific case rate. The 15–19 years and 20–24 years age groups had the highest incidence rates. While the disease burden is probably highest among these age groups, the high rate is also attributable to screening recommendations that all sexually active females aged 25 years or less who present for routine healthcare visits receive screening for chlamydia and gonorrhea.

Figure 8. Chlamydia incidence rate by age — Montana, 2015

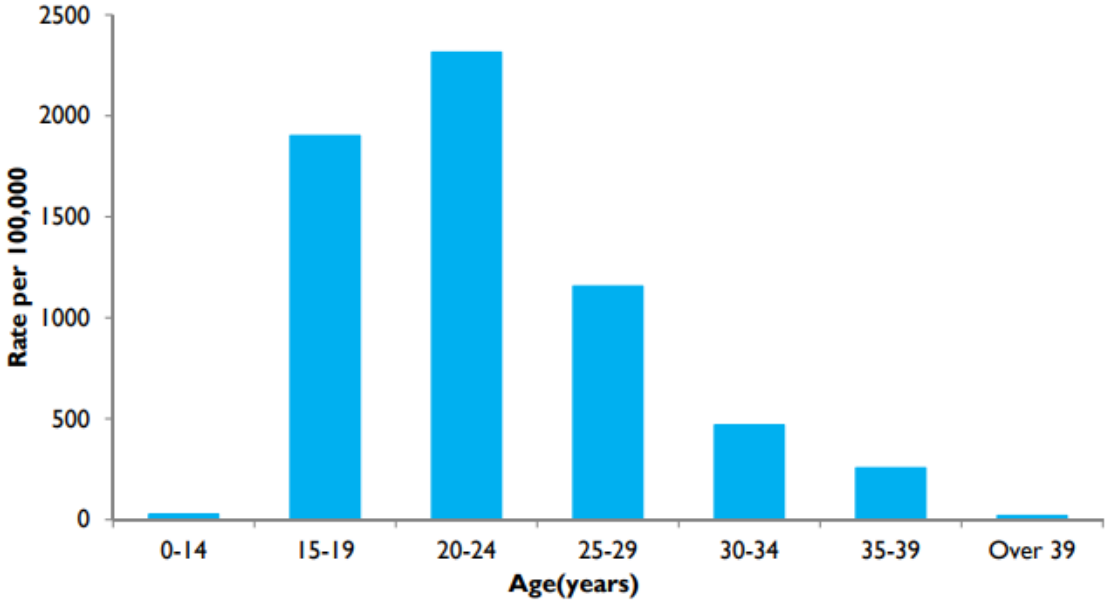


Table 2 outlines the cases of chlamydia reported to DPHHS in 2015 by age, sex, and race. In 2015, the chlamydia incidence rate for persons reported as American Indian was more than four times greater than those reported as white. However, because of the larger percentage of Montana residents classified as white, the number of chlamydia cases among white persons is greater. Moreover, broader STD screening efforts among American Indians seeking services at IHS and tribal clinics may contribute to the higher reported chlamydia incidence rate in this population. However, the specific magnitude of the contribution has not been measured.

Table 2. Chlamydia cases by age, sex, and race — Montana, 2015*

	Female					Male					Total
Age (years)	White	American Indian	Other†	Missing	Total	White	American Indian	Other†	Missing	Total	
0–14	18	23	--	3	44	2	3	--	--	5	49
15–19	636	208	33	27	904	160	59	9	9	237	1141
20–24	863	222	40	30	1155	415	80	33	23	551	1706
25–29	304	107	7	9	427	219	66	9	7	301	728
30–34	102	58	3	7	170	89	29	7	7	132	302
35–39	48	37	--	4	89	35	11	5	6	57	146
≥ 40	29	21	--	3	53	34	6	8	1	49	102
unknown	2	1	--	1	4	--	3	1	1	5	9
Total	2002	677	83	84	2846	954	257	72	54	1337	4183

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

Gonorrhea

Neisseria gonorrhoeae infections are the second most commonly reported STD in Montana and the United States and incidence rates have been steadily increasing over the last five years. *N. gonorrhoeae* infections are a major cause of PID. In addition, epidemiologic and biologic studies provide strong evidence that gonococcal infections facilitate the transmission of HIV.[4]

In 2015, 844 gonorrhea cases from 33 counties were reported in Montana. This is an incidence rate of 81.7 cases per 100,000 population, almost a 100% increase from 2014 when 434 cases were reported. Montana's rate of gonorrhea cases was relatively stable from 2007–2012, averaging 10.5 cases per 100,000 population, until 2013 when 22.1 cases per 100,000 population were reported (Figure 9).

Figure 9. Gonorrhea incidence rate — Montana, 2004–2015

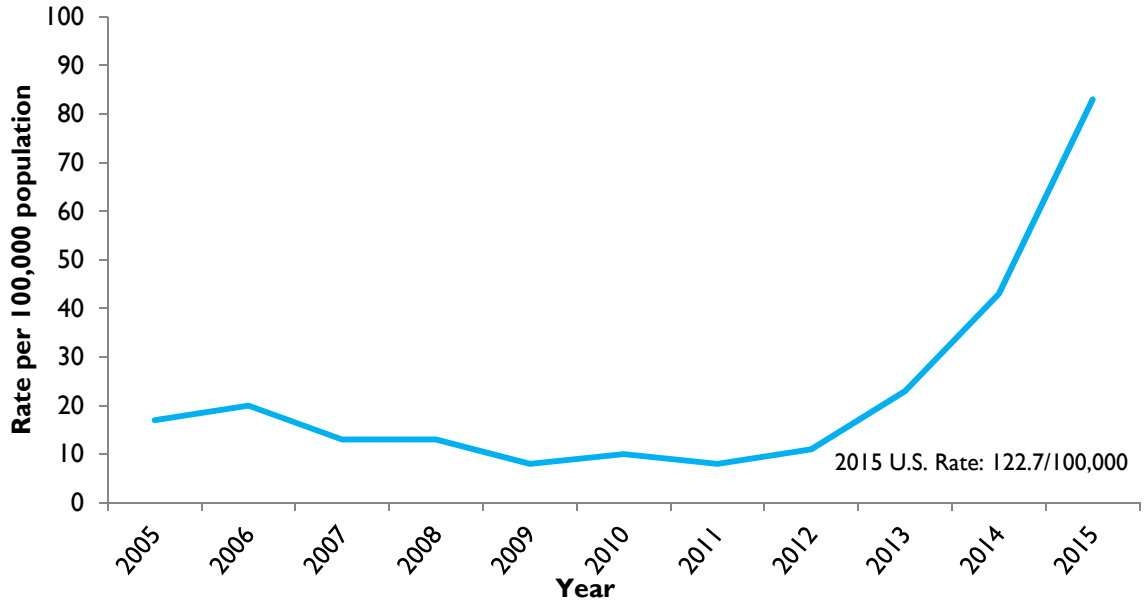


Figure 10 displays the distribution of cases by sex and age group. In Montana, 463 gonorrhea cases (55%) were reported in females. Of the 235 cases of gonorrhea diagnosed in the 20–24 year age group, 129 (55%) occurred among females. As with chlamydia, this may be related to routine STD screening practices for sexually active women less than 25 years.

Figure 10. Gonorrhea cases by sex and age — Montana, 2015

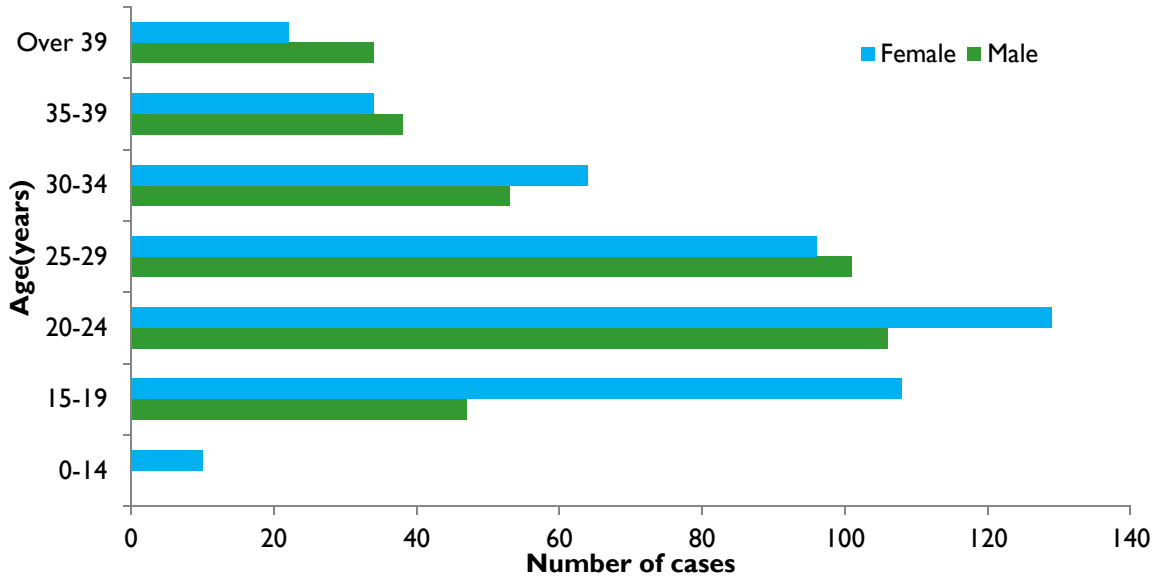
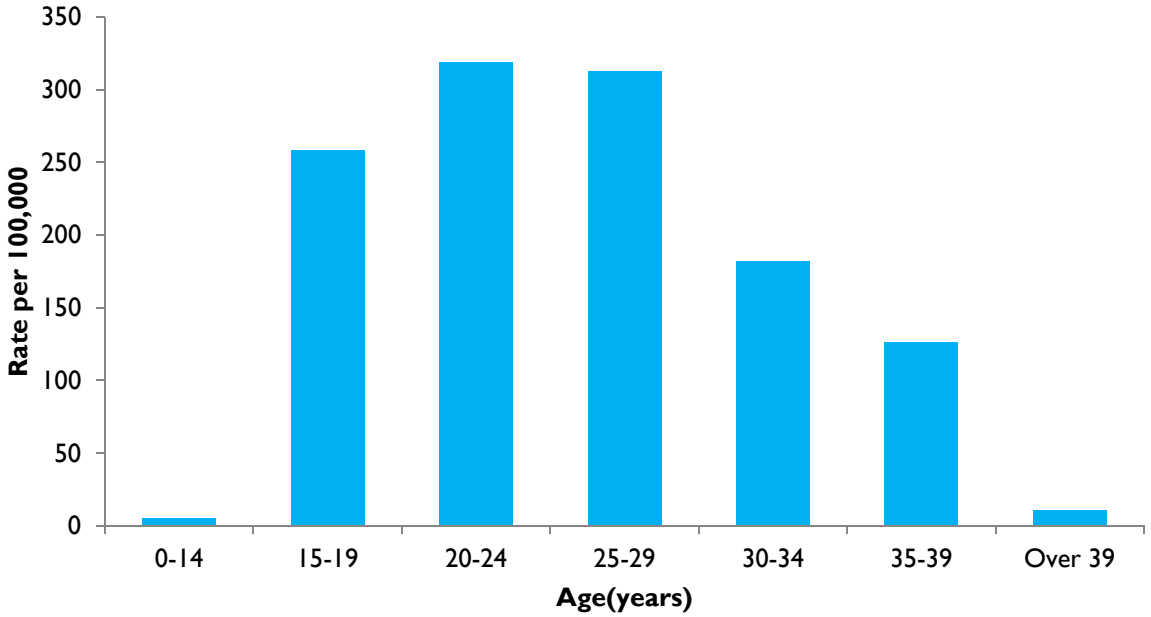


Figure 11 displays the age-specific case rate in 2015. Most of the cases continue to occur in the 20–24 and 25–29 year age groups, which account for more than 51% of the cases and only 14% of the general population. While there was an increase in cases among all races, American Indians disproportionately accounted for the 420 cases of the 844 cases in 2015. The largest and steepest increase occurred among American Indians. Broader STD screening efforts among American Indians seeking services at IHS and tribal clinics may contribute to the higher incidence rate in this population. However, the specific magnitude of the contribution has not been measured. Table 3 outlines the demographics of gonorrhea cases in 2015 by age, sex, and race.

Figure 11. Gonorrhea case rate by age — Montana, 2015



In 2015, the gonorrhea incidence rate was highest among American Indians (572 cases per 100,000 population). This rate is 15 times greater than those reported as white (37.4 cases per 100,000 population). In 2011, the incidence rate among American Indians was about five times greater than whites and continues to be elevated in this population, and was largely attributed to an ongoing outbreak. Broader STD screening practices among American Indians and an increase in cases begetting more testing may contribute to the higher reported gonorrhea incidence rate in this population. However, the specific magnitude of these contributions has not been measured.

Table 3. Gonorrhea cases by age, sex, and race — Montana, 2015*

	Male					Female					Total
Age (years)	White	American Indian	Other†	Missing	Total	White	American Indian	Other†	Missing	Total	
0–14	--	--	--	0	0	3	7	--	--	10	10
15–19	20	22	3	2	47	46	54	7	1	108	155
20–24	57	39	8	2	106	53	71	3	2	129	235
25–29	39	51	4	7	101	32	56	3	5	96	197
30–34	24	18	8	3	53	22	40	1	1	64	117
35–39	18	13	5	2	38	12	21	--	1	34	72
≥ 40	17	10	5	2	34	5	17	--	--	22	56
unknown	--	1	--	1	2	--	--	--	--	--	2
Total	175	154	33	19	381	173	266	14	10	463	844

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

Syphilis

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

Syphilis can be divided into stages for the purposes of treatment and follow-up. Patients with early stages of syphilis (primary and secondary) are more infectious. Since 2004, 10 or fewer cases of syphilis (all stages) have been reported in Montana each year. In 2015, twenty-two cases of syphilis were reported; thirteen were staged as primary or secondary. This was an increase from the 8 cases of primary or secondary, reported in 2014.

Montana's primary and secondary syphilis rate increased to 1.3 cases per 100,000 population in 2015 from 0.9 in 2014. The U.S. rate has been generally higher, averaging 5 cases per 100,000 population in the last five years (2010–2014). Figure 12 displays the fluctuating incidence rate of syphilis in Montana. Demographic and risk information is noted in Table 4.

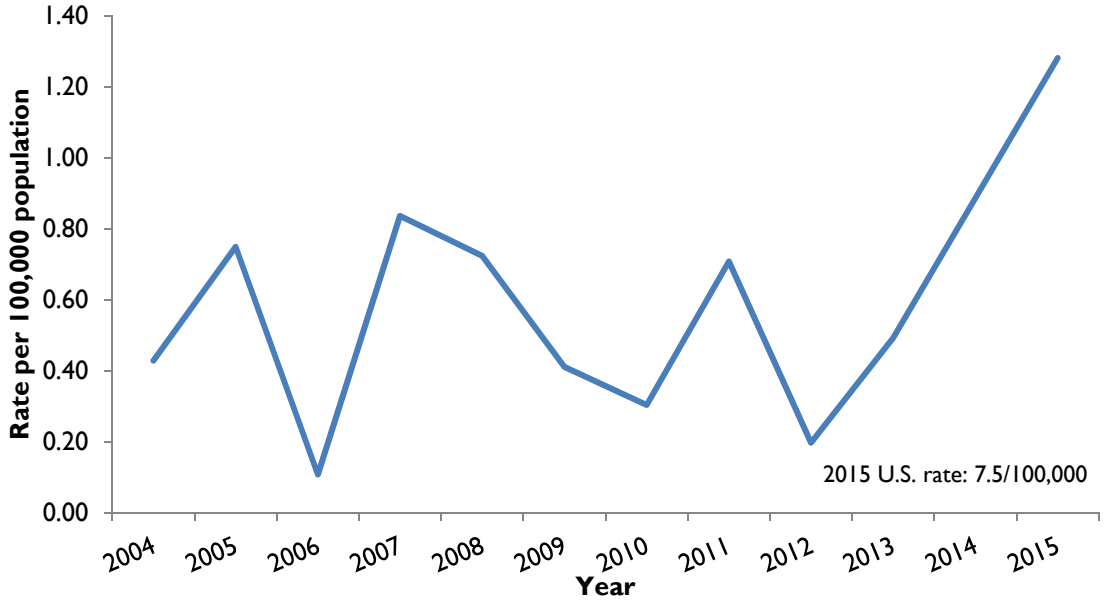
A syphilis sore can facilitate the transmission of HIV infection, with two to five times increased likelihood of HIV transmission when sores are present.[5] In 2015, twelve of the thirteen cases of syphilis diagnosed among men were at the primary or secondary stage. Nine of the male patients reported having sex with men (MSM).

Table 4. Newly diagnosed syphilis infection* by select characteristics (N=13) — Montana, 2015

Characteristics	Number
Sex	
Male	12
Female	1
Age at diagnosis (years)	
≤19	3
20–29	4
30–39	4
40–49	2
≥50	0
Ethnicity, race	
Non-Hispanic, white	10
Hispanic, any race	0
Non-Hispanic, other*	3
Transmission category by sex†	
Male only:	
Male sexual contact w/ another male (MSM)	9
Injection drug use (IDU)	1
MSM & IDU	1
Heterosexual contact‡	4
No identified risk	0
Female only:	
Injection drug use (IDU)	1
No identified risk	0

*primary and secondary cases

Figure 12. Primary and secondary Syphilis case rate — Montana, 2004–2015



HIV/AIDS

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

In 2015, 18 newly diagnosed cases of HIV infection were reported, an incidence rate of 1.7 cases per 100,000 population compared with an estimated U.S. incidence rate of 13.8 cases per 100,000 population in 2014 (Figure 13)[7]. During 2000–2015, 14–32 cases of HIV infection have been diagnosed each year, mostly among males (Figure 14). The majority of HIV infections in Montana continue to be diagnosed among white men, with 13 (81%) in 2015. Thirteen (81%) of the 16 men diagnosed with HIV infection reported sexual contact with another man (MSM) or injection drug use (IDU) as a risk factor. One woman reported injection drug use as a risk factor. No risk was identified for three cases in 2015 (Table 5).

Figure 13. Case rate of newly diagnosed HIV infection — Montana, 2000–2015

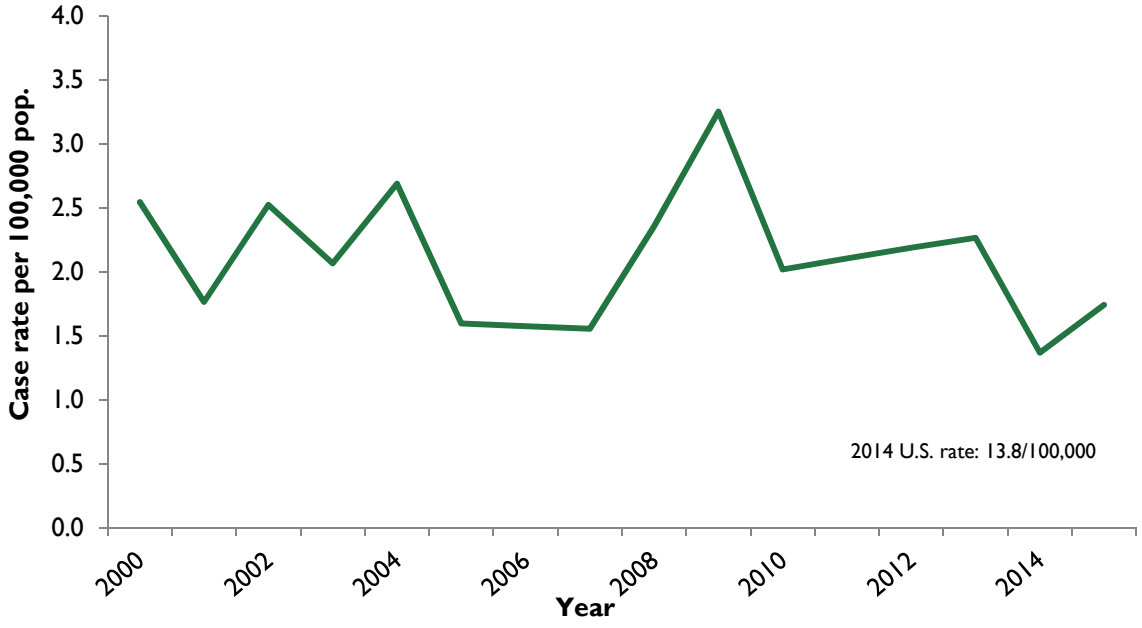
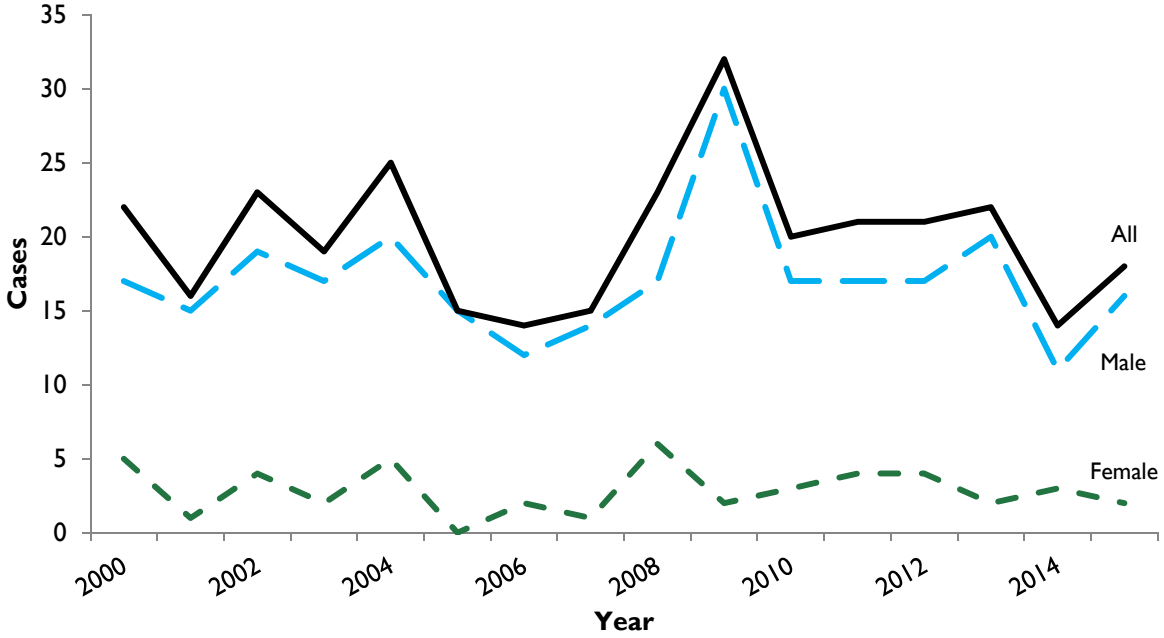


Figure 14: Newly diagnosed HIV infections by year and sex — Montana, 2000–2015



Four (22%) of the 18 cases were diagnosed as AIDS at the same time, or within 30 days of HIV diagnosis, indicating that the person may have gone undiagnosed for some time and a need for earlier and regular testing for individuals at risk for HIV infection. Table 4 outlines selected characteristics of the reported cases of newly diagnosed HIV infection for Montana in 2015.

Table 5. Persons newly diagnosed with HIV infection by select characteristics (N=18) — Montana, 2015

Characteristics	Number
Sex	
Male	16
Female	2
Age at diagnosis (years)	
≤19	2
20–29	6
30–39	5
40–49	3
≥50	2
Ethnicity, race	
Non-Hispanic, white	15
Hispanic, any race	2
Non-Hispanic, other*	1
Transmission category by sex†	
Male only:	
Male sexual contact w/ another male (MSM)	8
Injection drug use (IDU)	1
MSM & IDU	4
Heterosexual contact‡	1
No identified risk	2
Female only:	
Injection drug use (IDU)	1
No identified risk	1

* Non-Hispanic, other is all other races including multiple races
† Transmission category describes the combinations of risk factors by which a person may have acquired HIV
‡ Heterosexual contact with a person known to have, or to be at high risk for, HIV infection

Since 1985, more than 1,300 HIV cases have been reported to DPHHS. Fifty-two percent (n=706) of the cases reported were diagnosed in Montana, with nearly 70% from Cascade, Flathead, Gallatin, Lewis & Clark, Missoula, or Yellowstone counties.

As of December 31, 2015, 595 HIV-infected persons were known to be living in Montana. Eighty-five percent (n=508) of HIV-infected persons are male and 80% (n=477) are non-Hispanic white. Nearly 87% of HIV-infected men reported MSM or IDU as a risk, and 77% of HIV-infected women reported high-risk heterosexual contact or IDU as a risk.

Tuberculosis

Tuberculosis (TB) is caused by the bacterium *Mycobacterium tuberculosis* and is transmitted person to person through the air when someone with pulmonary TB disease coughs, sneezes, shouts or sings. Persons who become infected with TB can develop active disease at any time during their lifetime. Without treatment of the infection, about 10% of persons with normal immune systems will develop TB disease. The risk is much higher for persons with immunosuppressive conditions such as HIV, diabetes, chronic renal failure, drug or alcohol abuse, and children 5 years of age or younger.

The number of TB cases reported annually in Montana has steadily decreased (Figure 15). During the 1990s, an average of 20 cases was reported annually. From 2000–2009, an average of 12.6 cases per year was reported (Range: 7-21 cases per year). During 2010–2015, an average of 6.7 cases per year was reported. TB cases among American Indians have declined from an average of 9.7 cases per year in the 1990s to 3.8 cases per year during 2000–2015. TB among foreign-born persons has increased to an average of 1.5 cases per year during 2000–2015 compared with an average of one case per year during the 1990s (Range: 0–6 cases per year).

Nine cases of active TB were reported in Montana in 2015 (Table 5). Counties of residence included Big Horn, Cascade, Glacier, Lake, Roosevelt, Silver Bow, and Yellowstone. The 2015 Montana TB incidence rate was 0.9 cases per 100,000 population, significantly lower than the 2015 U.S. case rate of 3.0 per 100,000 (Figure 16). The Montana 2015 incidence rate for American Indians was 4.1 per 100,000 population, also lower than the 2015 U.S. American Indian case rate of 6.8 per 100,000.

Figure 15. Reported active tuberculosis cases — Montana, 1990–2015

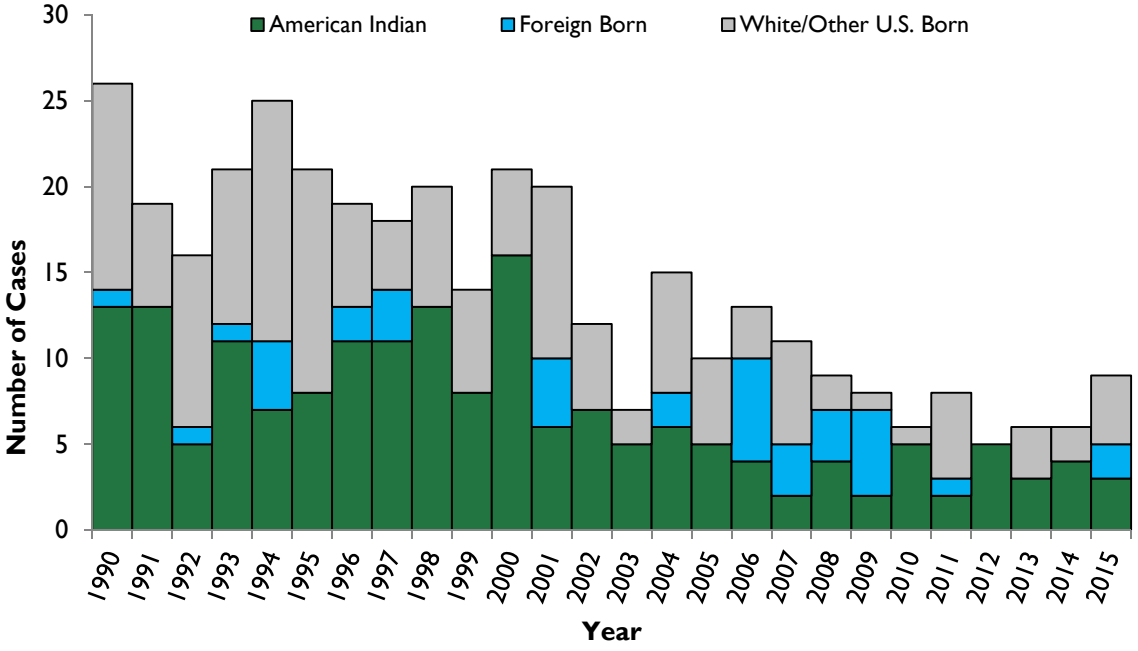


Figure 16. Tuberculosis incidence rate — Montana and United States, 2000–2015

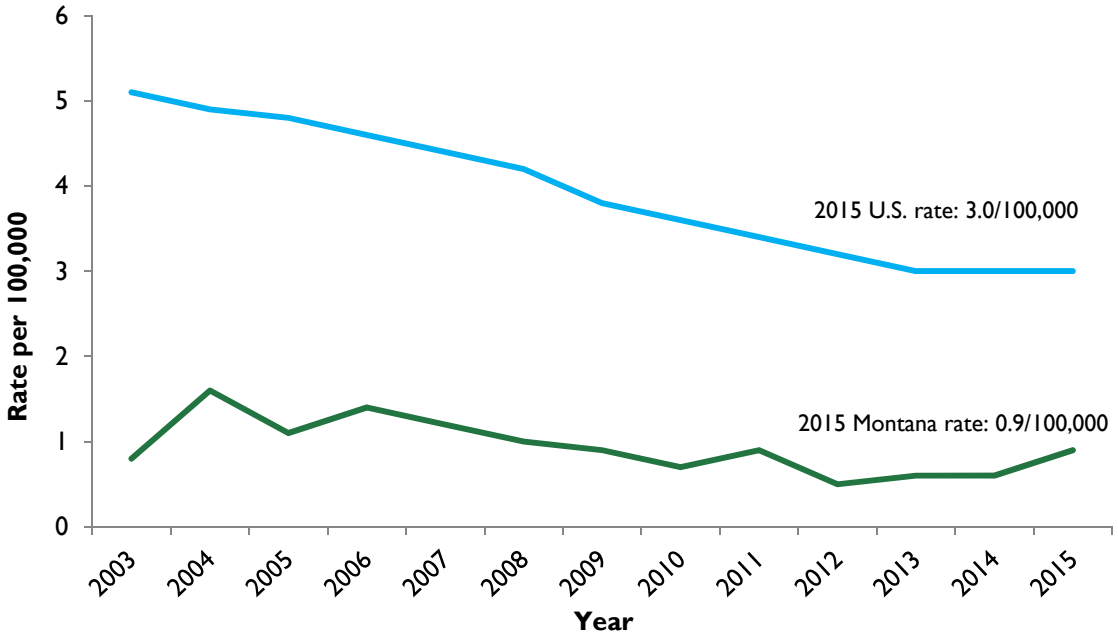


Table 5. Tuberculosis case summary — Montana, 2015

Characteristics	Number
New TB Cases	9
Incidence Rates	
Montana (total)	0.9/100,000
American Indian	4.1/100,000
Sex	
Male	7
Female	2
Age at diagnosis (years)	
<5	0
5-14	0
15-24	1
25-44	2
45–64	2
≥65	4
Ethnicity, race	
Non-Hispanic, White	4
Non-Hispanic, American Indian	3
Non-Hispanic, Other	2
Site of Disease	
Pulmonary/Pleural	8
Extrapulmonary only	1
Pulmonary & Extrapulmonary	0
Drug Resistance*	
No resistance	5
Isoniazid resistance	2
Multiple-drug resistance	1
Country of Origin	
U.S.-born	7
Foreign-born	2

*One clinical case had no isolate to test.

Two of the 2015 cases were epidemiologically linked and another case was linked to an outbreak that occurred in Montana in 2010. One of the nine cases was culture negative, but met the clinical case definition: close contact with an infectious TB case, positive tuberculin skin test, an abnormal chest x-ray, and improvement on TB therapy. Two isolates/specimens had resistance to isoniazid (INH) only and one isolate was multidrug-resistant (MDR, resistant to at least INH and rifampin). Since 2000, 5.4% of the total TB cases reported in Montana had single resistance to INH and 1.8 % (3 cases) had MDR-TB. Of the nine cases reported in 2015, seven completed tuberculosis treatment, one remains on therapy, and one was not treated following an extensive surgical procedure. All cases were or are being managed using directly observed therapy (DOT). Six pediatric cases (aged <15 years) have been reported since 2000; none were reported in 2015. Pediatric TB cases are considered a sentinel public health event because they provide evidence of recent TB transmission.

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

Viral Hepatitis

Hepatitis A

Hepatitis A virus (HAV) infection is primarily transmitted by the fecal-oral route, either by person-to-person contact or consumption of contaminated food or water. Although viremia occurs early in infection and can persist for several weeks after onset of symptoms, blood borne transmission of HAV is uncommon. In 2015, two cases of acute HAV infection were reported from two counties in Montana. Both patients reported travel outside of the United States prior to onset of symptoms.

Hepatitis B

Hepatitis B virus (HBV) is transmitted through activities that involve percutaneous (puncture through the skin) or mucosal contact with infectious blood or body fluids. Hepatitis B virus infections have decreased significantly over time with increased use of the HBV vaccine. In 2015, 35 chronic HBV infections were reported in Montana. The median age was 41 years and 46% of cases were female. Seven acute Hepatitis B cases reported in 2015 with a median age of 57 years. Case investigations revealed the most common risk factors reported included contact to a known case and intravenous drug use.

Hepatitis C

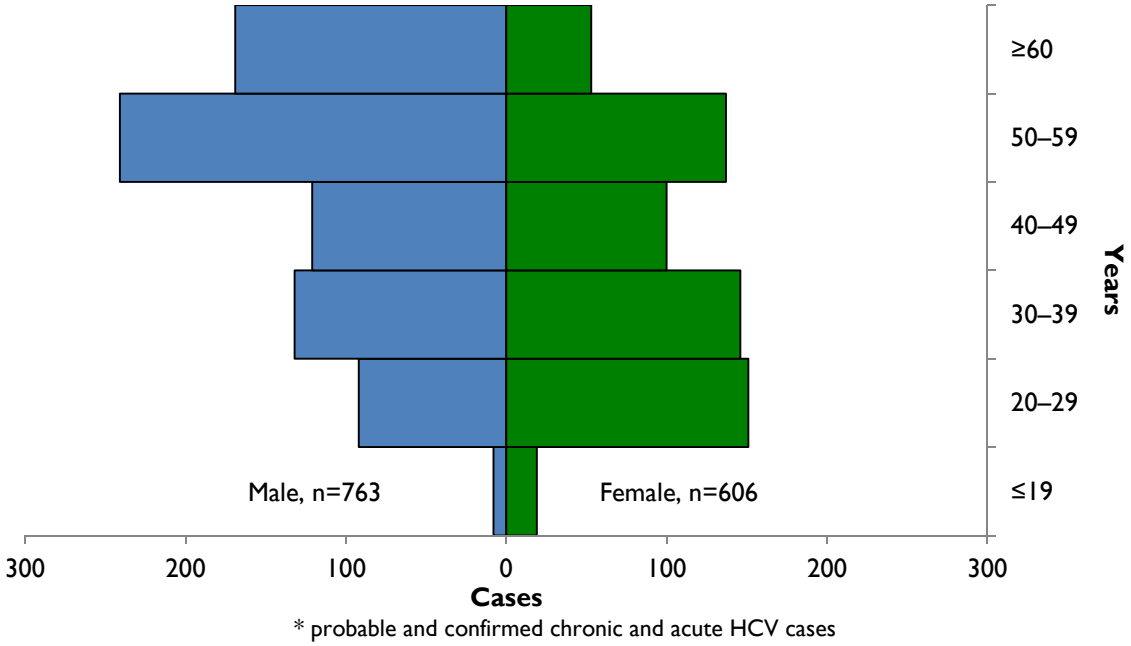
Hepatitis C virus (HCV) is transmitted through contact with the blood of an infected person, primarily through sharing contaminated needles used to inject drugs, needle stick injuries in healthcare settings, and to infants born to HCV-infected mothers. Hepatitis C virus infection sometimes results in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

The CDC estimates that in 2014 (the latest data available) there were 30,500 acute hepatitis cases in the United States, and that 2.7–3.9 million persons were living with chronic HCV infection. This increase is likely influenced by the CDC screening recommendations for all 'baby boomers' (born between 1945-1965).[8]

In 2015, nearly 1,400 probable and confirmed chronic HCV cases were reported in Montana. Most of the cases were among whites (64%) followed by persons who identified as American Indian (21%). The median age of chronic HCV cases was 46 years (range: 1–85 years). Nearly 30% of newly reported cases of HCV infection were in persons aged 50–59 years, the most common age group. Figure 17 shows the distribution of chronic HCV cases by sex and age group. Persons aged 20–39 years accounted for nearly 40% of the cases. About 55% of the reported cases were among men.

Fifteen acute HCV cases were reported in 2015, an increase of two case from 2014. Of the 15 cases, 8 persons identified as white and 5 identified as American Indian. The median age of acute HCV cases was 31 years (range: 17–58 years). Nine of the 15 cases were women. Of the cases where risk factors were identified (N=11), the most common risk factor was injection drug use (IDU).

Figure 17: Newly reported HCV infections by age and sex — Montana, 2015*



* probable and confirmed chronic and acute HCV cases

Zoonotic and Vector-borne Diseases

Rabies

Rabies is a vaccine-preventable viral disease that is nearly always fatal and is most often transmitted to humans through the bite of a rabid animal. The majority of animal rabies cases reported to DPHHS each year occur among wild animals including skunks and bats. Occasionally domestic animals (e.g., cats, dogs, and horses) are also infected. Human exposure can occur through contact with the saliva of an infected wild or domestic animal. A bite from an infected animal is the most common route of human exposure. Rabies in humans is preventable through prompt and appropriate medical care and use of post-exposure prophylaxis (PEP). Due to recent updates to the Administrative Rules of Montana (ARM), administration of PEP is reportable to DPHHS as of June 2013. In 2015 nearly 200 individuals received the recommendation to pursue a series of PEP shots to prevent disease after exposure to an animal that is capable of transmitting rabies. In 2015, 21 animals from nine counties in Montana tested positive for the rabies virus. Six of the positive animals had a documented human exposure. Eighteen of the positive animals were bats and three were skunks. No human cases of rabies were reported in 2015.

Tickborne Diseases

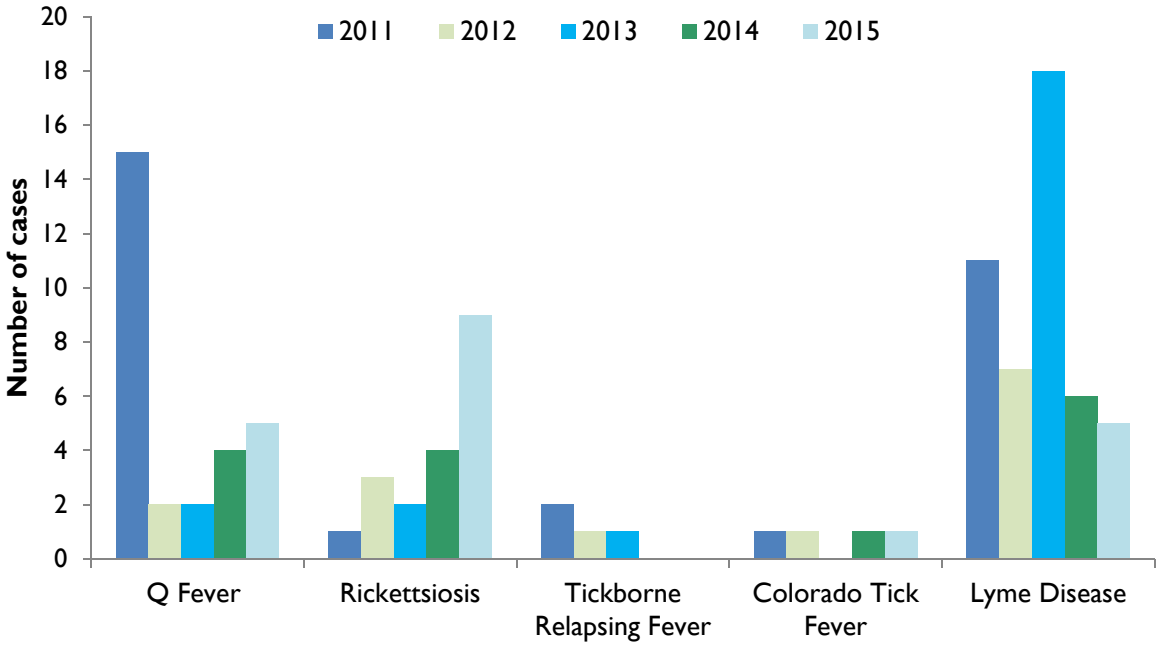
Vector-borne pathogens present in Montana and transmissible to humans include those that cause Colorado tick fever (*Coltivirus* spp.), Rickettsiosis (*Rickettsia spp.*), tickborne relapsing fever (*Borrelia hermsii*), Q fever (*Coxiella burnetii*), tularemia (*Francisella tularensis*), and plague (*Yersinia pestis*). The number of reported cases from each of the last five years is shown in Figure 18. Nine cases of rickettsiosis and one case of Colorado tick fever were reported in 2015. There were no cases of plague reported.

In addition to vector-borne transmission, *F. tularensis and Coxiella burnetii* can be acquired through inhalation of contaminated aerosols. *Coxiella burnetii* can also be transmitted through exposure to milk, urine, feces, or birth products from infected farms animals (particularly sheep, cattle, and goats). In 2015, there were seven cases of tularemia, three

cases of acute Q fever, and two cases of chronic Q fever reported in Montana. Precautions should be taken to minimize exposure to ticks, fleas, and deer flies, as well as to provide protection in settings where aerosolization could occur.

While travelling out of state, Montanans acquired confirmed or probable disease caused by a vector-borne pathogen not locally transmitted in Montana. Five cases of Lyme disease, six cases of Dengue fever, three cases of Chikungunya virus, and one case of Malaria were confirmed in Montana residents in 2015. Before travelling, Montanans should plan to limit exposure to mosquitos and ticks and get appropriate vaccines or prophylaxis to prevent vector-borne diseases.

Figure 18. Reported cases of tickborne diseases — Montana, 2011–2015



West Nile Virus

West Nile virus (WNV) is an arbovirus that is transmitted by infected mosquitoes throughout the United States. The majority of persons infected with WNV do not exhibit symptoms. Less than 1% of infected persons develop West Nile neuroinvasive disease (WNND), a serious and potentially life-threatening disease. In 2015 three human cases of WNV infection, none of which were WNND, were reported in Montana residents. None of them died. Cases were reported from Cascade, Roosevelt, and Wibaux counties and no fatalities occurred.

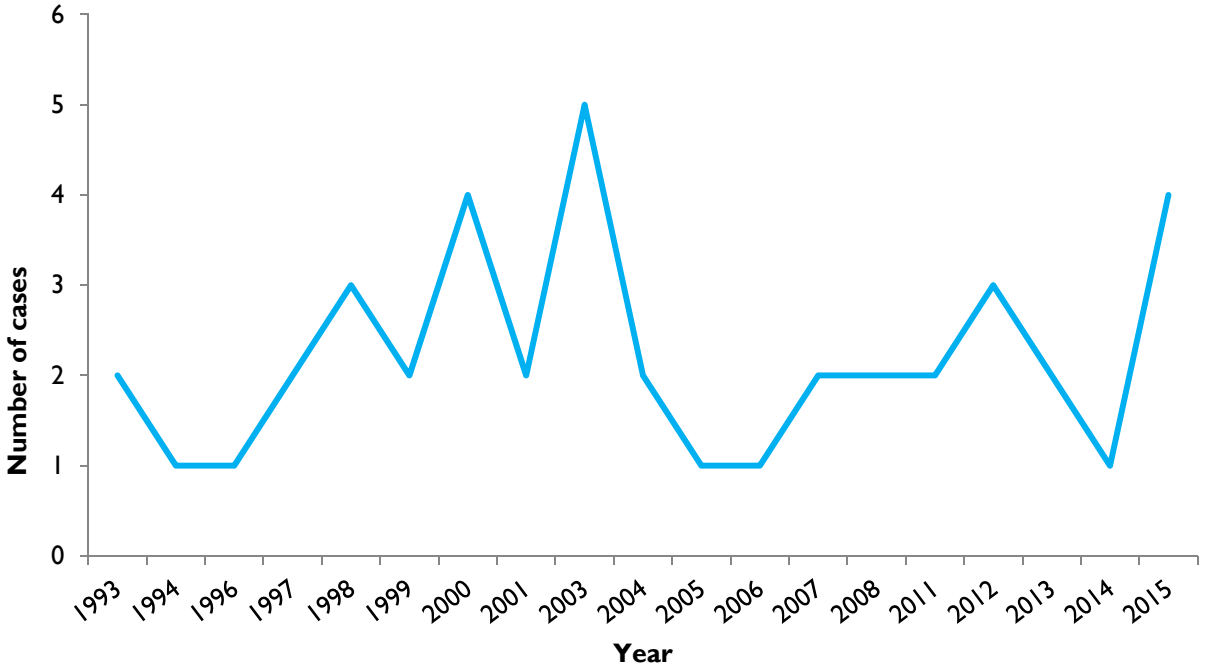
Since the introduction of WNV into Montana in 2002, the number of cases in Montana varied from year to year. Nine of the fourteen years of WNV surveillance had fewer than 10 annual cases (range 0–6). Three years had between 25 and 38 (2005, 2006, 2013) and two years (2003 and 2007) had over 200.

Nationally, the number of cases has varied almost 14 fold between two consecutive years, 2011 and 2012, when 712 and 9,862 cases respectively were reported. Given the variation of WNV activity in Montana and nationally, and uncertainty of forecasting the disease burden prevention steps must be emphasized. Montanans are reminded to prevent mosquito bites every season through use of mosquito repellant, limited outdoor activity during dawn and dusk, covering skin with clothing, and elimination of breeding pools in vessels around the home.

Hantavirus

Hantavirus is transmitted to humans through exposure to infected rodent urine, droppings or saliva. The rodent hosts that transmit Hantavirus to humans (primarily the deer mouse and the white footed mouse) are widespread in Montana. The majority of Montana hantavirus cases have been reported during spring and summer months. Since 1993 Montana has reported 42 cases of Hantavirus Pulmonary Syndrome, including 10 deaths (Figure 19). Four cases were reported in Montana in 2015 with no fatalities.

Figure 19. Reported Hantavirus cases by year — Montana, 1993–2015



Other Diseases

Acute Flaccid Myelitis

Acute Flaccid Myelitis (AFM) is a subset of Acute Flaccid Paralysis (AFP) that can be caused by polio and non-polio enterovirus, West Nile virus, herpesvirus and adenovirus. Children under the age of 21 years are at greatest risk of developing AFM, but AFM can also occur in adults. AFM is characterized by sudden onset of limb weakness and loss of muscle tone. Other symptoms include facial droop/weakness, drooping lids, difficulty moving eyes, and difficulty swallowing or slurred speech. In response to an increase in the incidence of AFM in 2014, the CDC implemented an enhanced surveillance program in 2015. One case of AFM was reported in Montana in 2015; however, no etiology was identified. Case determination was accomplished through coordination with the local health jurisdiction, CDEpi, another state Department of Health and the CDC.

Coccidioidomycosis (Valley fever)

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

Although not endemic in Montana, the number of cases reported among Montana residents has increased slightly during the past two years. Most of these cases were in individuals that previously lived or worked in areas where coccidioidomycosis is endemic. The remainder are Montana residents that spend their winters in endemic areas. In 2015, there were 12 cases of coccidioidomycosis reported with a median age of 65 years. All cases reported previous travel to endemic areas.

Legionellosis

Legionellosis is an infection caused by the bacterium, *Legionella*. The disease presents as either a mild febrile illness (Pontiac fever) or pneumonia (Legionnaires Disease) that can become severe. An estimated 5,000 cases are reported in the U.S. each year. An average of five cases of legionellosis are reported each year in Montana. *Legionella* is a bacterium that is found in the environment, usually in water. The bacteria grow well in warm water and have been isolated from environments such as hot tubs, cooling towers, hot water tanks, large plumbing systems, and decorative fountains. Home oxygen tubing and water supplied by old piping have also been implicated as vehicles for transmission. In 2015,

eight cases of legionellosis were reported in Montana. Ill persons ranged from 38-83 years. All of them were hospitalized and all survived. Five out of eight reported no travel in or out of Montana prior to illness onset.

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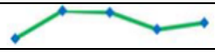
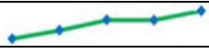
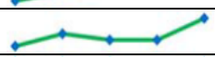
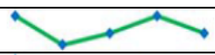
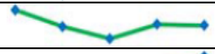
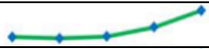
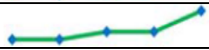
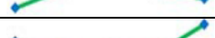
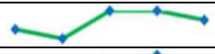
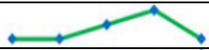
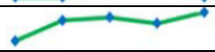
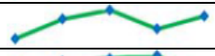
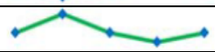
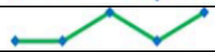
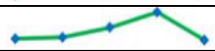
Appendix I: Comparative statistics for reportable communicable diseases — Montana, 2015 *†

CONDITION	2010	2011	2012	2013	2014	2015	5 yr median	2015 Rate	5 yr Trend
Acute Flaccid Myelitis	NR	NR	NR	NR	0	1	0	0.1	
Anaplasmosis	0	0	0	0	0	1	0	0.1	
Brucellosis	0	0	0	0	0	1	0	0.1	
Campylobacteriosis	190	236	233	205	216	323	216	31.3	
Chikungunya	NR	NR	NR	NR	0	3	0	0.3	
Chlamydia trachomatis	3078	3412	3827	3818	4193	4183	3818	405.0	
Coccidioidomycosis	1	5	3	3	10	12	3	1.2	
Colorado tick fever	1	1	1	0	1	1	1	0.1	
Creudtzfeldt Jakob disease	2	4	1	3	3	1	3	0.1	
Cryptosporidiosis	49	77	69	125	66	39	69	3.8	
Cyclosporiasis	NR	NR	NR	0	0	3	0	0.3	
Dengue Fever	5	0	2	5	2	6	2	0.6	
Giardiasis	115	87	67	91	89	93	89	9.0	
Gonorrhea	101	84	108	224	434	844	108	81.7	
Haemophilus influenzae, invasive	3	3	6	6	14	15	6	1.5	
Hantavirus	0	2	3	2	1	4	2	0.4	
Hemolytic uremic syndrome (HUS)	2	1	1	0	5	2	1	0.2	
Hepatitis A, acute	4	3	6	6	5	2	5	0.2	
Hepatitis B, acute	0	0	2	4	0	7	0	0.7	
Hepatitis B, chronic	4	24	27	21	32	35	24	3.4	
Hepatitis C, acute	4	9	9	16	13	15	9	1.5	
Hepatitis C, chronic	934	1349	1544	1142	1413	1386	1349	134.2	
HIV	20	21	22	23	14	18	21	1.7	
Legionellosis	5	1	4	10	5	8	5	0.8	
Listeriosis	1	3	1	0	1	1	1	0.1	
Lyme disease	5	11	7	18	6	5	7	0.5	
Malaria	4	3	0	0	2	1	2	0.1	
Meningococcal disease	2	4	10	1	4	1	4	0.1	
Mumps	0	0	1	0	1	1	0	0.1	
Pertussis	122	134	547	663	494	230	494	22.3	
Q fever	1	15	2	2	4	5	2	0.5	
Rabies, animal	17	18	25	36	16	21	18	2.0	
Salmonellosis	98	120	110	94	145	195	110	18.9	
Shiga toxin-producing *Escherichia coli* (STEC)	43	39	44	49	39	85	43	8.2	
Shigellosis	9	124	12	69	44	14	44	1.4	
Spotted Fever Rickettsiosis	3	1	3	2	4	9	3	0.9	
Streptococcal toxic shock syndrome	0	0	0	0	0	4	0	0.4	
Streptococcus pneumoniae, invasive	23	22	33	31	41	61	31	5.9	
Syphilis	5	9	3	8	9	13	8	1.3	
Tuberculosis	6	8	5	6	6	9	6	0.9	
Tularemia	1	3	3	5	1	7	3	0.7	
Varicella	197	163	133	84	72	132	133	12.8	
West Nile	0	1	6	38	5	3	5	0.3	

* Confirmed and probable cases only. † Conditions for which there were zero (0) cases in 2015 are not reflected in this table. NR = Not Reportable

Appendix II: Cases of reportable communicable diseases by jurisdiction — Montana, 2015[1]

	Acute Flaccid Myelitis	Brucellosis	Campylobacteriosis	Chikungunya virus	Chlamydia	Coccidioidomycosis	Colorado Tick Fever	Cruetzfeldt Jakob Disease	Cryptosporidiosis	Cyclosporiasis	Dengue	Ehrlichiosis	Giardiasis	Gonorrhea	*Haemophilus influenzae*	Hantavirus Pulmonary Syndrome	Hemolytic Uremic Syndrome (HUS)	Hepatitis A, Acute	Hepatitis B, Acute	Hepatitis B, Chronic	Hepatitis C, Acute	Hepatitis C, Chronic	HIV	Legionellosis	Listeriosis	Lyme Disease	Malaria	Meningococcal Disease	Pertussis	Q Fever	Rabies, Animal	Shiga-toxin producing *E. coli* (STEC)	Salmonellosis	Shigellosis	Spotted Fever Rickettsiosis	Streptococcal Toxic-Shock Syndrome	*Streptococcus pneumoniae*	Syphilis	Tuberculosis	Tularemia	Varicella	West Nile
Beaverhead	--	--	9	--	27	2	--	--	--	--	--	--	3	--	1	--	--	--	--	--	--	7	--	--	--	--	--	--	1	--	--	2	2	--	--	--	--	--	--	--	1	--
Big Horn/Crow	--	--	3	--	1565	1	--	--	1	--	--	--	1	120	1	--	--	--	--	--	1	12	--	--	--	--	--	--	--	--	--	--	6	--	--	--	2	1	1	1	1	--
Blaine/Ft. Belknap	--	--	2	--	28	--	--	--	--	--	--	--	--	3	2	--	--	--	--	--	--	20	--	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	--	1	--
Broadwater	--	--	4	--	16	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--
Carbon	--	--	6	--	14	--	--	--	--	--	--	--	1	4	--	--	--	--	--	--	--	12	1	--	--	1	--	--	--	--	--	--	1	--	--	--	2	--	--	--	--	--
Carter	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cascade	--	--	24	1	425	1	--	--	1	--	--	--	4	64	1	--	--	--	--	4	--	109	--	3	--	--	--	--	46	1	1	7	14	3	1	--	1	--	2	--	1	1
Chouteau	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Custer	--	--	7	--	43	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	1	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--
Daniels	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dawson	--	--	2	--	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	14	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--
Deer Lodge	--	--	--	--	37	--	--	--	--	--	--	--	1	2	--	--	--	--	--	--	--	19	--	--	--	--	--	--	31	--	--	2	--	--	--	--	--	--	--	--	--	--
Fallon	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2	--
Fergus	--	--	7	--	17	--	--	--	--	--	--	--	1	1	--	1	--	--	--	--	--	7	--	--	--	1	--	--	2	--	--	--	2	--	--	--	--	--	--	--	3	--
Flathead	--	--	30	--	408	--	--	--	10	1	1	--	22	25	2	--	--	--	1	5	--	95	1	2	--	--	--	--	21	--	5	7	12	--	--	2	10	1	1	--	78	--
Gallatin	--	--	44	--	412	2	--	--	6	--	1	--	15	26	--	--	--	1	1	1	--	52	2	--	--	--	1	--	25	1	--	15	23	4	--	--	--	2	--	1	8	--
Garfield	--	--	--	--	1	--	--	--	--	--	--	--	--	----	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Glacier/Blackfeet	--	1	3	--	147	--	--	--	1	--	--	--	1	40	--	--	--	--	--	--	--	65	--	--	--	--	--	--	--	1	--	1	2	--	--	--	1	--	1	--	--	--
Golden Valley	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Granite	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hill/Rocky Boy	--	--	2	--	116	--	--	--	--	--	--	--	--	15	1	--	--	--	--	2	1	41	--	--	--	--	--	--	--	--	--	2	--	--	--	--	2	1	--	--	1	--
Jefferson	--	--	4	--	17	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	4	1	--	--	--	--	--	3	--	--	1	2	--	--	--	--	--	--	--	1	--
Judith Basin	--	--	1	--	2	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
Lake/CSKT	--	--	21	1	142	--	--	--	--	1	--	--	1	35	--	--	--	--	--	--	--	42	--	--	--	--	--	--	--	--	--	1	5	--	1	--	--	1	1	1	1	--
Lewis & Clark	--	--	17	1	232	1	--	--	6	--	1	--	3	24	1	--	--	--	--	1	1	72	--	--	--	--	--	--	23	1	3	4	16	1	2	1	8	--	--	--	2	--
Liberty	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--
Lincoln	--	--	6	--	39	--	--	--	--	--	--	--	--	4	1	--	--	--	--	--	--	32	--	--	--	--	--	--	6	--	3	1	1	1	--	--	1	--	--	--	4	--
Madison	--	--	8	--	7	--	--	--	--	--	--	1	1	3	--	--	--	--	1	1	--	3	--	--	--	1	--	--	--	--	--	2	1	--	--	--	--	--	--	--	3	--
McCone	--	--	2	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--

	Acute Flaccid Myelitis	Brucellosis	Campylobacteriosis	Chikungunya virus	Chlamydia	Coccidioidomycosis	Colorado Tick Fever	Cruetzfeldt Jakob Disease	Cryptosporidiosis	Cyclosporiasis	Dengue	Ehrlichiosis	Giardiasis	Gonorrhea	*Haemophilus influenzae*	Hantavirus Pulmonary Syndrome	Hemolytic Uremic Syndrome (HUS)	Hepatitis A, Acute	Hepatitis B, Acute	Hepatitis B, Chronic	Hepatitis C, Acute	Hepatitis C, Chronic	HIV	Legionellosis	Listeriosis	Lyme Disease	Malaria					Shiga-toxin producing *E. coli*									
Meagher	--	--	3	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--
Mineral	--	--	--	--	5	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--
Missoula	--	--	38	--	460	--	1	--	8	--	--	--	17	74	--	1	--	--	--	10	1	110	3	1	--	--	--	1	2	--	4	11	12	3	1	--	1	3	--	--	12	--
Musselshell	--	--	1	--	9	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	6	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--
Park	--	--	2	--	20	--	--	--	--	--	--	--	3	2	--	--	--	--	--	1	--	24	--	--	--	--	--	--	3	--	--	1	5	--	--	--	2	--	--	--	--
Petroleum		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phillips	--	--	2	--	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--
Pondera	--	--	2	--	7	--	--	--	--	--	--	--	--	4	--	--	--	--	--	--	--	5	--	--	--	--	--	--	1	--	--	2	3	--	--	--	--	--	--	--	--
Powder River	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Powell/Montana State Prison	--	--	4	--	16	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	74	--	1	--	--	--	--	1	--	--	1	--	--	--	--	1	--	--	--	--
Ravalli	--	--	9	--	64	--	--	--	--	--	3	--	5	3	1	--	--	--	1	--	--	30	--	--	--	--	--	--	6	--	2	5	4	--	--	--	2	--	--	1	--	--
Richland	--	--	1	--	59	--	--	--	2	--	--	--	--	1	--	--	--	--	--	1	--	8	3	--	1	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	3	--
Roosevelt/Ft. Peck	--	--	--	--	160	--	--	--	--	--	--	--	1	92	--	--	--	--	--	--	2	88	--	--	--	--	--	--	2	--	--	--	3	--	--	--	5	--	1	1	1	1
Rosebud/N. Cheyenne	--	--	2	--	90	1	--	--	--	--	--	--	2	61	--	--	--	--	--	--	--	29	--	--	--	--	--	--	--	--	--	2	4	--	1	--	--	1	--	--	--	--
Sanders	--	--	2	--	16	--	--	--	--	--	--	--	3	3	--	--	--	--	--	--	--	18	--	--	--	--	--	--	--	--	--	3	2	--	--	--	1	--	--	2	--
Sheridan	--	--	1	--	9	--	--	--	--	--	--	--	--	1	--	--	--	--	1	1	--	1	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
Silver Bow	--	--	3	--	142	1	--	--	--	--	--	--	1	13	1	1	--	--	--	3	1	60	--	--	--	--	--	--	33	--	--	1	--	--	--	--	5	--	1	--	--	--
Stillwater	--	--	7	--	10	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	9	1	--	--	--	--	--	--	--	--	1	3	--	--	--	1	1	--	--	--	--
Sweet Grass	--	--	3	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	--	2	--
Teton	--	--	1	--	2	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	4	1	--	--	--	--	--	--	--
Toole	--	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	25	1	1	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--
Treasure	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Valley	--	--	3	--	3	--	--	--	--	--	--	--	--	6	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	--	2	--	--	--	--	--	--	--	--
Wheatland	--	--	--	--	2	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wibaux	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	1
Yellowstone	1	--	34	--	750	2	--	1	2	1	--	--	2	206	3	--	2	--	1	4	6	253	6	--	--	2	--	--	9	--	--	13	52	1	2	1	10	3	1	2	2	--
MONTANA	1	1	323	3	4180	12	1	1	39	3	6	1	93	844	15	4	2	2	7	35	15	1374	18	8	1	5	1	1	230	5	21	85	195	14	9	4	61	13	9	7	132	3

[1]Counts are confirmed and probable cases that were newly reported to DPHHS in 2015.

Appendix III: Montana Demographic Profile 2015

The state of Montana is a geographically large state with a small population. It is the fourth largest state by area in the United States with just over one million residents. There are 58 public health jurisdictions that include 50 individual counties and one health district composed of six rural counties) as well as seven tribal health departments within the state. Over one quarter of the population resides in areas where the population density is categorized as "frontier." Approximately 60% of all case reports of reportable diseases for Montana were submitted from six counties, all with populations ≥50,000 residents.[1,2]

Characteristic	Population	Percent[2]
	1,032,949	**100**
Geographic Classification		
Urban	157,048	15.2
Rural	586,017	56.7
Frontier	289,884	28.1
Sex		
Male	519,330	50.3
Female	513,619	49.7
Age Group (years)		
<1	12,601	1.2
1-4	49,285	4.8
5-14	126,737	12.3
15-24	138,607	13.4
25-39	191,984	18.6
40-64	335,724	32.5
65+	178,011	17.2
Race		
White	937,867	90.8
American Indian	74,383	7.2
African American	9,958	1.0
Asian	10,741	1.0
Ethnicity		
Non-Hispanic	995,748	96.4
Hispanic	37,201	3.6

[1]The Montana Infectious Disease Information System (MIDIS) generated report of 2010-2015 data. The six counties are Yellowstone, Flathead, Missoula, Gallatin, Lewis and Clark, and Cascade.

[2]Based on 2015 population estimates from the National Center for Health Statistics. Bridged-race intercensal estimates of the July 1, 1990-July 1, 1999; July 1, 2000-July 1, 2009. Postcensal estimates of the resident population of the United States for July 1, 2010-July 1, 2014. United States resident population by year, county, single-year of age, sex, bridged race, and Hispanic origin. Prepared by the U.S. Census Bureau with support from the National Cancer Institute. Available on the Internet at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm as of April 24, 2004; Oct 26, 2012; June 23, 2016

Appendix IV: Diseases Reportable to Montana DPHHS, 2015

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

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

An up to date list of Reportable Diseases in Montana is maintained on our website. To view the current list, please visit: **http://www.mtrules.org/gateway/Subchapterhome.asp?scn=37%2E114%2E2**

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