2018 North Dakota Epidemiology Report

NORTH Dakota | Health

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North Dakota Department of Health (NDDoH) Division of Disease Control

- Conducts a general communicable disease program and provides epidemiology for reportable diseases. Programs administered include: Immunization, HIV/STD/TB/Viral Hepatitis, and Epidemiology and Surveillance.
- Identifies and analyzes disease trends and implements appropriate intervention activities to reduce morbidity and mortality
- Acts as a resource for health care providers and the public regarding public health questions and issues
- Investigates illnesses and outbreaks of communicable diseases
- Works with the media to provide timely public education

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July 24, 2019

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EQUAL OPPORTUNITY EMPLOYER

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Immunization Program

The NDDoH Immunization Program serves the state of North Dakota by preventing vaccine preventable diseases and promoting immunizations. The NDDoH Immunization Program supplies free vaccines for children who are eligible for the Vaccines for Children (VFC) program. The program also investigates cases of vaccine-preventable diseases, provides education about immunizations and vaccine-preventable diseases, monitors the state's immunization rates, implements evidence-based activities to increase immunization rates, and maintains and updates the North Dakota Immunization Information System (NDIIS).

Vaccine-Preventable Disease Surveillance

Jenny Galbraith, Surveillance Epidemiologist

Measles

In 2018, the United States saw 372 cases of measles. There were seventeen outbreaks across the United States. Three of these outbreaks, associated primarily with unvaccinated people in Orthodox Jewish communities, contributed to most of the cases. These outbreaks serve as an important reminder on how quickly disease can spread when immunization rates fall in a community. The last reported case of measles in North Dakota occurred in 2011.

Measles is an extremely contagious respiratory disease caused by a virus. Measles usually begins with a fever. Individuals develop a cough, runny nose, and red watery eyes soon after. Three to four days after symptom onset, a rash of tiny red spots breaks out on the head, and eventually covers the entire body. Serious health complications can occur as a result of measles, including encephalitis, pneumonia, and death.

The measles, mumps, and rubella (MMR) vaccine protects against the measles virus. MMR vaccine is routinely recommended at ages 12-15 months and 4-6 years. Additionally, adults born in or after 1957 are recommended to have at least one documented dose of MMR vaccine or laboratory evidence of immunity. Adults who are considered high risk should have two documented doses of MMR vaccine or laboratory evidence of immunity. Health care workers, college students, and international travelers are considered high risk.

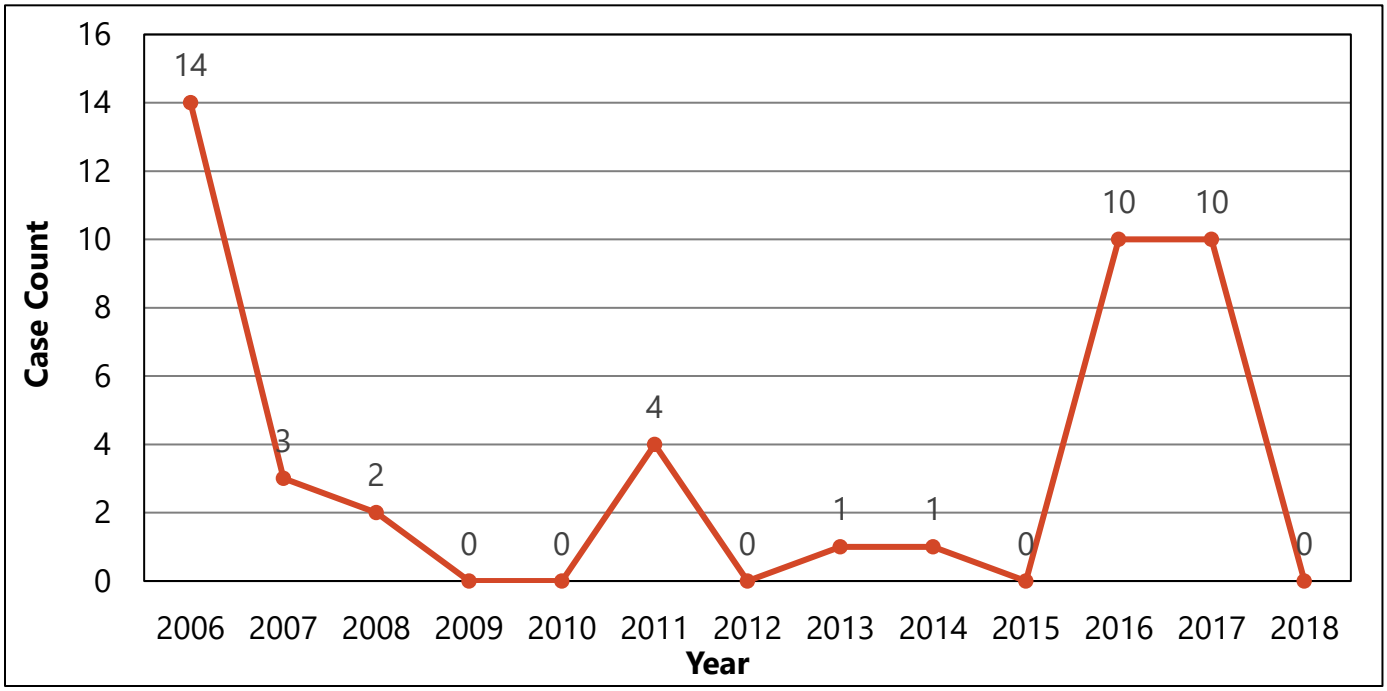
Mumps

Mumps is a vaccine-preventable disease caused by the mumps virus. Common symptoms of mumps include fever, headache, muscle aches, tiredness, and loss of appetite. The most recognizable symptom of mumps is the puffy cheeks and swollen jaw caused by swollen salivary glands.

Mumps cases range in the United States from year to year from hundreds to thousands. In 2018, there were 2,251 cases of mumps reported to the Centers for Disease Control and Prevention (CDC). Prior to the introduction of the vaccine, there were about 186,000 cases reported in the United States every year. Since the vaccine, the annual number of reported mumps cases has decreased by more than 99%. In North Dakota, there were 0 confirmed or probable cases of mumps reported in 2018. Mumps cases across the country have increased in recent years.

The MMR vaccine protects against the mumps virus. MMR vaccine is routinely recommended at ages 12-15 months and 4-6 years. Additionally, adults born in or after 1957 are recommended to have at least one documented dose of MMR vaccine or laboratory evidence of immunity. Adults who are considered high risk should have two documented doses of MMR vaccine or laboratory evidence of immunity. Health care workers, college students, and international travelers are considered high risk.

Figure 1: Mumps Cases in North Dakota, 2006-2018



Meningococcal Meningitis

Over 300 cases of meningococcal disease were reported to the CDC in the United States in 2018. Additionally, outbreaks involving *Neisseria meningitidis* serogroup B continue to be reported on college campuses. North Dakota did not have any reports of meningococcal disease in 2018.

Meningococcal disease is an invasive infection of the bacteria *N. meningitidis*. A common outcome of infection is meningitis. Symptoms accompanying meningitis include nausea, vomiting, photophobia, and altered mental status. Invasive meningococcal infection can also result in a blood stream infection, known as bacteremia. Symptoms of bacteremia include fatigue, vomiting, cold hands and feet, cold chills, severe aches or pain in the muscles, joints, chest or abdomen, rapid breathing, diarrhea, and a dark purplish rash.

The meningococcal conjugate vaccine protects against strains A, C, W, and Y. All 11 to 12-year-olds should receive a dose of meningococcal conjugate vaccine, followed by a booster at age 16 years. In addition, the serogroup B meningococcal vaccine is available for 16 through 23-year-olds.

Pertussis

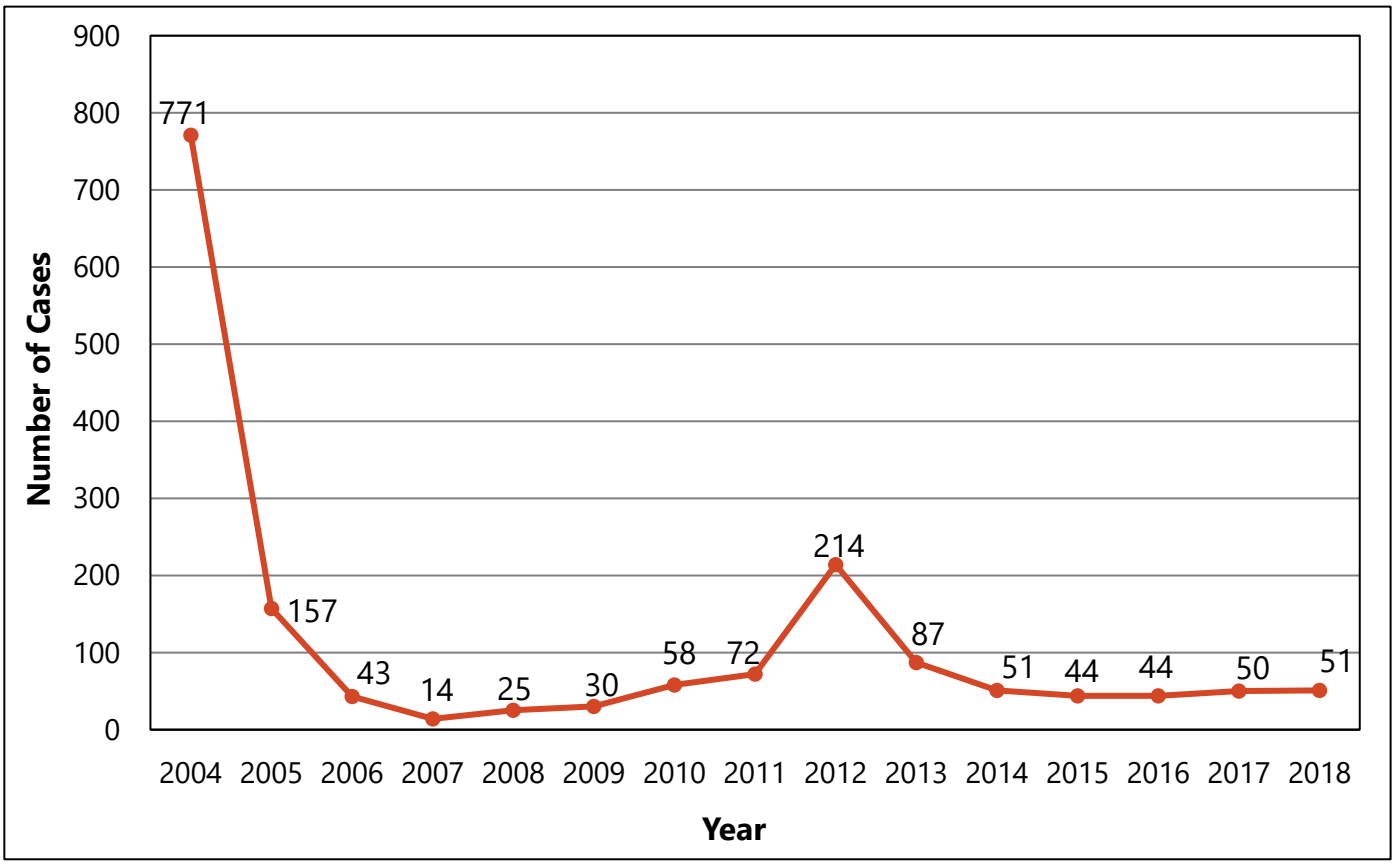
Pertussis or whooping cough is a respiratory disease caused by the bacteria *Bordetella pertussis*. The illness usually begins with cold-like symptoms and progresses to a cough, gradually becoming more severe. Pertussis is known for uncontrollable, violent coughing which often makes it hard to breath. The characteristic whooping sound is made when an individual has a severe coughing attack and needs to take a deep breath. Pertussis can be especially severe in unvaccinated infants and can results in pneumonia and even death.

Transmission of pertussis occurs via large respiratory droplets; pertussis is highly contagious during the first three weeks of coughing. Antibiotic treatment can limit transmission; after five days of appropriate antibiotic treatment an individual is no longer contagious.

Two vaccines are routinely recommended to protect against pertussis. DTaP (diphtheria, tetanus, and acellular pertussis) vaccine is routinely recommended for infants age 2, 4, 6, and 15-18 months, with an additional dose given at age 4-6 years. Tetanus, diphtheria, and pertussis (Tdap) vaccine is routinely recommended for adolescents age 11-12. Adults who have never received a dose of Tdap are recommended to do so. Additionally, pregnant women are recommended to receive a dose of Tdap during each pregnancy between 27 and 36 weeks gestation, ideally between 27 to 32 weeks. Tdap given during pregnancy not only protects the mother, but protective antibodies are passed to the fetus to protect the infant during the first few months of life.

In 2018 North Dakota reported 51 cases of pertussis. Outbreaks of pertussis typically occur every three to four years. North Dakota's last peak year was in 2012, with 214 cases.

Figure 2: Pertussis Cases in North Dakota, 2004-2018



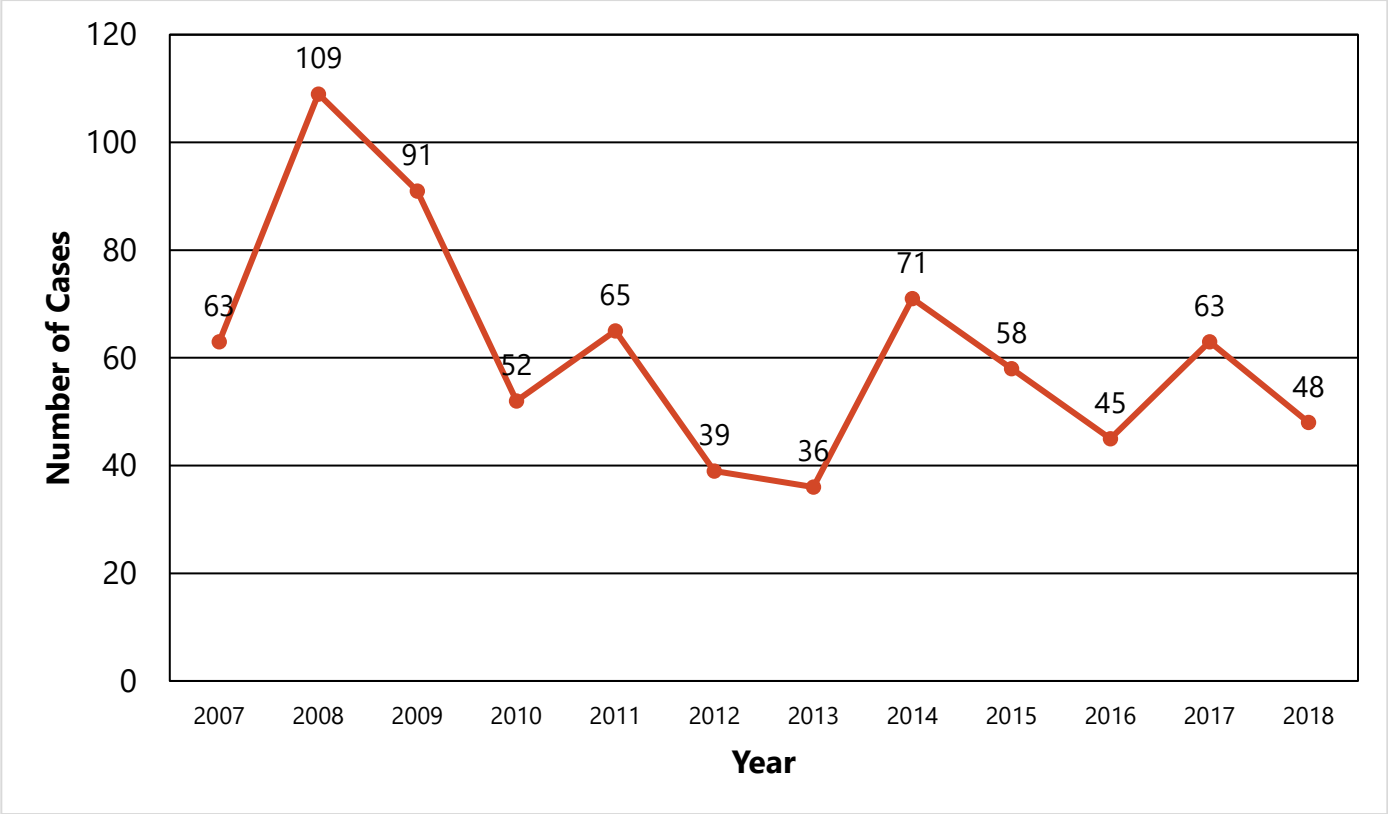
Chickenpox (Varicella)

Chickenpox or varicella is caused by the varicella-zoster virus. Symptoms typically include a blister-like rash, itching, tiredness, and fever. Chickenpox is a very contagious disease. The virus is spread from person to person by touching or breathing in virus particles from the blisters, or through the air when an infected person coughs or sneezes. An infected person is contagious from 1-2 days before the onset of the rash until all lesions have crusted.

In 2018, 48 cases of chickenpox were reported to the NDDoH. The NDDoH recommends confirming chickenpox cases through PCR testing. Vaccination has made the classical presentation of chickenpox less common, and the disease more difficult to diagnose. Breakthrough rash may look similar to other diseases, such as hand, foot, and mouth disease. In addition, all chickenpox cases should be reported to the NDDoH regardless of testing.

The varicella vaccine protects against chickenpox. The vaccine is routinely recommended at ages 12-15 months and 4-6 years. Two doses of varicella vaccine are required for kindergarten entry in North Dakota.

Figure 3: Varicella (Chickenpox) Cases in North Dakota 2007-2018 (Confirmed or Probable)



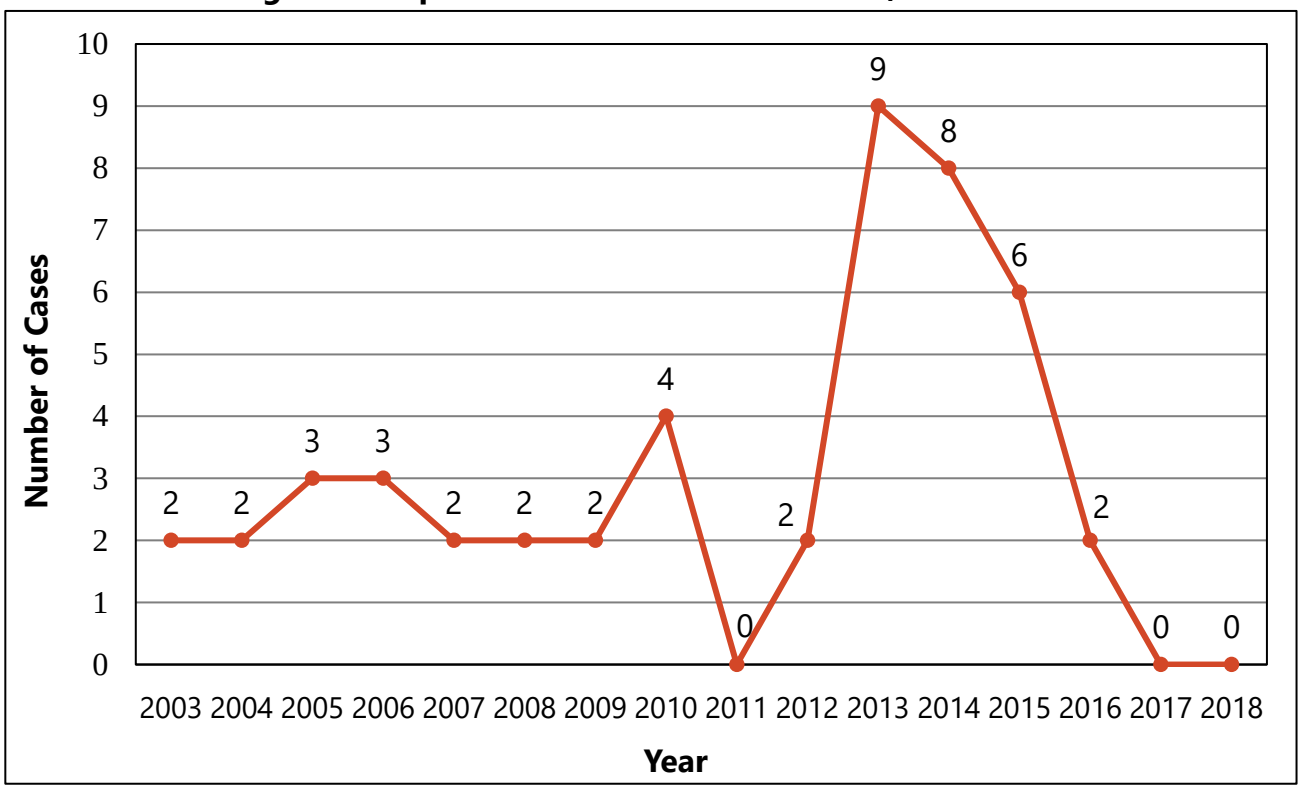
Hepatitis A

Hepatitis A is a liver infection caused by the hepatitis A virus. Symptoms of hepatitis A may include fever, fatigue, loss of appetite, nausea, abdominal discomfort, dark urine, pale stools, and jaundice. Hepatitis A infection does not result in a chronic disease and symptoms typically last less than two months. A person with hepatitis A can generally spread the disease from two weeks before symptoms start, to one week after symptom onset. Hepatitis A virus is found in the stool of infected people. The virus is highly contagious and is spread by the fecal-oral route. Person-to-person transmission is possible when handwashing is inadequate after using the restroom, or when caring for an infected person, such as changing a diaper or cleaning stool. Hepatitis A is also spread when food or drinks, such as fruits, vegetables, raw shellfish, and untreated water or ice are contaminated. Hepatitis A is not transmitted by blood.

Multiple states across the country have reported outbreaks of hepatitis A, primarily among people who use drugs and people experiencing homelessness. Since the hepatitis A outbreaks were first identified in 2016, more than 15,000 cases, 8,500 (57%) hospitalizations, and 140 deaths as a result of hepatitis A virus infection have been reported.

There is no specific treatment for hepatitis A, but there is a vaccine to prevent the infection. Two doses of hepatitis A vaccine separated by six months are routinely recommended for all children at 12 to 23 months and required if the child is attending child care in North Dakota. The vaccine is also recommended for people traveling to or working in a high-risk area, men who have sex with men, people experiencing homelessness, users of injection drugs, people who anticipate having close contact with an international adoptee from high risk area, people who have clotting disorders, those who may be exposed in a laboratory setting, and those with chronic liver disease. There were no cases of hepatitis A reported in North Dakota in 2018.

Figure 4: Hepatitis A Cases in North Dakota, 2003-2018



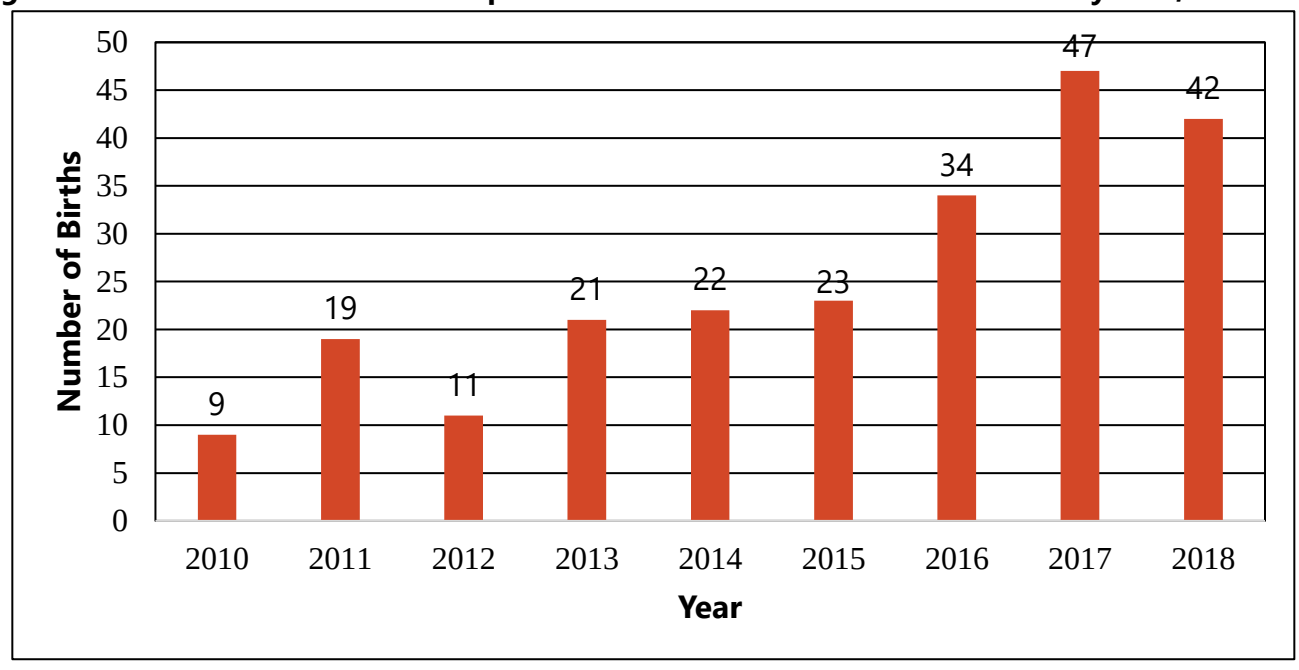
Perinatal Hepatitis B

Hepatitis B is a virus that can be transmitted via blood, or other bodily fluids, and sexually. Chronically infected persons are at an increased risk for cirrhosis and liver cancer. Rates of new infection and acute disease are highest among adults, but chronic infections are more likely to occur in people infected as infants and young children. For infants and children, the two primary sources of hepatitis B infection are perinatal transmission from infected mothers and horizontal transmission from infected household contacts. The hepatitis B birth dose prevents between 70-95% of transmission to infants born to hepatitis B surface antigen positive women. When hepatitis B immune globulin (HBIG) is given in conjunction with the vaccine, between 85-95% of infections are prevented.

The North Dakota Perinatal Hepatitis B Prevention Program seeks to prevent perinatal hepatitis B infections by managing infants born to hepatitis B positive women. Case management includes contacting hepatitis B positive women before delivery to educate them regarding hepatitis B virus transmission and the importance of HBIG and hepatitis B vaccine for their infant. Household contacts are also identified and recommended to be tested or vaccinated, depending on the circumstances. The perinatal hepatitis B coordinator then notifies the hospital where the woman is planning to deliver so they are prepared to administer HBIG and hepatitis B vaccine to the infant at birth.

After delivery, the perinatal hepatitis B coordinator works with the infant's pediatrician to ensure that all three doses of vaccine are given, and that hepatitis B serology testing is performed at 9 months of age, 1-2 months after the last dose of vaccine. Hepatitis B serology testing is essential to determine if the infant gained protection from the vaccine and to ensure that he/she did not develop hepatitis B infection. If the infant does not show a protective immune response from vaccination, one additional hepatitis B dose must be given, and the infant must be retested. The number of births to hepatitis B positive women continues to increase in North Dakota. In 2018, there were 42 births to hepatitis B positive women.

Figure 5: The Number of Births to Hepatitis B Positive Women in North Dakota by Year, 2010-2018

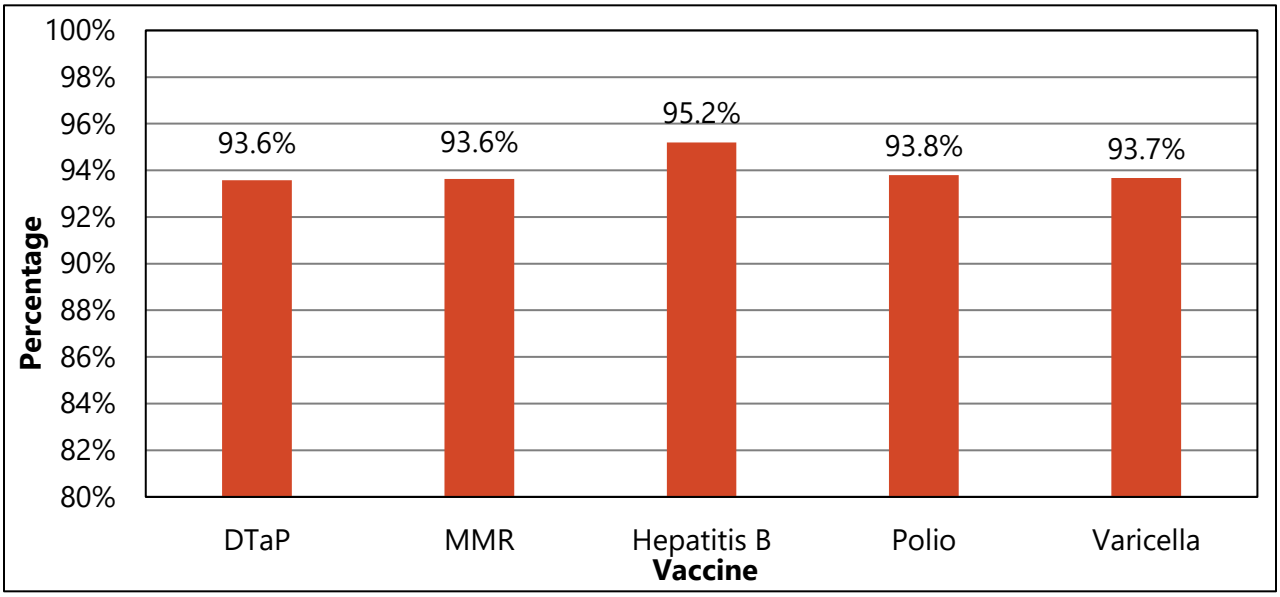


For more information about vaccine preventable diseases in North Dakota, please visit www.ndhealth.gov/immunize.

Kindergarten Vaccination Rates

Each year, the NDDoH gathers school immunization rates through the school immunization survey. The survey is self-reported by schools and is sent out each fall through the Department of Public Instruction. The survey is submitted online and is due around mid-November. Kindergarten vaccination rates for the 2018-2019 school year were around 94% for all five of the required vaccinations. The percent of personal belief exemptions increased again this year.

Figure 6: North Dakota Kindergarten Entry Immunization Rates for the 2018-2019 School Year



The survey also indicated that schools that exclude students who are not up-to-date on immunizations have higher kindergarten vaccination rates than schools that do not exclude students who are not up-to-date. Exemption rates are similar in both situations.

Figure 7: North Dakota Kindergarten Entry Immunization Rates from 2011 to 2018

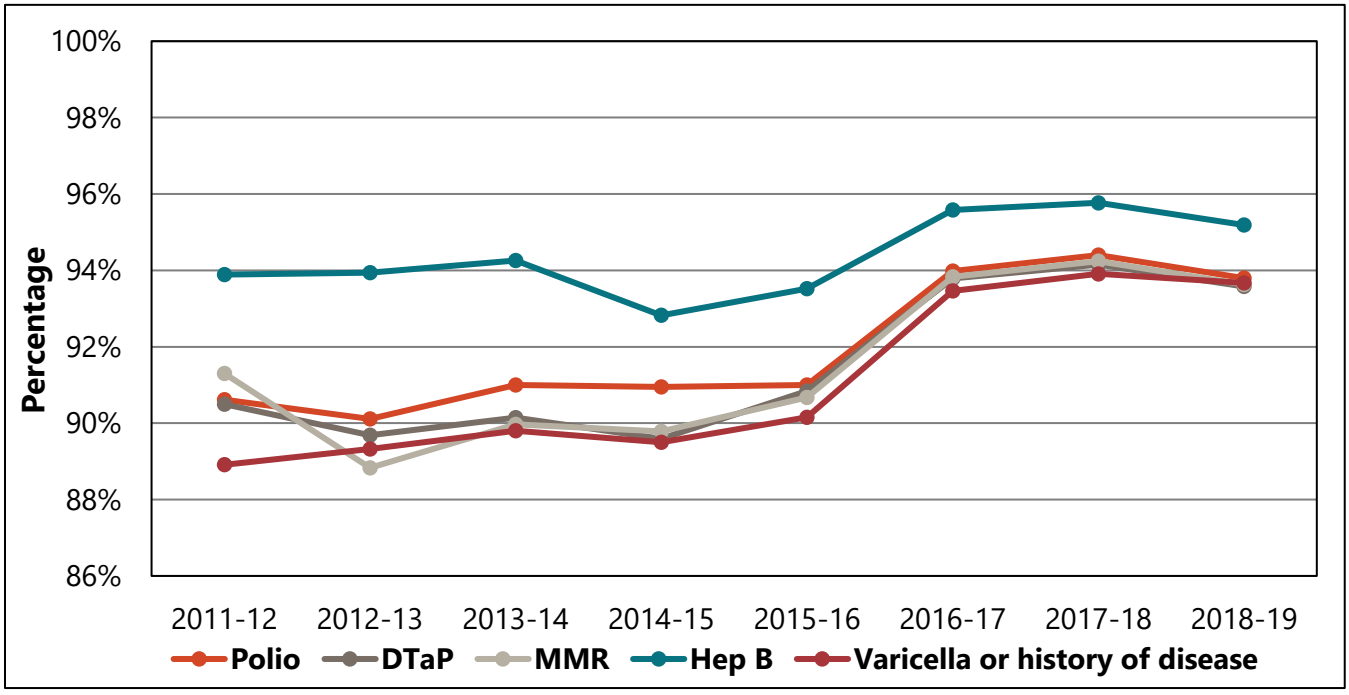


Figure 8: North Dakota Kindergarten Entry Exemption Rates for the 2018-2019 School Year

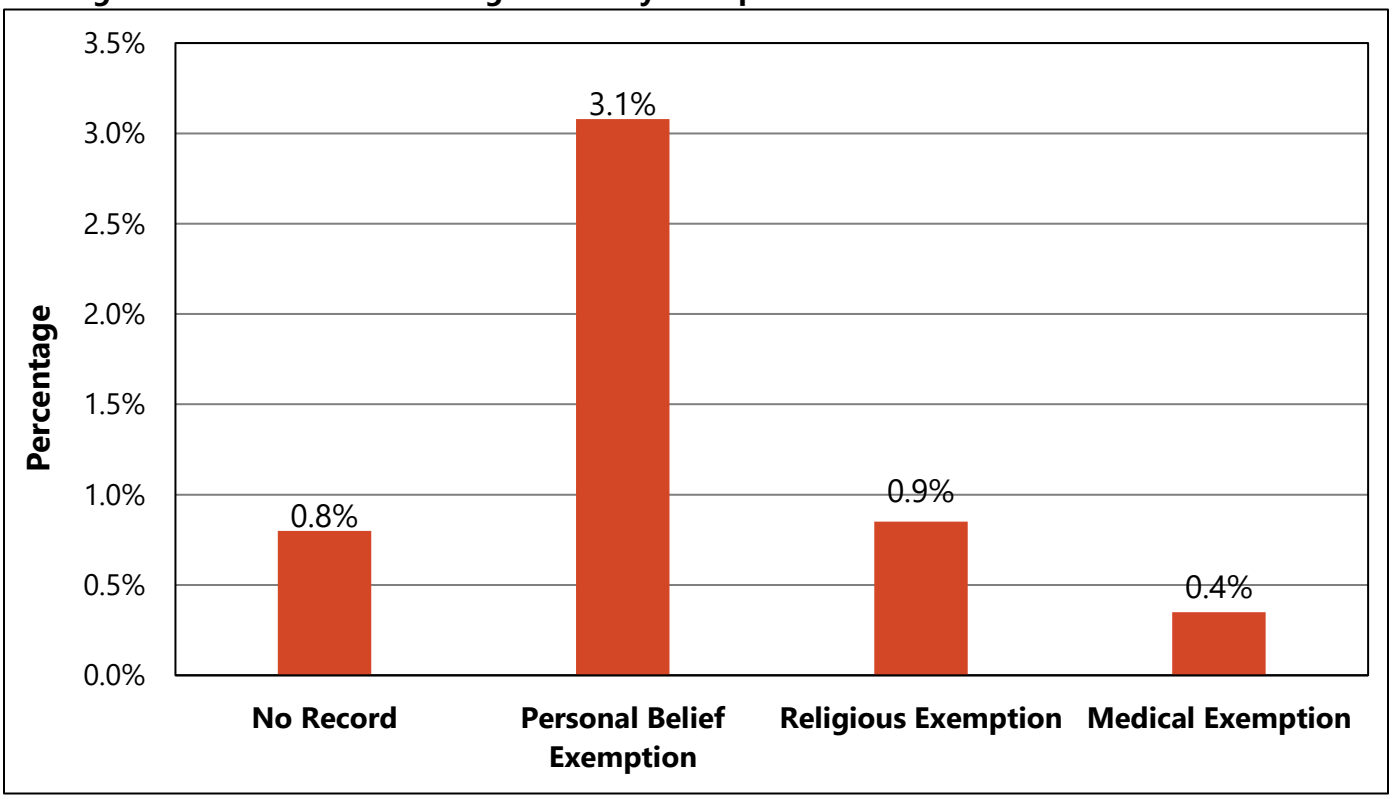
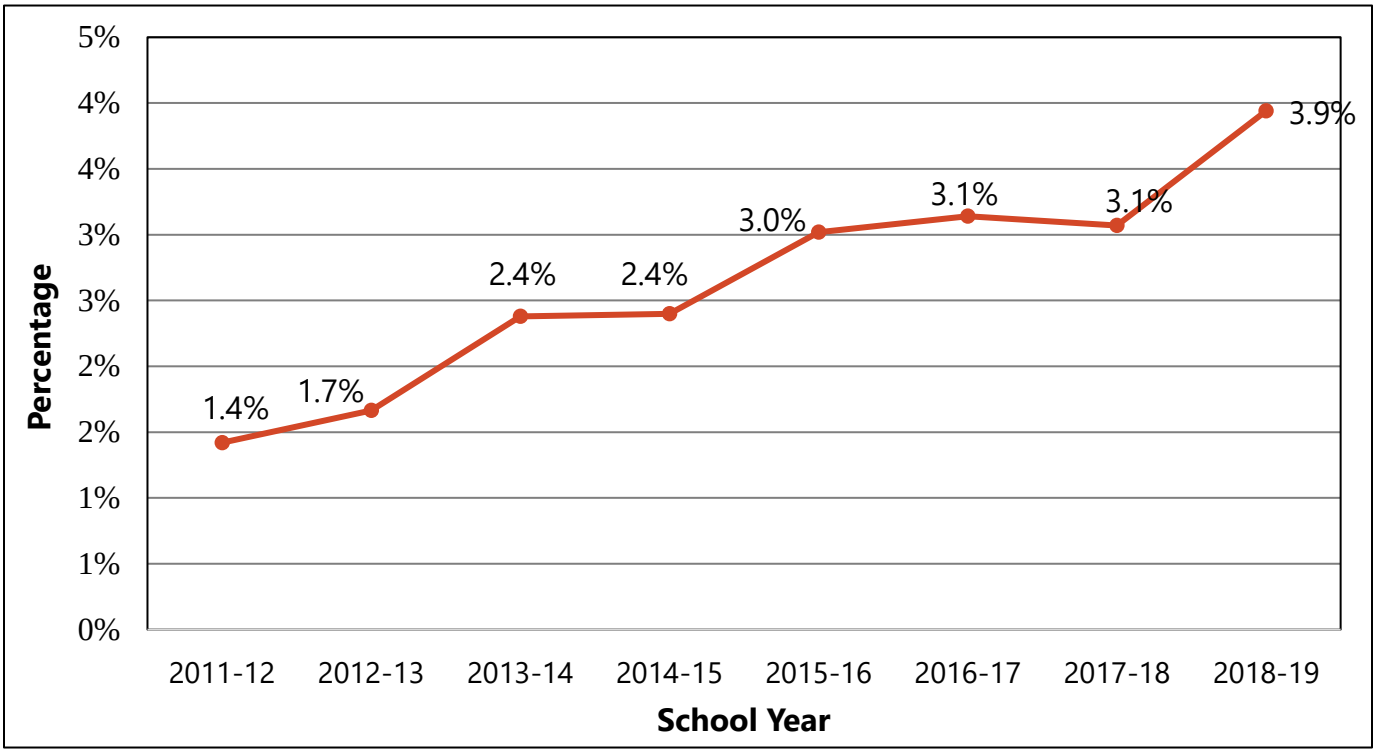
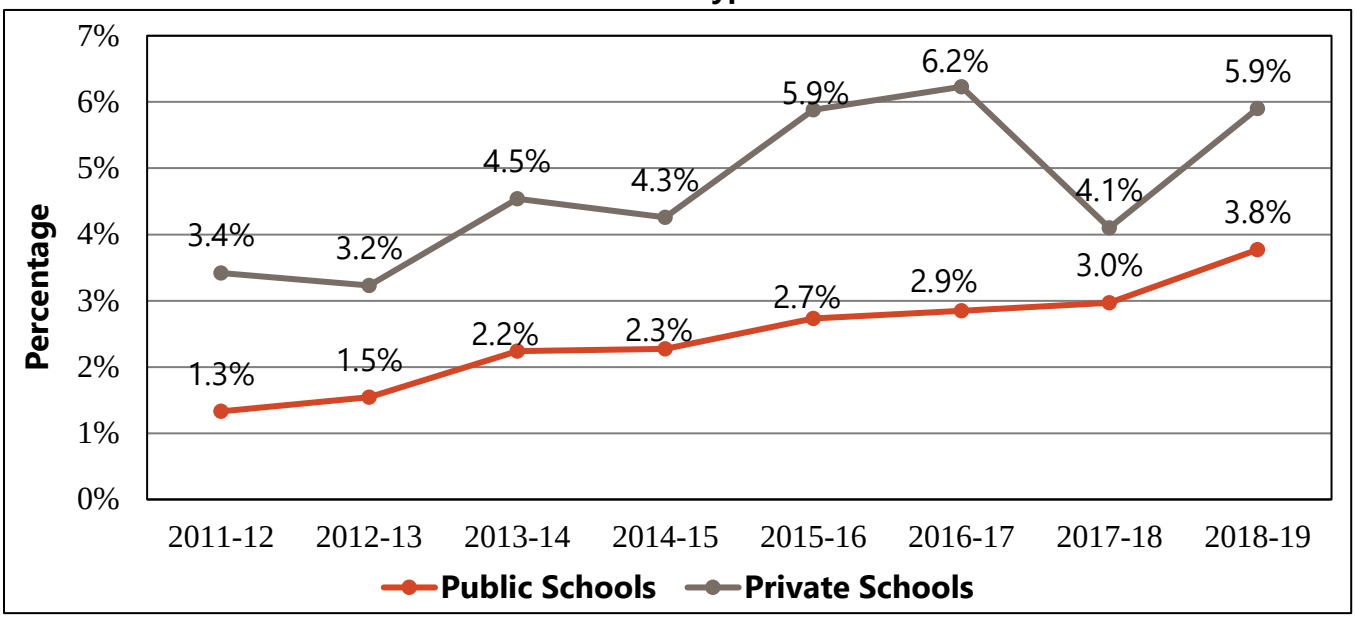


Figure 9: North Dakota Kindergarten Entry Personal Belief and Religious Exemption Rates from 2011 to 2018



The rise in exemptions becomes more apparent when kindergarten data is separated by school type (Figure 10).

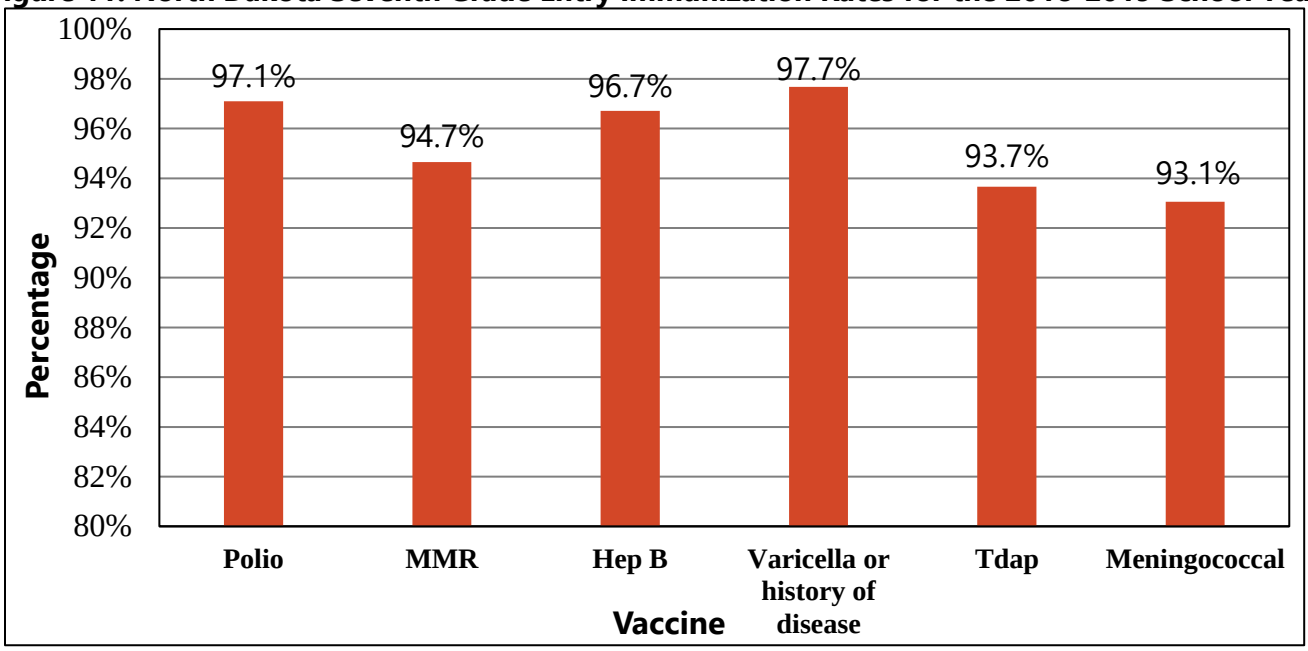
Figure 10: North Dakota Kindergarten Entry Exemption Rates from 2011 to 2018, Stratified by School Type



Seventh Grade Vaccination Rates

Tdap and meningococcal conjugate (MCV4) vaccines were first required for middle school entry in 2008. This was changed for the 2014-2015 school year, to require Tdap and MCV4 for seventh grade entry to standardize the recommendations. For the 2018-2019 school year, Tdap and meningococcal coverage rates were about 94% and 93%, respectively.

Figure 11: North Dakota Seventh Grade Entry Immunization Rates for the 2018-2019 School Year



For more information about school immunization rates, please visit www.ndhealth.gov/immunize.

NDIIS Immunization Coverage Rates

Mary Woinarowicz, NDIIS Manager

Maintaining high immunization coverage helps protect all North Dakotans from vaccine preventable diseases. With timely, detailed immunization data, the ability of all stakeholders to coordinate effective vaccination strategies and help maintain high coverage rates is greatly increased. A widely used and accepted source for immunization data is immunization information systems (IIS). IISs are confidential, population-based, computerized systems that attempt to collect immunization data for all persons within a state or geographical area.[1] Using data from the North Dakota IIS (NDIIS), the NDDoH Immunization Program can monitor immunization coverage rates by health care provider or geographical area (i.e. county and state) in real time. North Dakota health care providers are required to enter immunizations administered to anyone 18 years of age and younger into the NDIIS. Adult immunizations are not required to be entered, however the NDIIS has high adult participation with approximately 97% of all North Dakota adults represented in the NDIIS with at least one adult immunization.

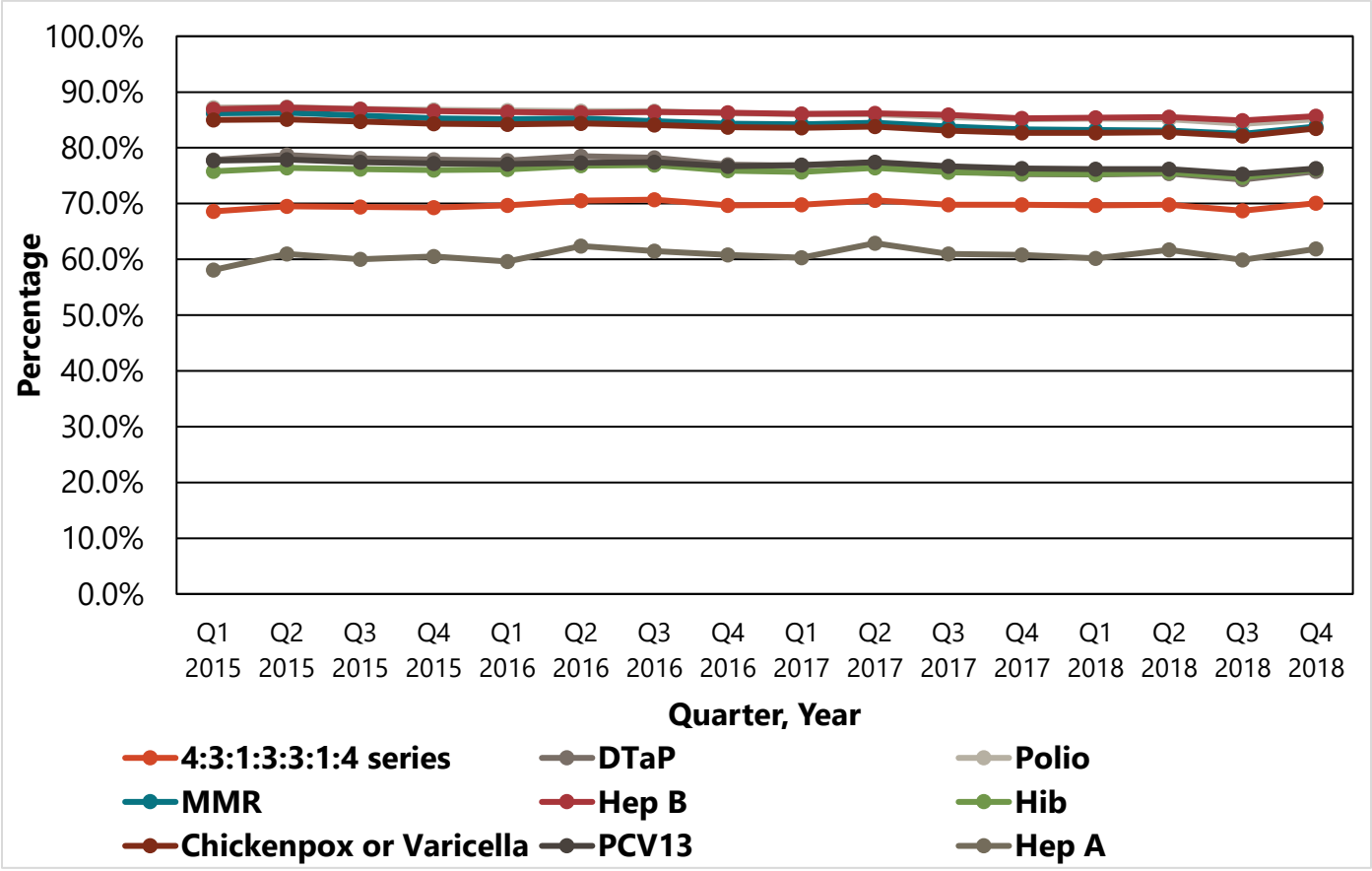
NDIIS data does have limitations. Any IIS is only as good as the data entered. Inaccurate or out-of-date address information could mean there are infants, adolescents and adults no longer living in North Dakota that are still being included in North Dakota coverage assessments. The NDIIS does have functionality and processes in place to remove duplicate patient and dose records and to merge fragmented records. However, it's possible that duplicate patient records are artificially inflating the NDIIS denominator data and fragmented records could look like multiple patients are not up-to-date when there is really one patient who is up-to-date. Additionally, the NDIIS may have incomplete records for individuals who have moved into North Dakota and do not have a record from another state or for adults that have been to a healthcare provider not reporting adult data to the NDIIS. There are also two U.S. Air Force Bases in North Dakota that do not report any immunizations to the NDIIS. Individuals receiving immunizations on the U.S. Air Force Bases will not have a complete record in the NDIIS but may still be included in the coverage assessments.

NDIIS immunization coverage rates are published quarterly on the NDDoH immunization program website at www.ndhealth.gov/immunize.

Infant Immunization Coverage

By 19 months of age, infants are recommended to receive four doses of diphtheria, tetanus and pertussis (DTaP), three doses of polio, one dose of MMR, three doses of hepatitis B, three or four doses of *Haemophilius influenzae* type B (Hib), one dose of varicella (chickenpox) and four doses of pneumococcal (PCV13) vaccines (4:3:1:3:3:1:4 series). Additionally, infants are also recommended to receive two doses of hepatitis A vaccine. Immunization rates for infants 19-35 months of age for the complete 4:3:1:3:3:1:4 vaccine series in 2018 saw very little variation compared to previous years, with a small increase in the fourth quarter. Quarter 4 2016 had a series rate of 69.7% compared to 69.8% for quarter 4 of 2017 and 69.7% for quarter 4 of 2018. Coverage rates for hepatitis A continue to see fluctuations between quarters with quarter 1 of 2018 having a rate of 60.2%, increasing to 61.7 % in quarter 2, decreasing to 59.9% in quarter 3 and increasing again to 61.9% in quarter 4.

Figure 12: North Dakota Immunization Rates for Infants Ages 19 – 35 Months Using the 4:1:3:3:3:1:4 Vaccine Series, 2015-2018

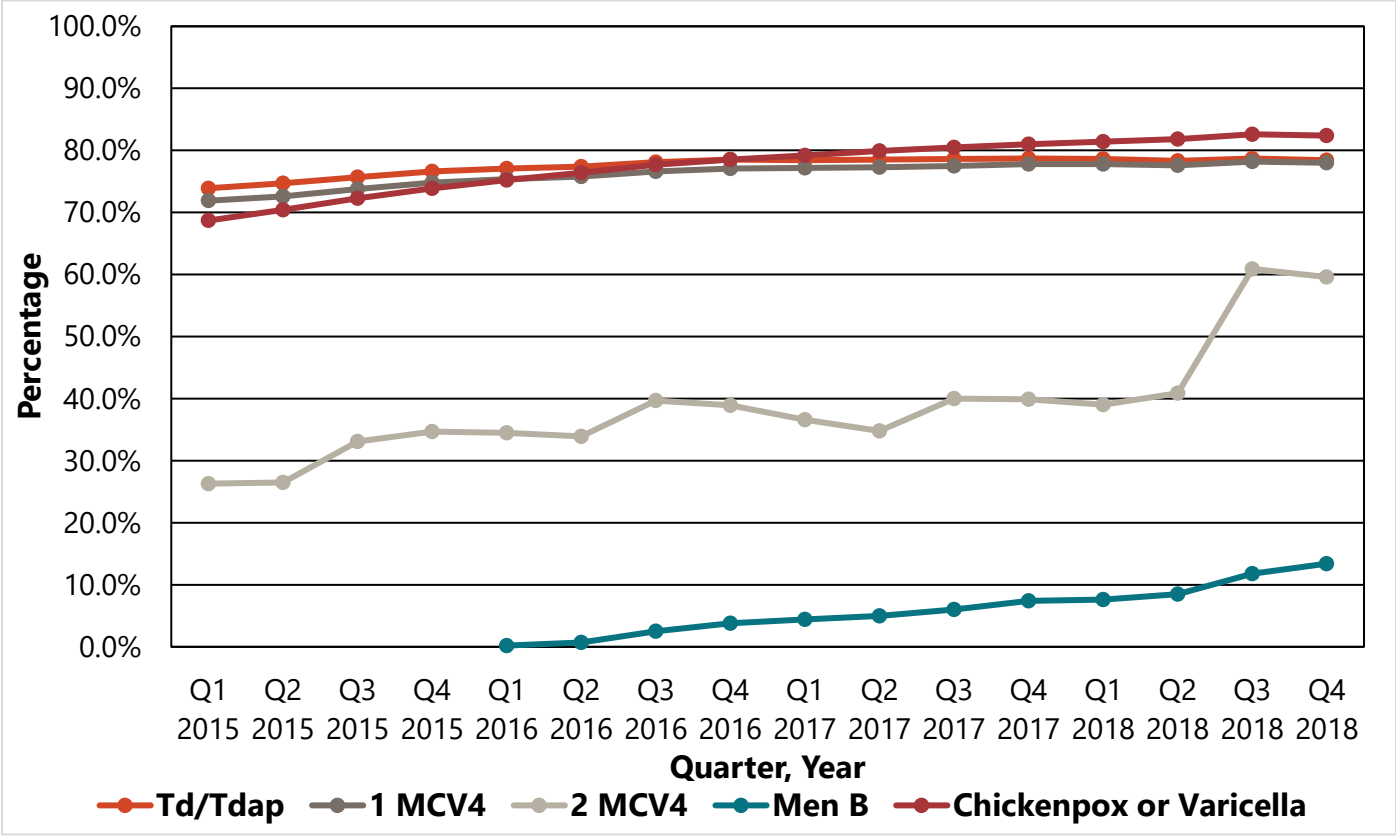


Adolescent Immunization Coverage

Adolescents are recommended to receive one dose of Tdap, one dose of MCV4 and two or three doses of human papillomavirus (HPV) vaccines at 11-12 years of age. Adolescents are also recommended to receive a second dose of MCV4 vaccine at 16-18 years of age and in 2014, a category B recommendation was made for administering meningococcal B vaccine. Since 2015, North Dakota has seen a steady increase in coverage rates for recommended adolescent immunizations. At the end of 2018, 78.4% of adolescents 13-17 years of age were up-to-date with one dose of Tdap and 78.0% were up-to-date with one dose of MCV4 vaccine. Approximately 59.6% of adolescents 16-17 years of age were up-to-date with their second dose of MCV4. Meningococcal B vaccine is not routinely recommended for all adolescents. Uptake for meningococcal B vaccine remains low with only 13.4% of adolescents up-to-date with the complete series. However, uptake for meningococcal B has been steadily increasing since the first quarter of 2016.

In 2007, a second dose of varicella (chickenpox) vaccine was recommended for kids at 4-6 years of age. Catch-up vaccination was recommended for all kids and adolescents who had only received one dose, however North Dakota is implementing the two-dose requirement for school incrementally (adding one additional grade each school year). At the end of 2018, 82.4% of adolescents 13-17 years were up-to-date with two doses of varicella vaccine compared to 73.9% at the end of 2015.

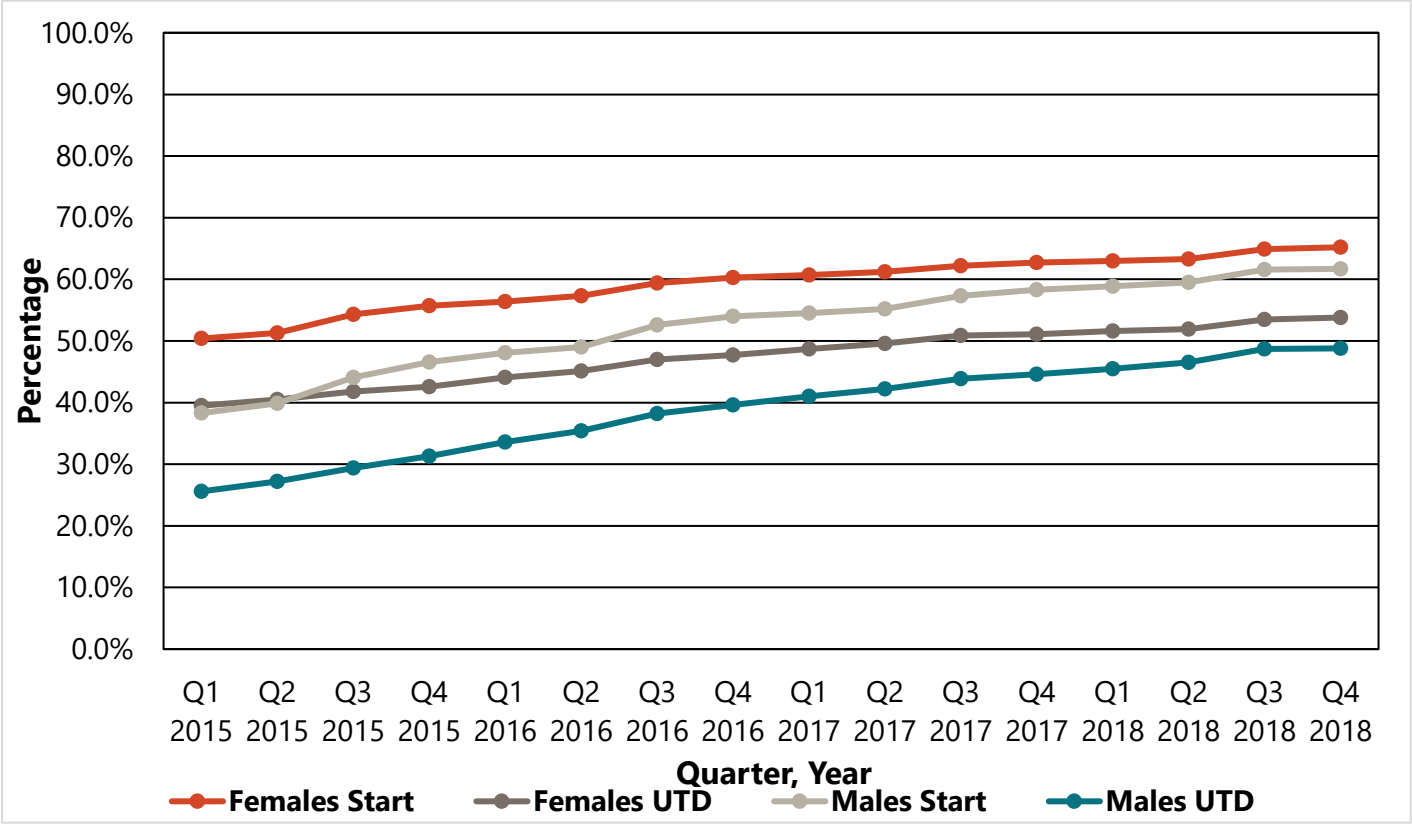
Figure 13: North Dakota Immunization Rates for Adolescents Ages 13 – 17 years, 2015-2018



Coverage rates for HPV, although lower than Tdap and MCV4, have seen much greater increases over the last four years. By the end of 2018, 65.2% of females and 61.7% of males 13 to 17 years had started the HPV vaccine series. This is an increase of 9.5% for females and 15.1% for males since 2015. Additionally, 53.8% of females and 48.8% of males are up-to-date with the complete HPV vaccine series. This is an increase of 11.2% for females and 17.5% for males since 2015.

Figure 14: North Dakota HPV Immunization Rates for Adolescents ages 13 – 17 years, 2015-2018

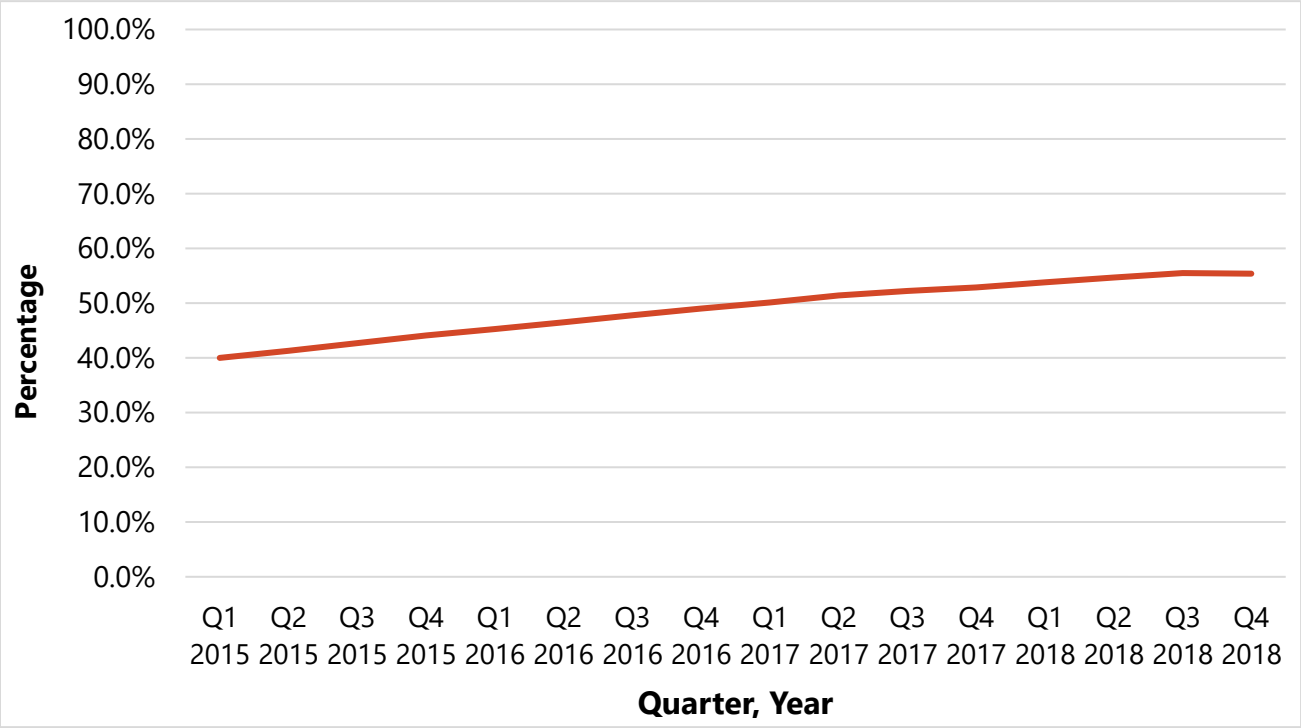
(UTD = up-to-date)



Adult Immunization Coverage

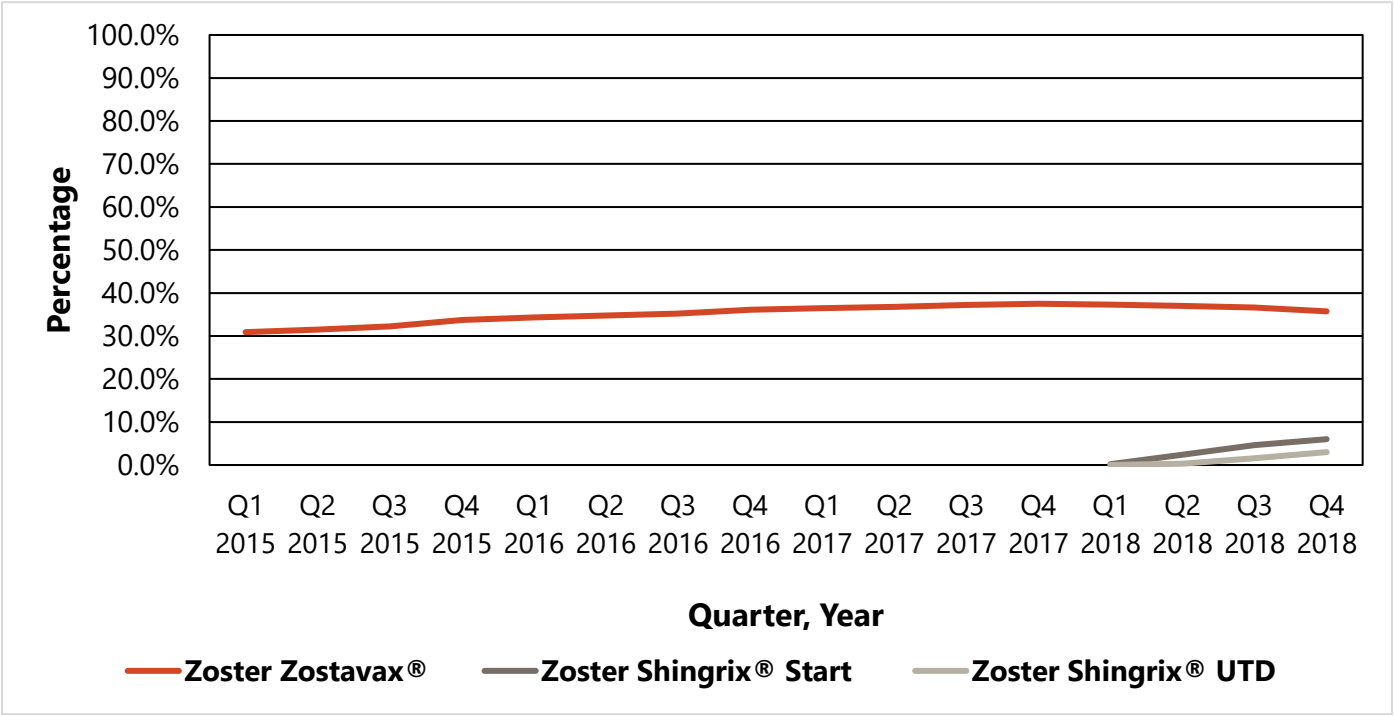
There are also routine vaccine recommendations for adults 19 years of age and older. All adults are recommended to receive one dose of Tdap vaccine. At age 50, adults are recommended to receive zoster (shingles) vaccine. Pneumococcal conjugate vaccine (PCV13) is recommended for all adults at age 65 followed by a dose of pneumococcal polysaccharide (PPSV23) vaccine 12 months later. North Dakota has seen a steady increase in all adult immunization coverage over the last four years. According to the NDIIS, 55.4% of adults had received their Tdap vaccine as of the end of 2018. This is an increase of 11.3% since 2015.

Figure 15: North Dakota Tdap Immunization Rates for Adults 19 and Older, 2015-2018



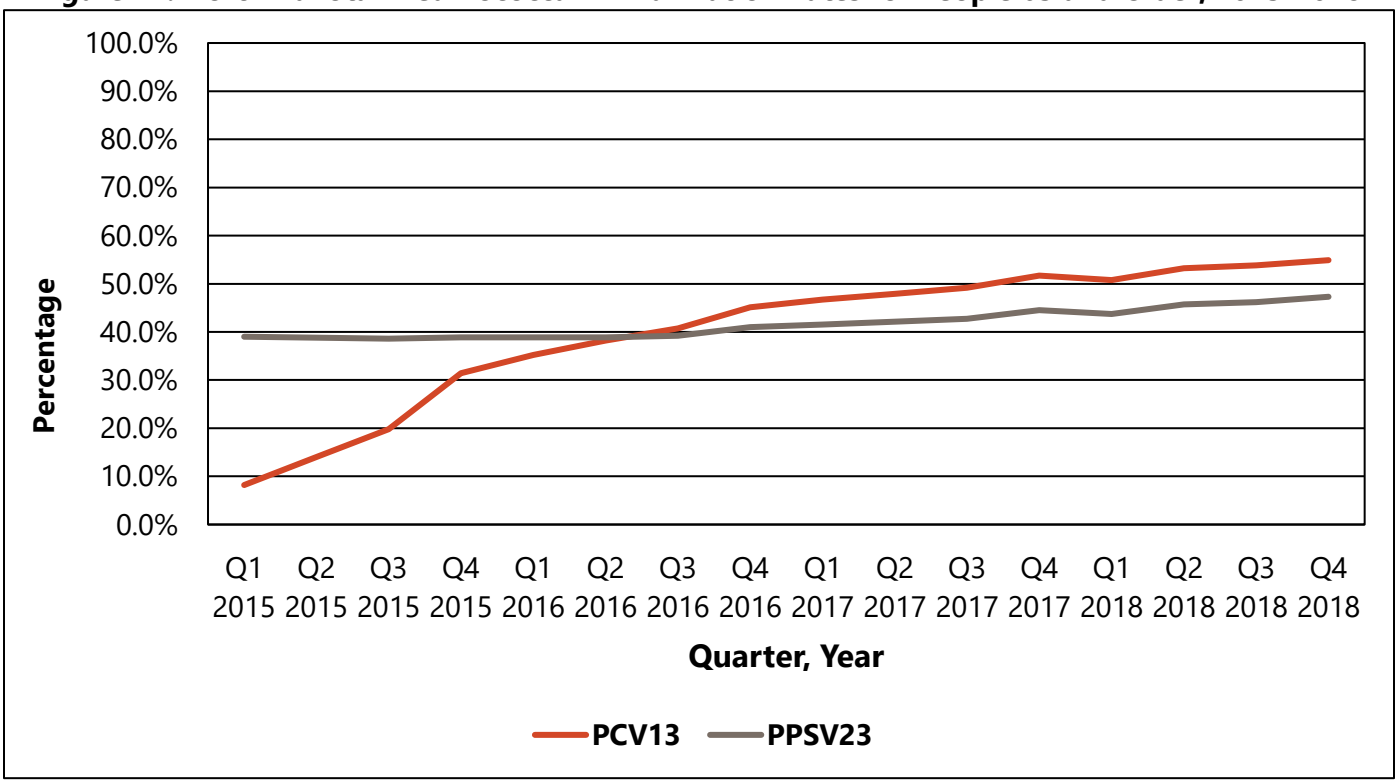
Adults were previously recommended to receive one dose of zoster (shingles) vaccine, brand name Zostavax®, at age 60. However, in October 2017 a new zoster vaccine, Shingrix®, was licensed for adults ages 50 and older. Shingrix® vaccine is recommended as a two-dose series, and there was such high demand for the vaccine that there has been a shortage of Shingrix® since early 2018, making it difficult to vaccinate all adults with the complete two-dose series. Prior to the licensure of Shingrix® vaccine, the coverage rate for Zostavax® vaccine for adults met the Healthy People 2020 goal of 30% for zoster vaccine in quarter 1 of 2015 and continued to exceed it every quarter since. Since the introduction of Shingrix® vaccine, 6% of adults had received their first dose by the end of 2018 and 3% of adults had completed the series.

Figure 16: North Dakota Zoster Immunization Rates for Adults 60 and Older, 2015-2018



Approximately 54.9% of all adults were up-to-date with one dose of PCV13 at the end of 2018. Since 2015, the coverage rate for PPSV23 has seen a slow but steady increase from 38.9% to 47.3%. This vaccine is recommended to be administered after PCV13, and in the third quarter of 2016, the rate for PCV13 exceeded the coverage rate for PPSV23.

Figure 17: North Dakota Pneumococcal Immunization Rates for People 65 and Older, 2015-2018



Epidemiology and Surveillance Program

The Epidemiology and Surveillance Program is responsible for the management and surveillance of infectious disease activities, such as enteric/foodborne, vector-borne, zoonotic, influenza, antibiotic resistant infections, parasitic infections, waterborne diseases, non-flu respiratory viruses, health care-associated infections, and mycotic infections. Additionally, the Epidemiology and Surveillance Program provides cross cutting and flexible epidemiology and health information systems capacity, which addresses a variety of infectious diseases. Additional functions include management of the NDDoH's syndromic surveillance program, general infection control assessment and outbreak response activities.

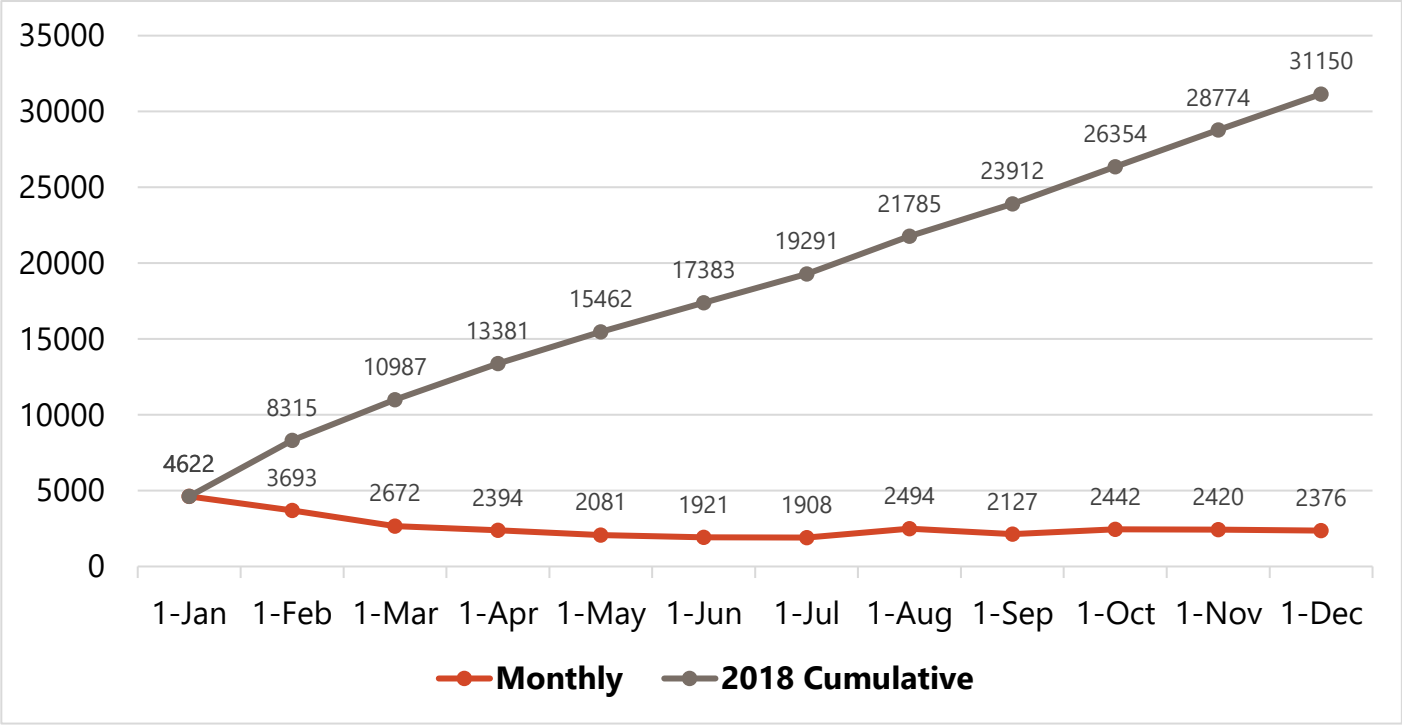
Electronic Laboratory Reporting (ELR)

Alicia Torfin, NEDSS Coordinator

Electronic Laboratory Reporting (ELR) is the electronic transmission of laboratory reports from hospitals, public and reference laboratories to the Division of Disease Control. ELR can improve timeliness, reduce manual data entry errors, and result in reports that are more complete. The NDDoH began receiving electronic laboratory reports in 2009 with the NDDoH's Division of Microbiology (DM). At the end of 2018, NDDoH had 30 laboratories in production with ELR, six of which had been added in 2018.

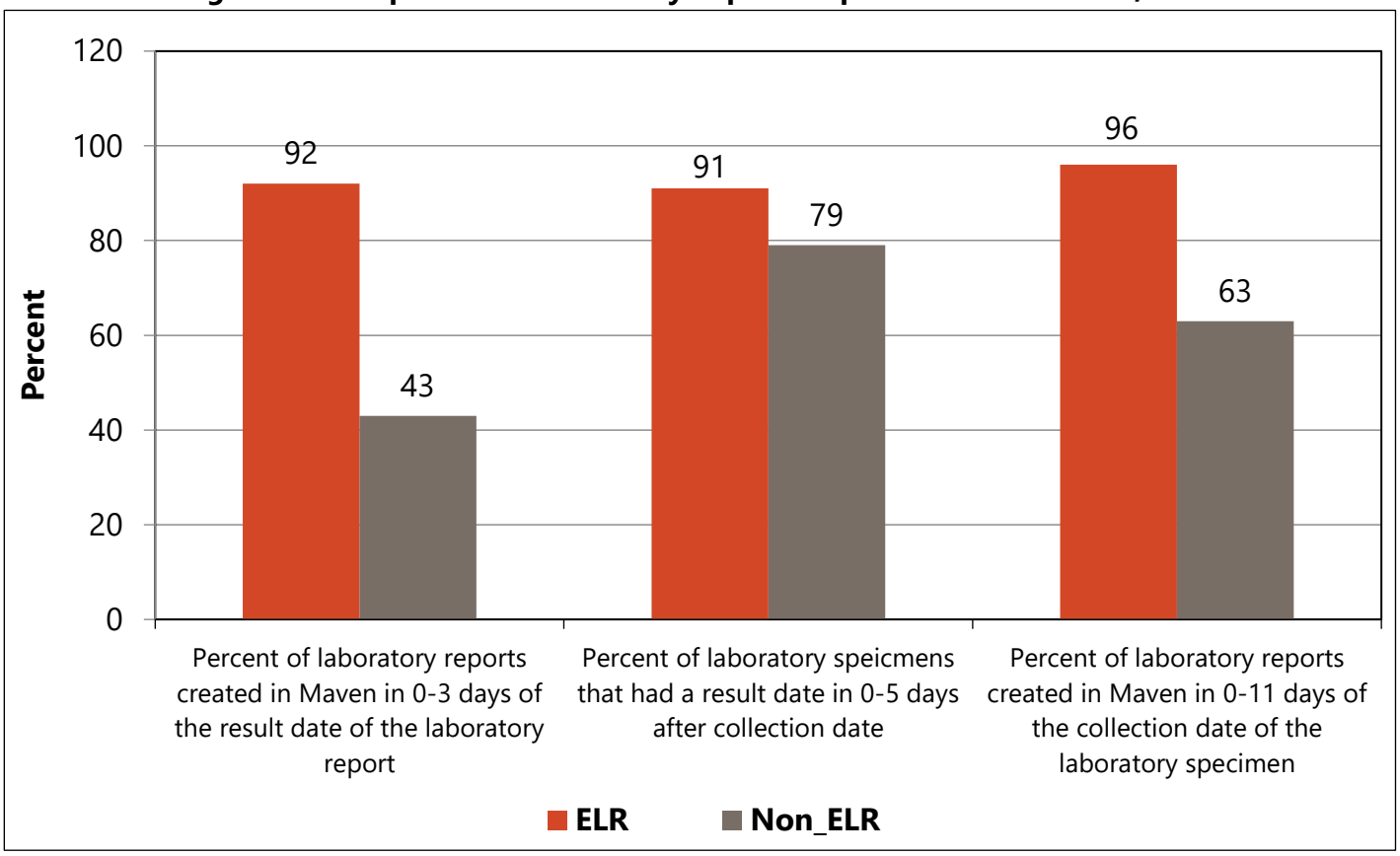
The total numbers of laboratory results received in 2018 were 37,105. Of those, 31,150 (84%) were reported through ELR (Figure 18).

Figure 18: Number of ELR Messages Received by NDDoH, 2018



Of the laboratory reports created in Maven by ELR, 92% were created in Maven in zero to three days of the result date of the initial laboratory report, 91% had zero to five days between the collection date of the laboratory specimen and the date of result of the initial laboratory report, and 96% were created in Maven in zero to eleven days between collection date of the laboratory specimen. Of the laboratory reports created in Maven by non-ELR methods (i.e., manual data entry), 43% were created in Maven in zero to three days of the result date of the initial laboratory report, 79% had zero to five days between the collection date of the laboratory specimen and the date of result of the initial laboratory report, and 63% were created in Maven in zero to eleven days between collection date of the laboratory specimen (Figure 19).

Figure 19: Comparison of Laboratory Reports Reported to the NDDoH, 2018



The number of laboratory reports received via ELR increased by 16.6% from the 26,716 records received in 2017. ELR timeliness appears to have stayed fairly consistent, with 92% of reports being created in Maven in zero to three days, 91% of reports having zero to five days between the collection date and the result date, and 96% of reports having zero to eleven days between the specimen collection date and the date when the laboratory report was created in Maven in 2017.

Implementation of ELR improves timeliness and accuracy of laboratory results. A greater proportion of cases are entered into Maven more quickly from the date of laboratory result when they are reported ELR than non-ELR. This results in quicker follow-up time for NDDoH staff to speak with confirmed cases to gain more accurate risk factors or exposures and to implement any public health action that is needed. Additionally, fewer data entry errors are made with ELR than non-ELR reporting methods. Ongoing assessment will continue to ensure data timeliness and accuracy of all laboratory reports.

Respiratory Diseases

Levi Schlosser, Influenza Surveillance Epidemiologist

2017-2018 Influenza Season

Influenza surveillance activities for the 2017-2018 season officially began August 1, 2017. The NDDoH requires all laboratory-identified cases of influenza, including positive rapid antigen tests, be individually reported to the NDDoH year-round. The timing for the season was average, with case counts increasing in December, and peaking the week ending January 27th. This season marked a slight change from the previous season (2016-17), which peaked later, in March, but saw slightly less total reported cases at 7,507 cases. At 8,530, the 2017-18 season had the most cases ever recorded in a single influenza season in North Dakota. However, this may likely be due to increased electronic reporting, meaning fewer cases of influenza were missed by surveillance due to underreporting. This contrasts with the 2015-16 season, which saw less than 2000 cases, as well as the 2014-15 season, which saw fewer cases (6,443 total reported cases), but was considered a fairly severe season due to a vaccine mismatch. Overall, the severity of the 2017-18 season was moderate, with the influenza A H3N2 strain predominating. Twenty-two percent (1,866) of the cases for 2017-18 were influenza B, a lower proportion than in previous years. The smaller-than-average B wave did not detract from the overall high case count. North Dakota's influenza activity was generally similar to national trends, but a side-by-side comparison is not possible because influenza is not a nationally notifiable disease.

More information on influenza in North Dakota can be found at www.ndflu.gov.

Figure 20: North Dakota 2017-2018 Reported Case Count for Seasonal Influenza

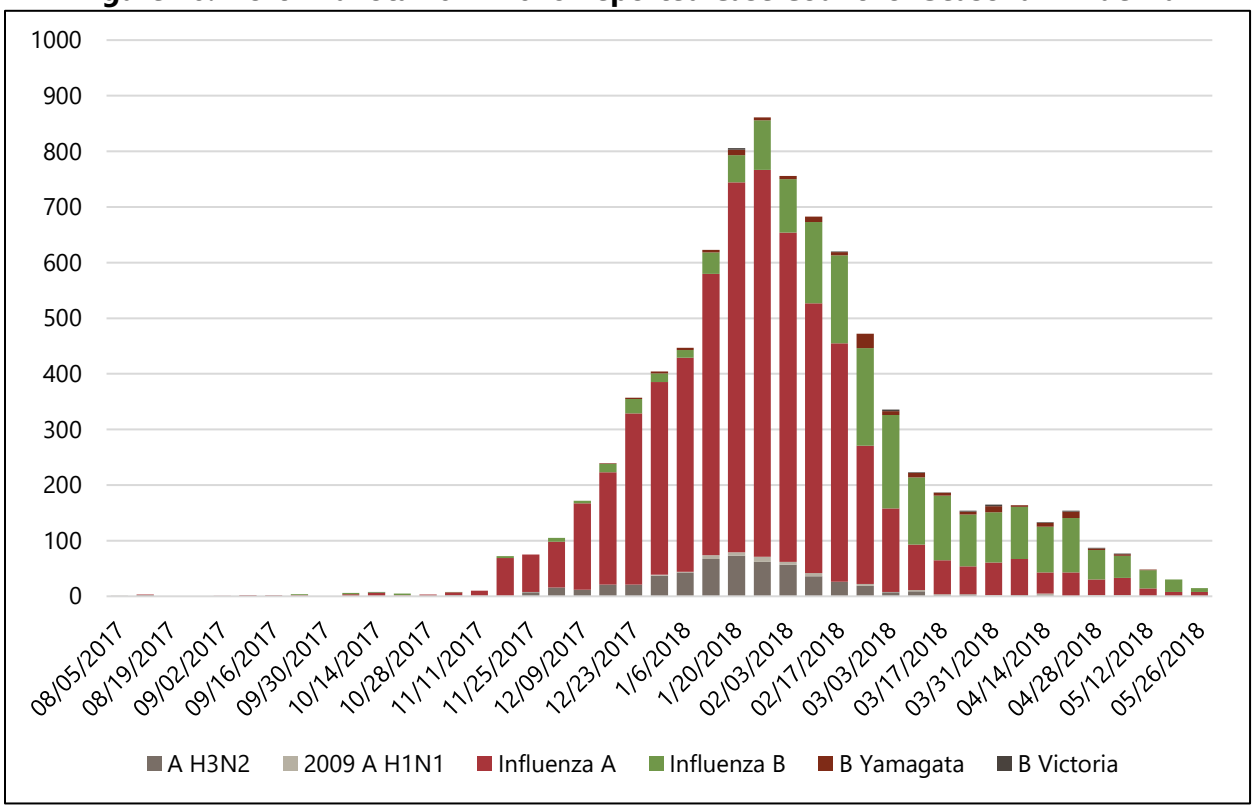
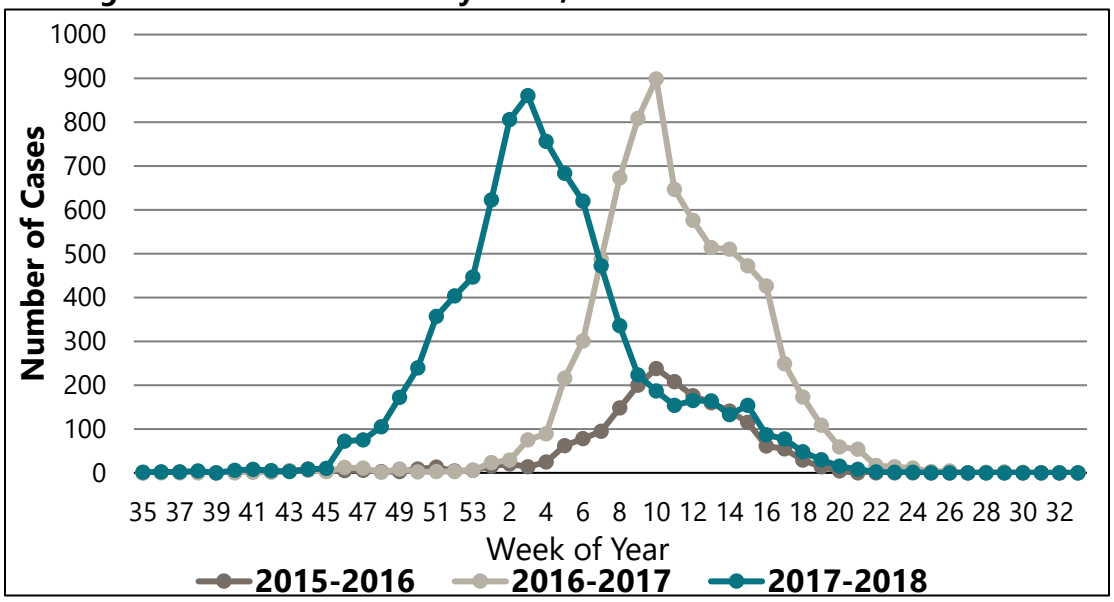


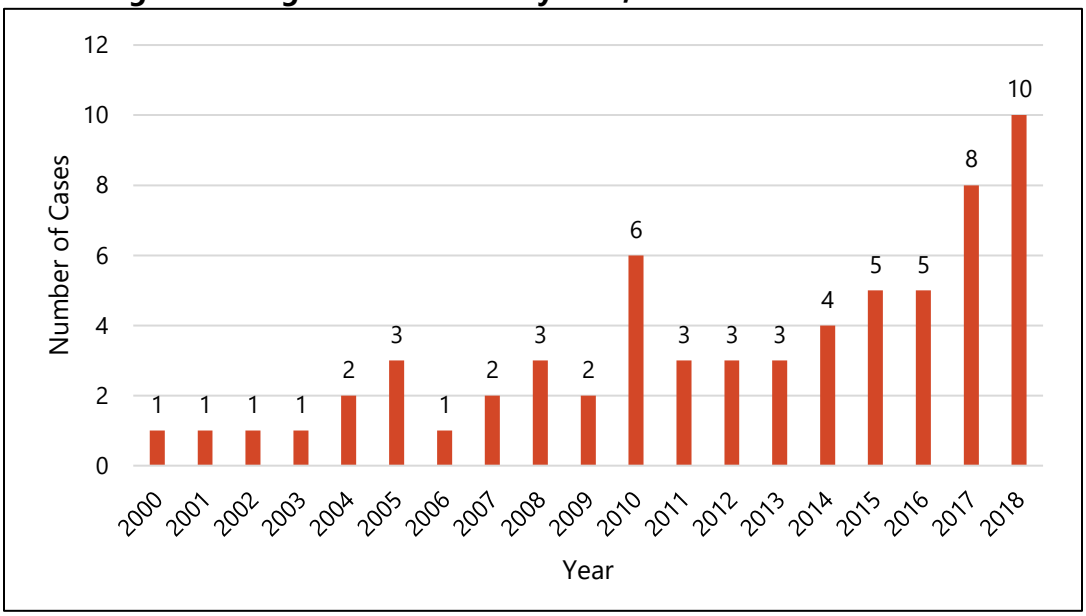
Figure 21: Influenza Cases by Week, North Dakota 2015-2018 Seasons



Legionellosis Cases

Legionnaires' disease is a severe lung infection caused by bacteria called *Legionella*. People get exposed to *Legionella* when they breathe in small droplets of water that contain *Legionella* bacteria. In the United States, the rate of reported Legionnaires' disease is increasing and has grown by nearly five and a half times since 2000. In North Dakota, there is a similar increase in reported Legionnaires' cases. In 2018, there were 10 cases reported from seven counties (Barnes – 1, Burleigh – 2, Cass – 3, Grand Forks – 1, Ransom – 1, Richland – 1 and Ward – 1). Seventy percent of the cases were male, all 10 cases were hospitalized, and none died. The NDDoH investigated one healthcare-associated Legionnaires' disease case at a long-term care (LTC) facility. A single case of legionellosis associated with a health care facility typically will prompt a full-investigation. An environmental assessment was conducted to identify possible risks and to review the LTC facility's water management plan. No additional cases and no exceptional risks for *Legionella* growth were found.

Figure 22: Legionellosis Cases by Year, North Dakota 2000-2018



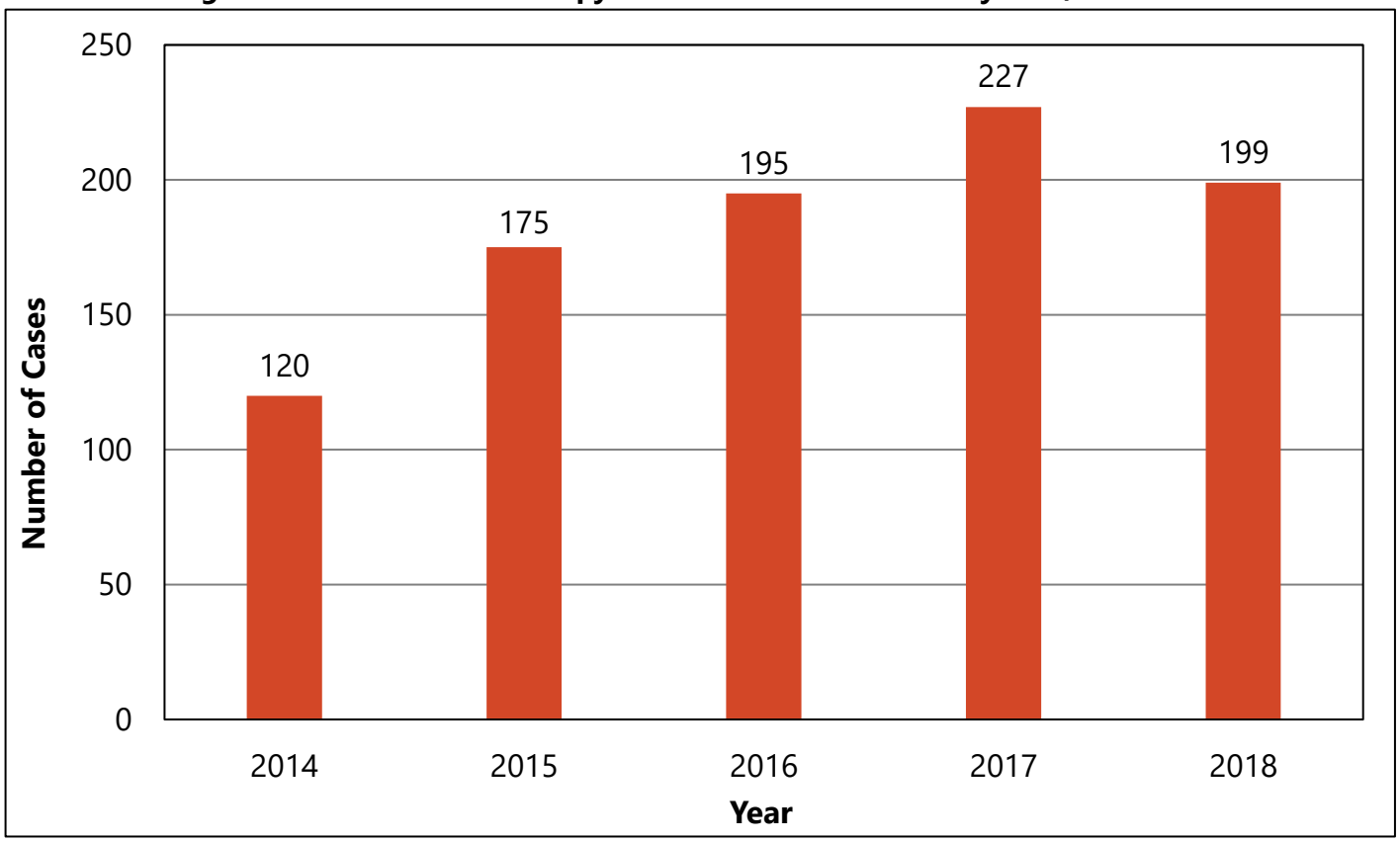
Enteric Diseases

Laura Cronquist, Enteric/Vector-borne/Zoonotic Disease Epidemiologist

Campylobacteriosis

In 2018, 199 cases of campylobacteriosis were reported to the NDDoH, a 12% decrease from the 227 cases reported in 2017 (Figure 23). Statewide, campylobacteriosis incidence was 26.3 cases per 100,000 people in 2018. Forty-three counties reported cases, with Slope (389.1 cases per 100,000 people), Bowman (252.7 cases per 100,000 people), and Kidder (161.2 cases per 100,000 people) having the highest incidence of campylobacteriosis.

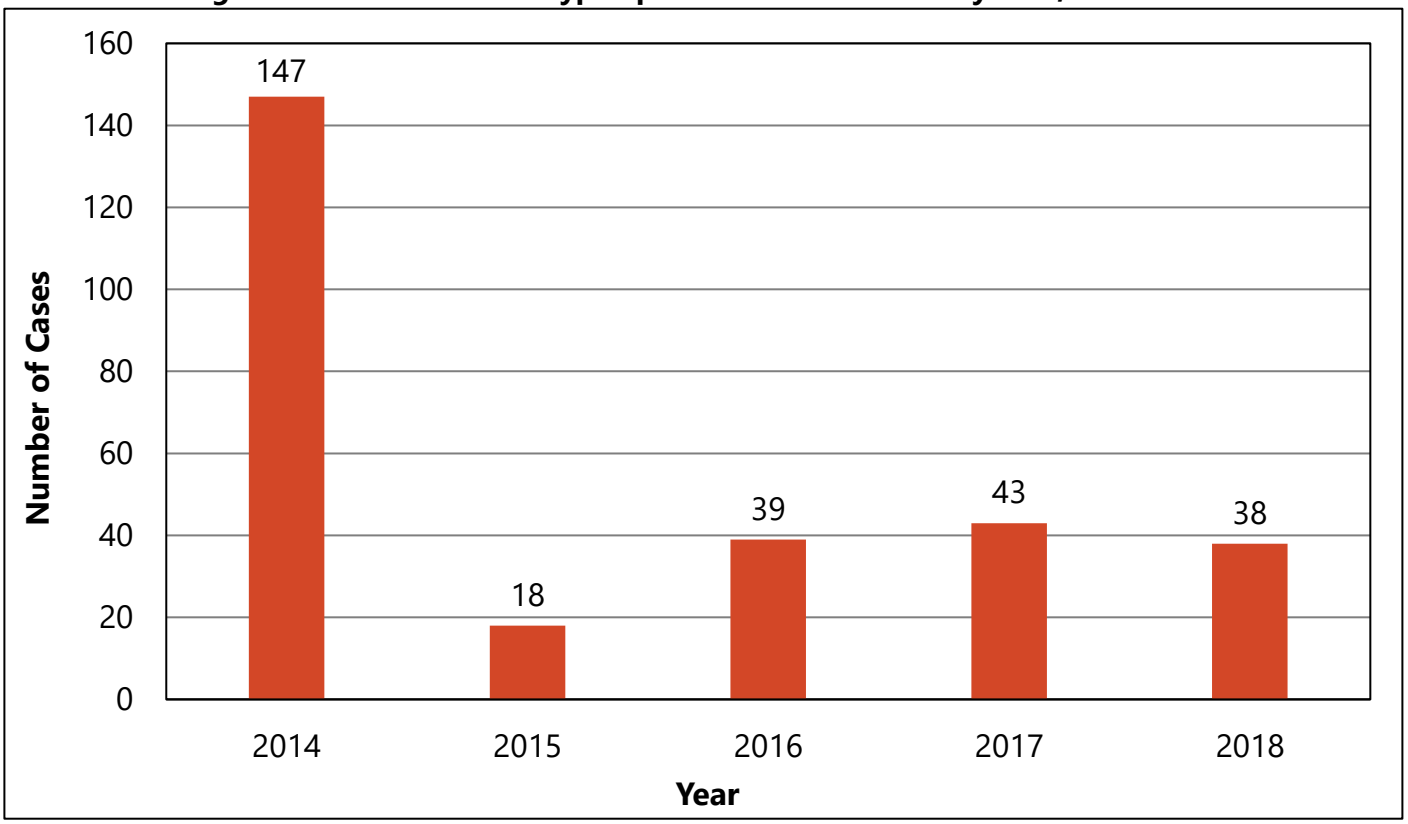
Figure 23: North Dakota Campylobacteriosis Case Counts by Year, 2014-2018



Cryptosporidiosis

In 2018, 38 cases of cryptosporidiosis were reported to the NDDoH, a 12% decrease from the 43 cases reported in 2017 (Figure 24). Statewide, cryptosporidiosis incidence was 5.0 cases per 100,000 people in 2017. Seventeen counties reported cases, with Emmons (60.6 cases per 100,000 people), Logan (52.1 cases per 100,000 people), and LaMoure (48.9 cases per 100,000 people) having the highest incidence of cryptosporidiosis.

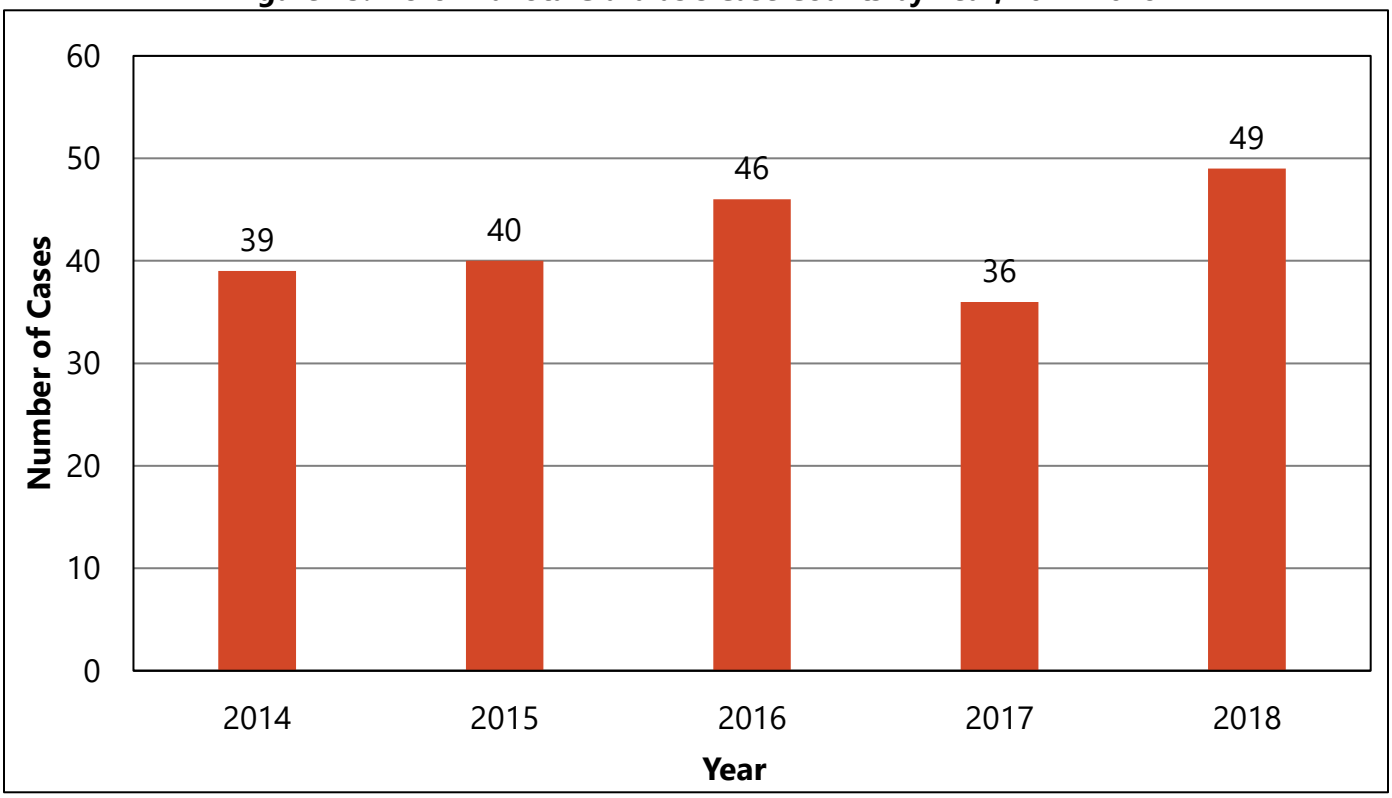
Figure 24: North Dakota Cryptosporidiosis Case Counts by Year, 2014-2018



Giardiasis

In 2018, 49 cases of giardiasis were reported to the NDDoH, which was a 27% increase from the 36 cases reported in 2016 (Figure 25). Statewide, giardiasis incidence was 6.5 cases per 100,000 people in 2017. Twenty counties reported cases, with McIntosh (38.4 cases per 100,000 people), Emmons (30.3 cases per 100,000 people), and Cavalier (26.6 cases per 100,000 people) having the highest incidence of giardiasis.

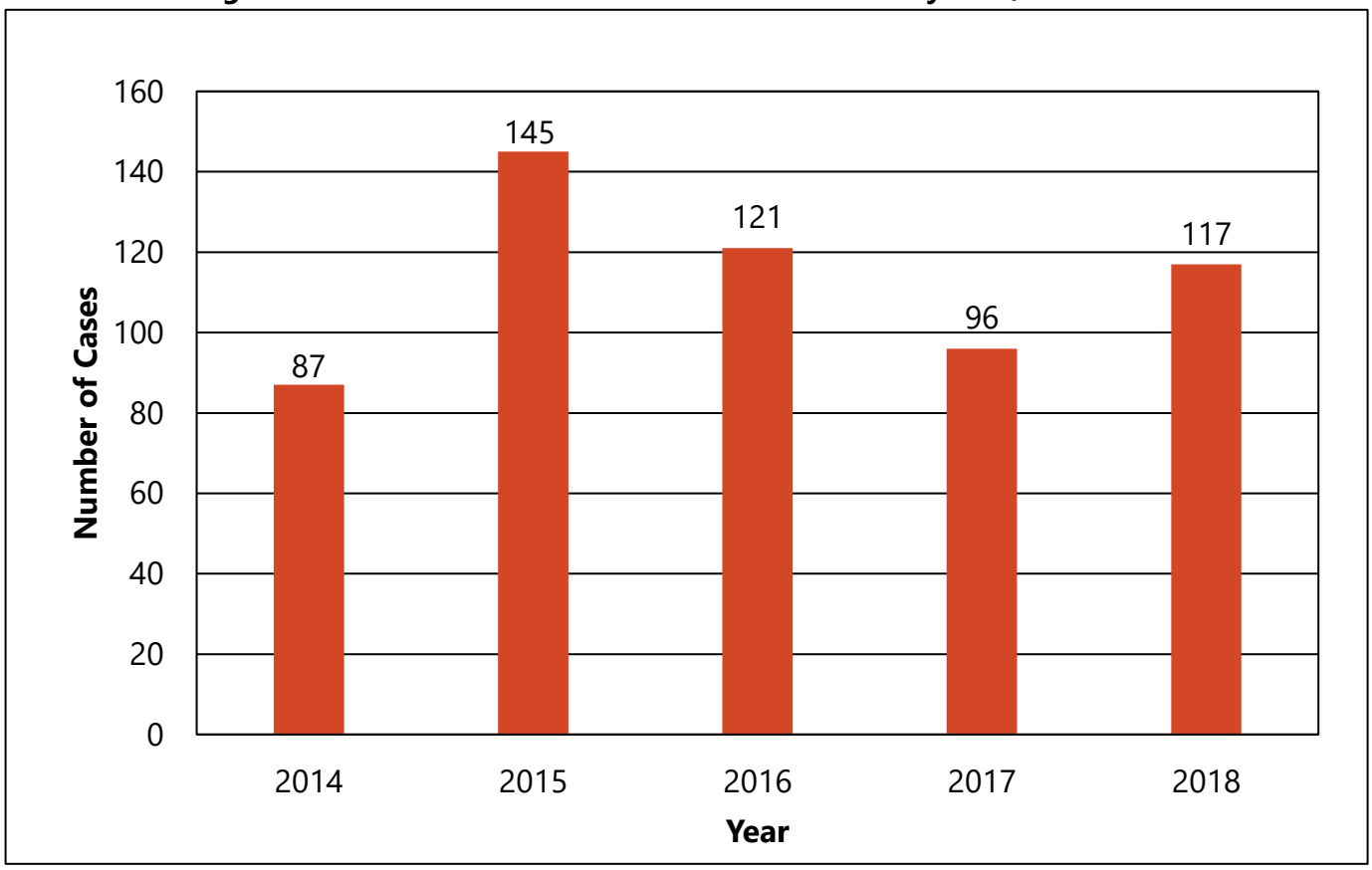
Figure 25: North Dakota Giardiasis Case Counts by Year, 2014-2018



Salmonellosis

In 2018, 117 cases of salmonellosis were reported to the NDDoH, a 22% increase from the 96 cases reported in 2017 (Figure 26). Statewide, salmonellosis incidence was 15.5 cases per 100,000 people in 2018. Twenty-eight counties reported cases, with Nelson (102.1 cases per 100,000 people), McIntosh (76.7 cases per 100,000 people), and Dunn (69.9 cases per 100,000 people) having the highest incidence of salmonellosis.

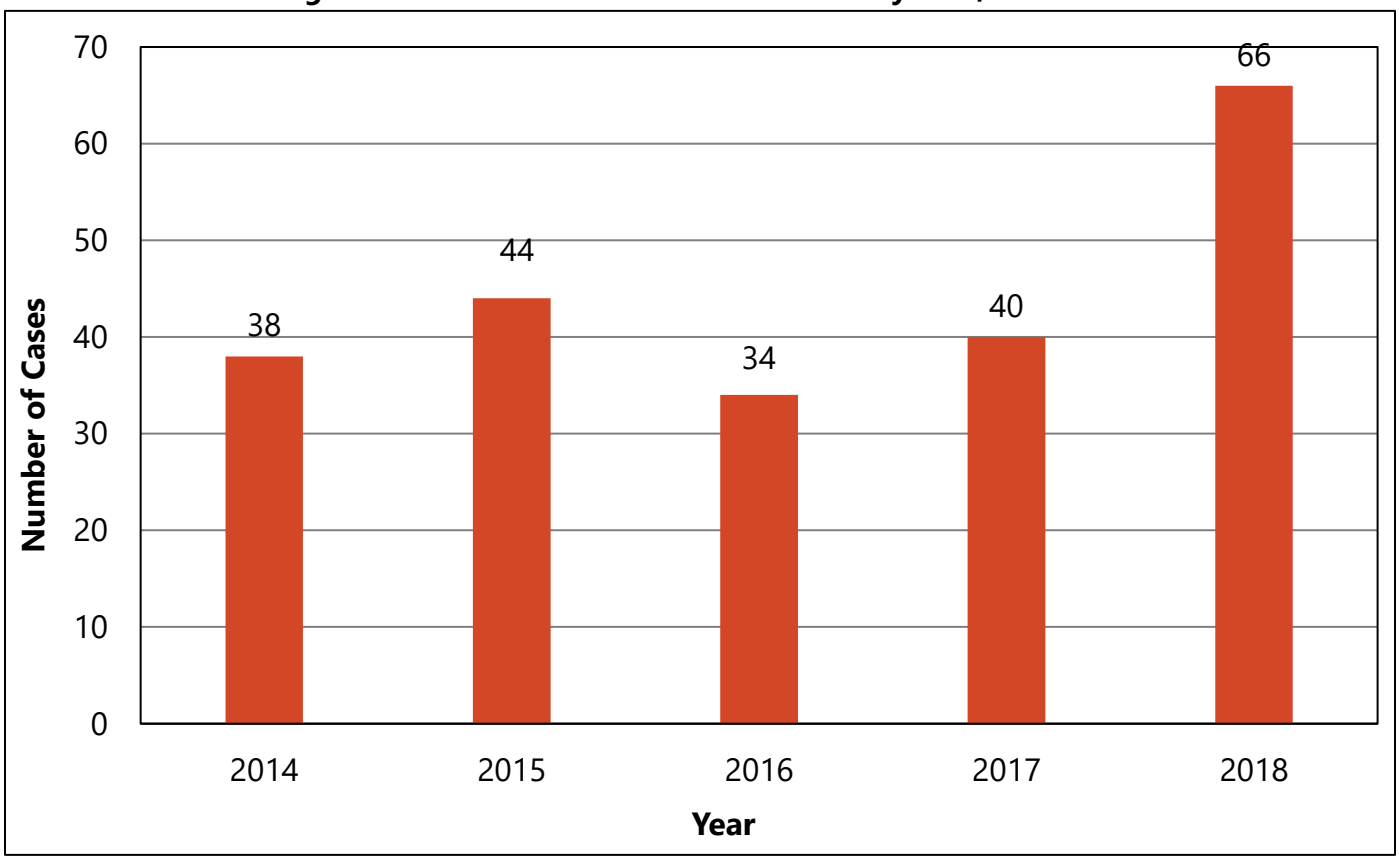
Figure 26: North Dakota Salmonellosis Case Counts by Year, 2014-2018



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

In 2018, 66 cases of STEC were reported to the NDDoH, a 65% increase from the 40 cases reported in 2017 (Figure 27). Of the 66 cases in 2018, eight were identified as *E. coli* O157. In 2017, 12 of the 40 cases were identified as *E. coli* O157. Statewide, STEC incidence was 8.7 cases per 100,000 people in 2018. Twenty counties reported cases, with Kidder (80.6 cases per 100,000 people), Dickey (61.7 cases per 100,000 people), and Traill (37.4 cases per 100,000 people) having the highest incidence of STEC.

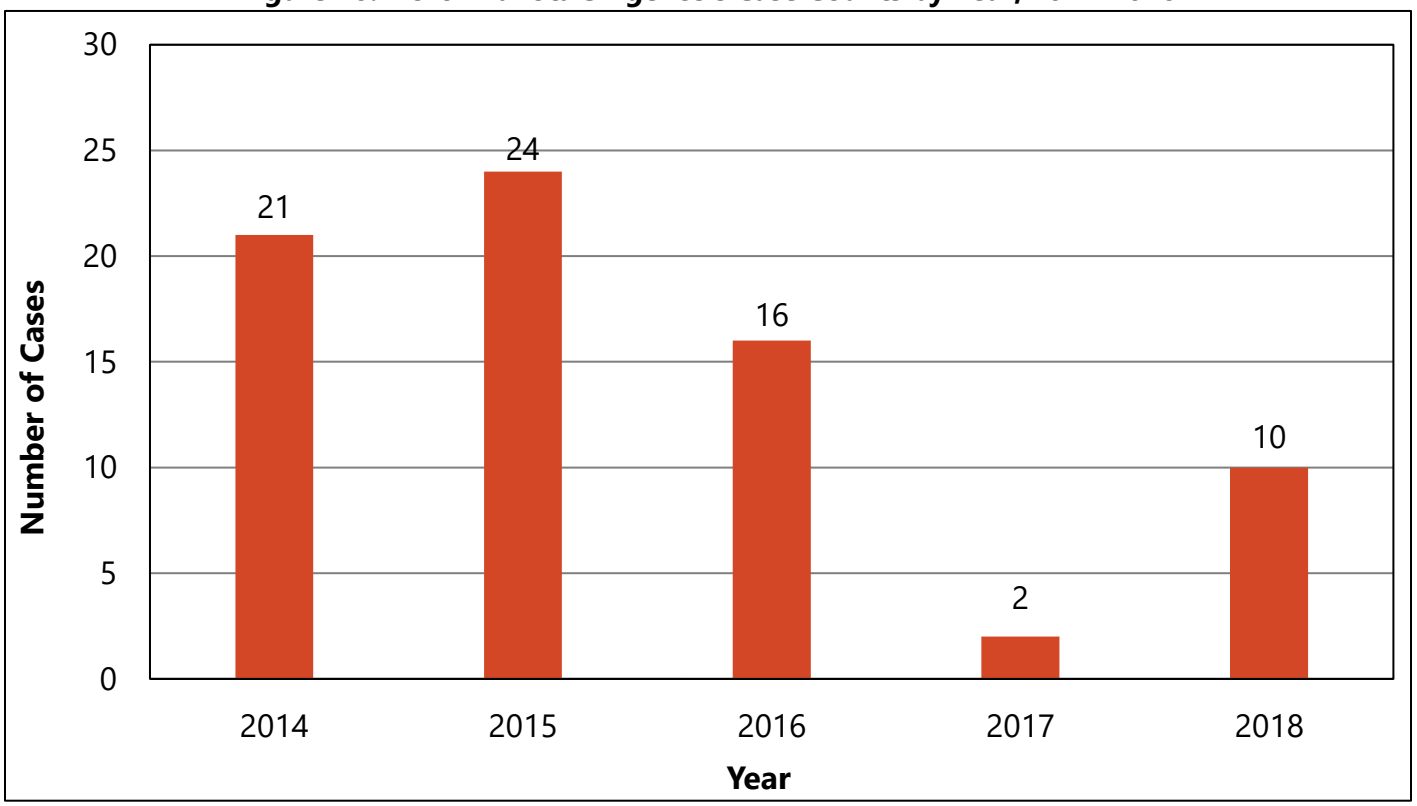
Figure 27: North Dakota STEC Case Counts by Year, 2014-2018



Shigellosis

In 2018, 10 cases of shigellosis were reported to the NDDoH, a 400% increase from the two cases reported in 2017 (Figure 28). Statewide, shigellosis incidence was 1.3 cases per 100,000 people in 2018. Five counties reported cases, with Adams (43.1 cases per 100,000 people), Stark (6.6 cases per 100,000 people), and Richland (6.1 cases per 100,000 people) having the highest incidence of shigellosis.

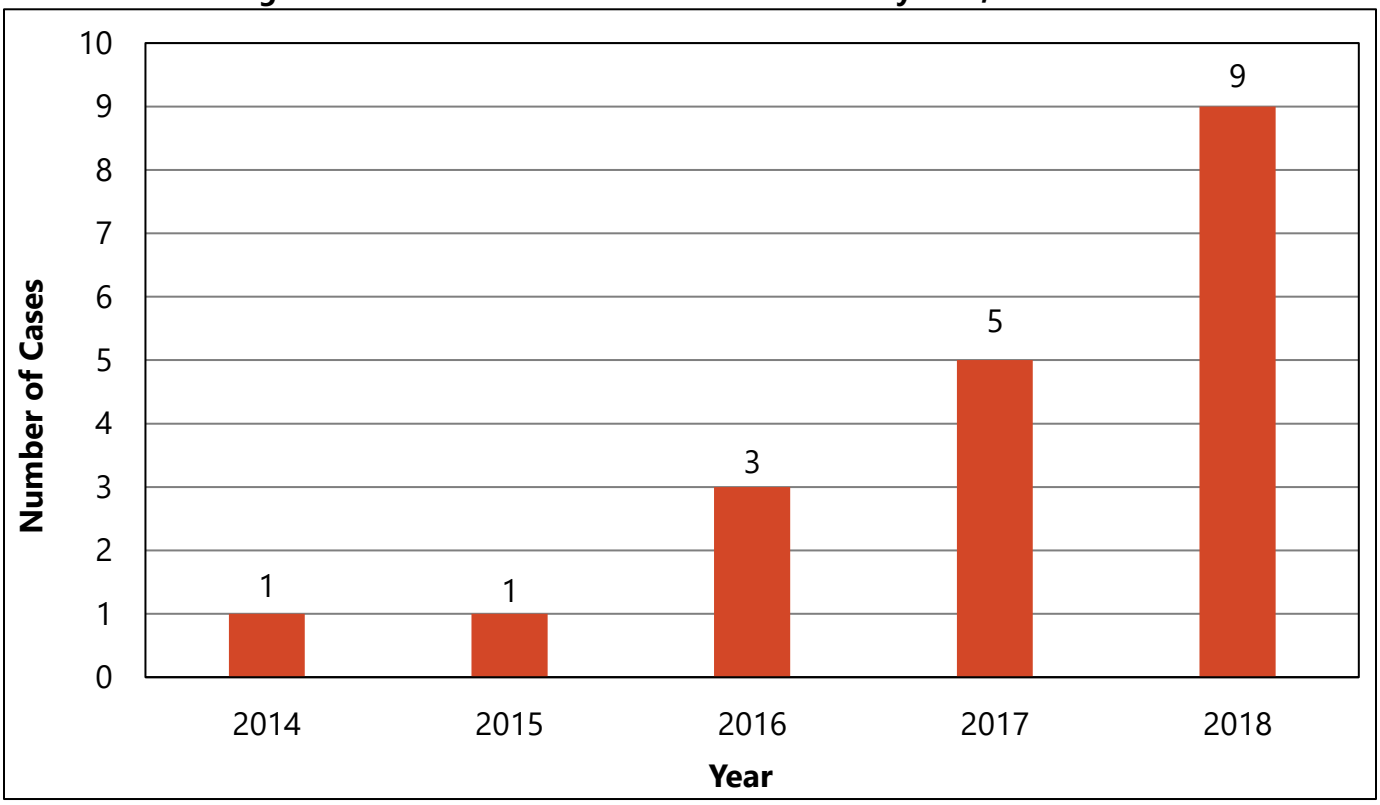
Figure 28: North Dakota Shigellosis Case Counts by Year, 2014-2018



Vibriosis

In 2018, nine cases of vibriosis were reported to the NDDoH, a 200% increase from the three cases reported in 2017 (Figure 29). Statewide, vibriosis incidence was 1.2 cases per 100,000 people in 2018. Six counties reported cases, with Sioux (22.9 cases per 100,000 people), Mercer (11.8 cases per 100,000 people), and Morton (3.2 cases per 100,000 people) having the highest incidence of vibriosis.

Figure 29: North Dakota Vibriosis Case Counts by Year, 2014-2018



For more information about enteric infections and foodborne gastrointestinal illness, visit www.ndhealth.gov/disease/GI.

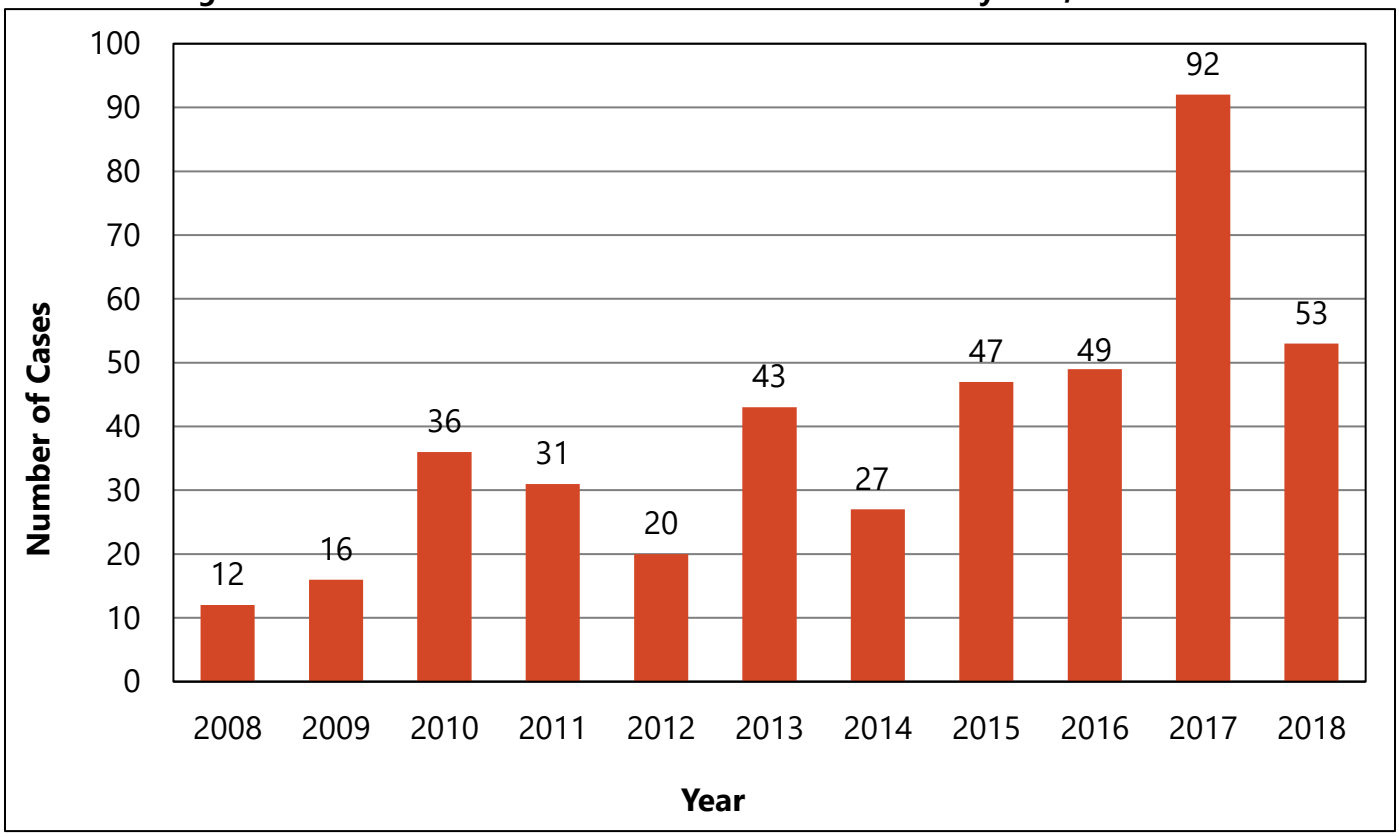
Zoonotic Diseases

Laura Cronquist, Enteric/Vector-borne/Zoonotic Disease Epidemiologist

Tickborne Diseases (Anaplasmosis, Babesiosis, Ehrlichiosis, Lyme Disease, Rocky Mountain Spotted Fever)

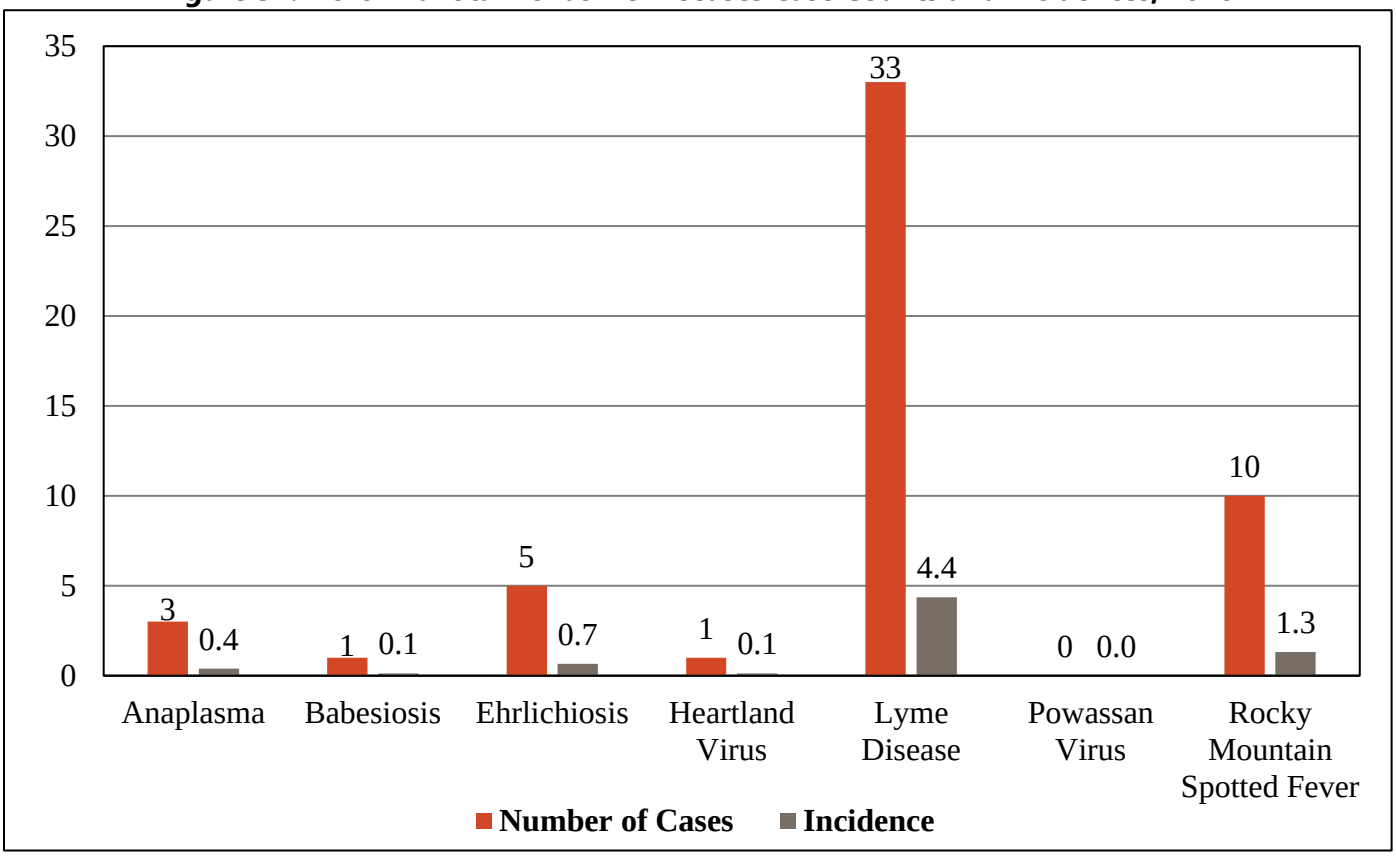
In 2018, 53 cases of tickborne diseases were reported to the NDDoH, a 42% decrease from the 92 cases reported in 2017 (Figure 30). Statewide, tickborne disease incidence was 7.0 cases per 100,000 people in 2018. Eighteen counties reported cases, with Slope (129.7 cases per 100,000 people), Grant (42.1 cases per 100,000 people), and Nelson (34.0 cases per 100,000 people), having the highest incidence of tickborne diseases.

Figure 30: North Dakota Tickborne Diseases Case Counts by Year, 2008-2018



Of the 53 reported cases of tickborne diseases in 2018, the majority of cases (62%) were Lyme disease (Figure 31).

Figure 31: North Dakota Tickborne Diseases Case Counts and Incidences, 2018

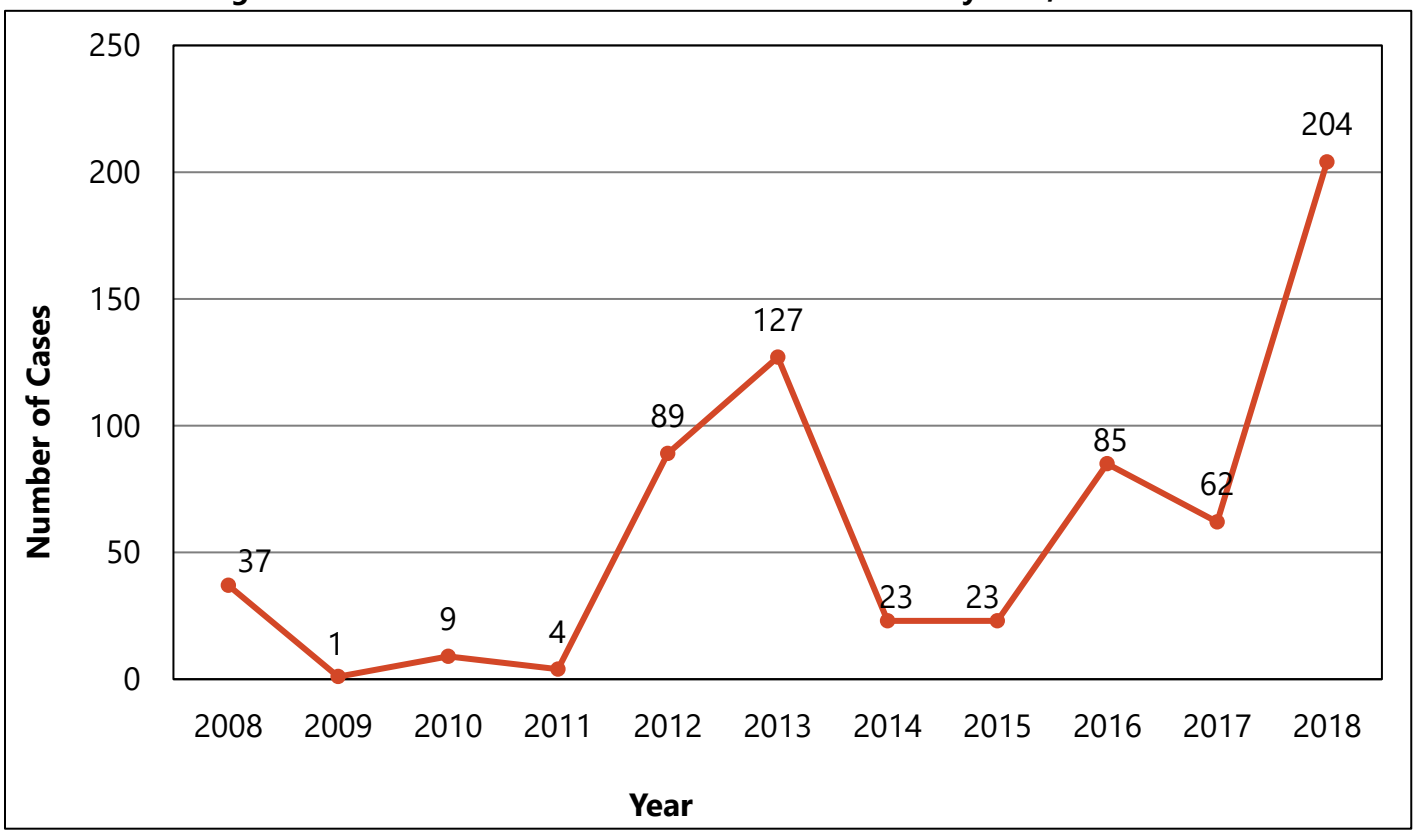


West Nile Virus (WNV)

In 2018, 204 cases of WNV infection were reported to the NDDoH, a 229% increase from the 62 cases reported in 2017 (Figure 32). Statewide, WNV incidence was 27 cases per 100,000 people in 2018. Thirty-six counties reported cases, with Billings (106.4 cases per 100,000 people), Burke (93.9 cases per 100,000 people) and Sheridan (73.9 cases per 100,000 people) having the highest incidence of WNV.

There were 60 cases of neuroinvasive disease, and 144 cases of non-neuroinvasive disease. Two cases were fatal.

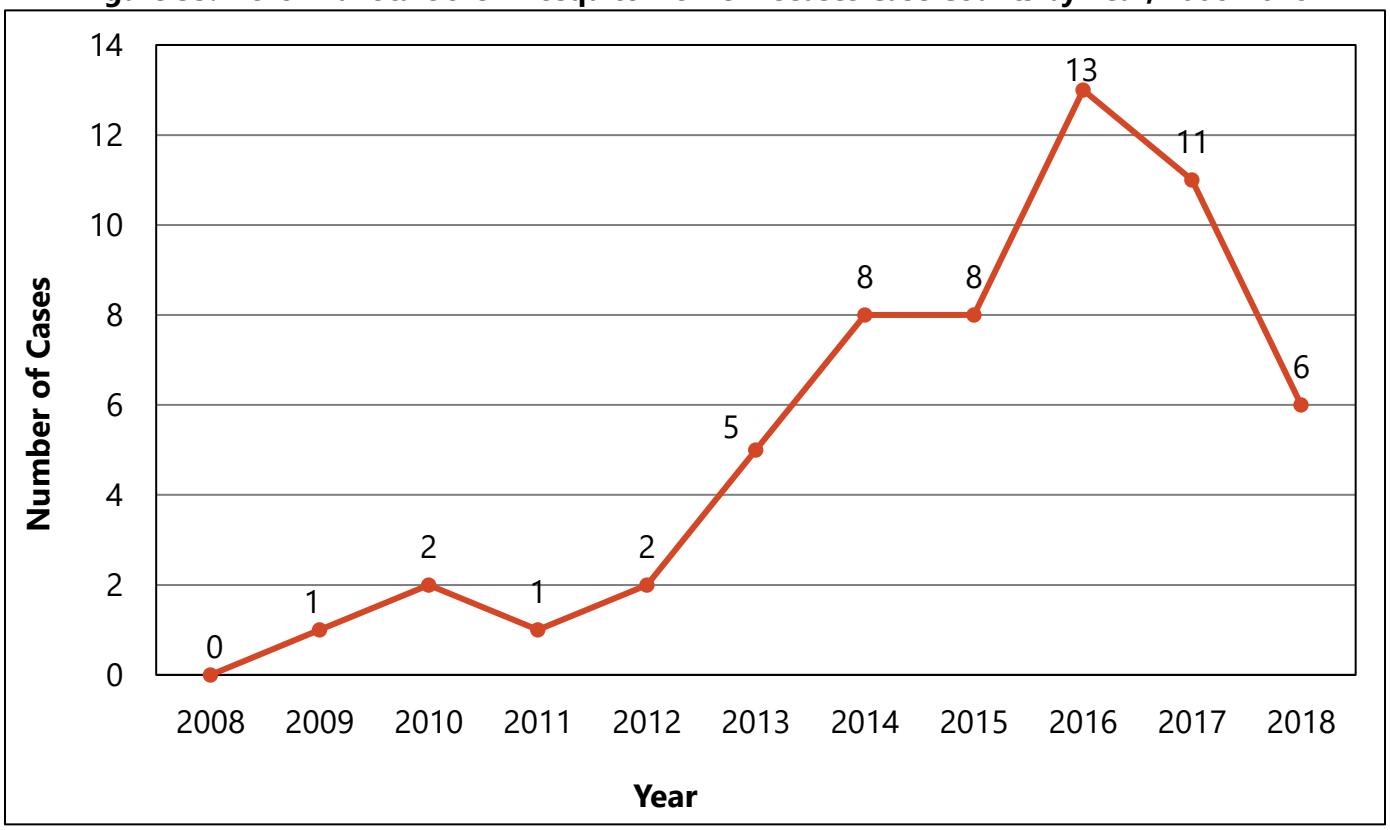
Figure 32: North Dakota West Nile Virus Case Counts by Year, 2008-2018



Other Mosquito-Borne Diseases (Chikungunya, Dengue, Malaria, Zika)

In 2018, six cases of other mosquito-borne diseases were reported to the NDDoH, a 45% decrease from the 11 cases reported in 2017 (Figure 33). All six cases were from malaria and none were locally acquired.

Figure 33: North Dakota Other Mosquito-Borne Diseases Case Counts by Year, 2008-2018

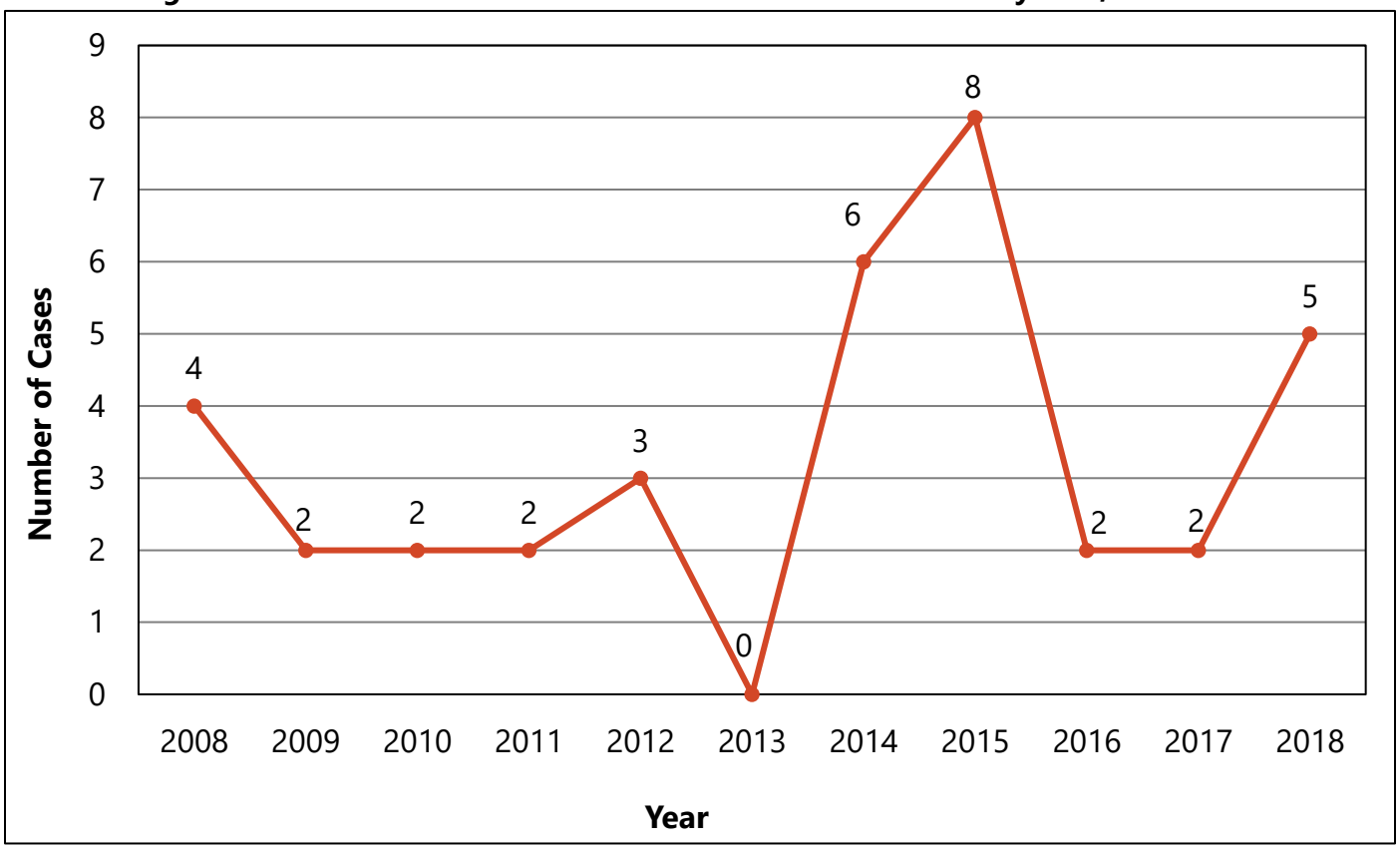


Statewide, the incidence of other mosquito-borne diseases was 0.79 cases per 100,000 people in 2018.

Other Zoonotic Diseases (Brucellosis, Hantavirus, Tularemia)

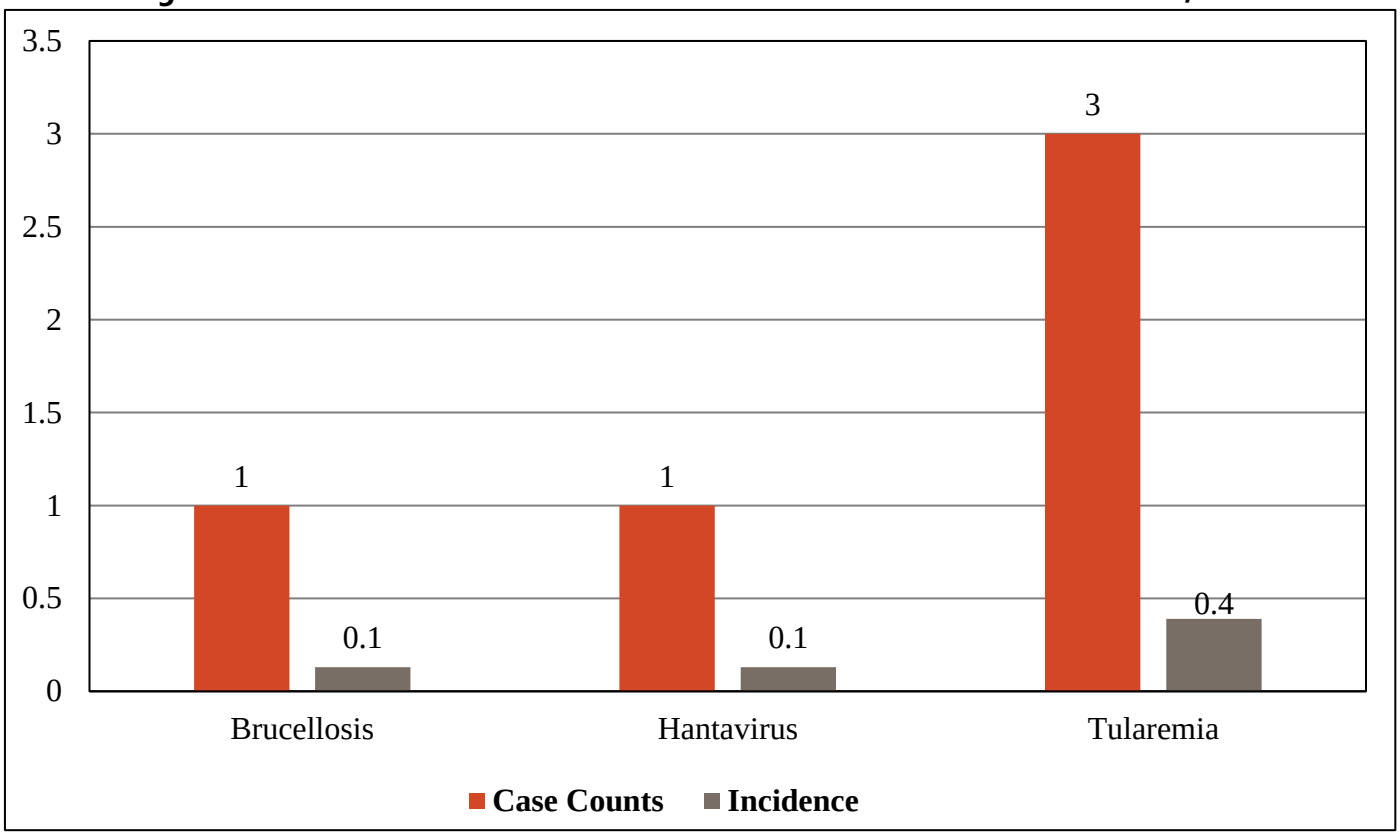
In 2018, five cases of other zoonotic diseases were reported to the NDDoH, which was a 67% increase from the two cases reported in 2017 (Figure 34).

Figure 34: North Dakota Other Zoonotic Diseases Case Counts by Year, 2008-2018



Statewide, other zoonotic disease incidence was 0.66 cases per 100,000 people in 2018.

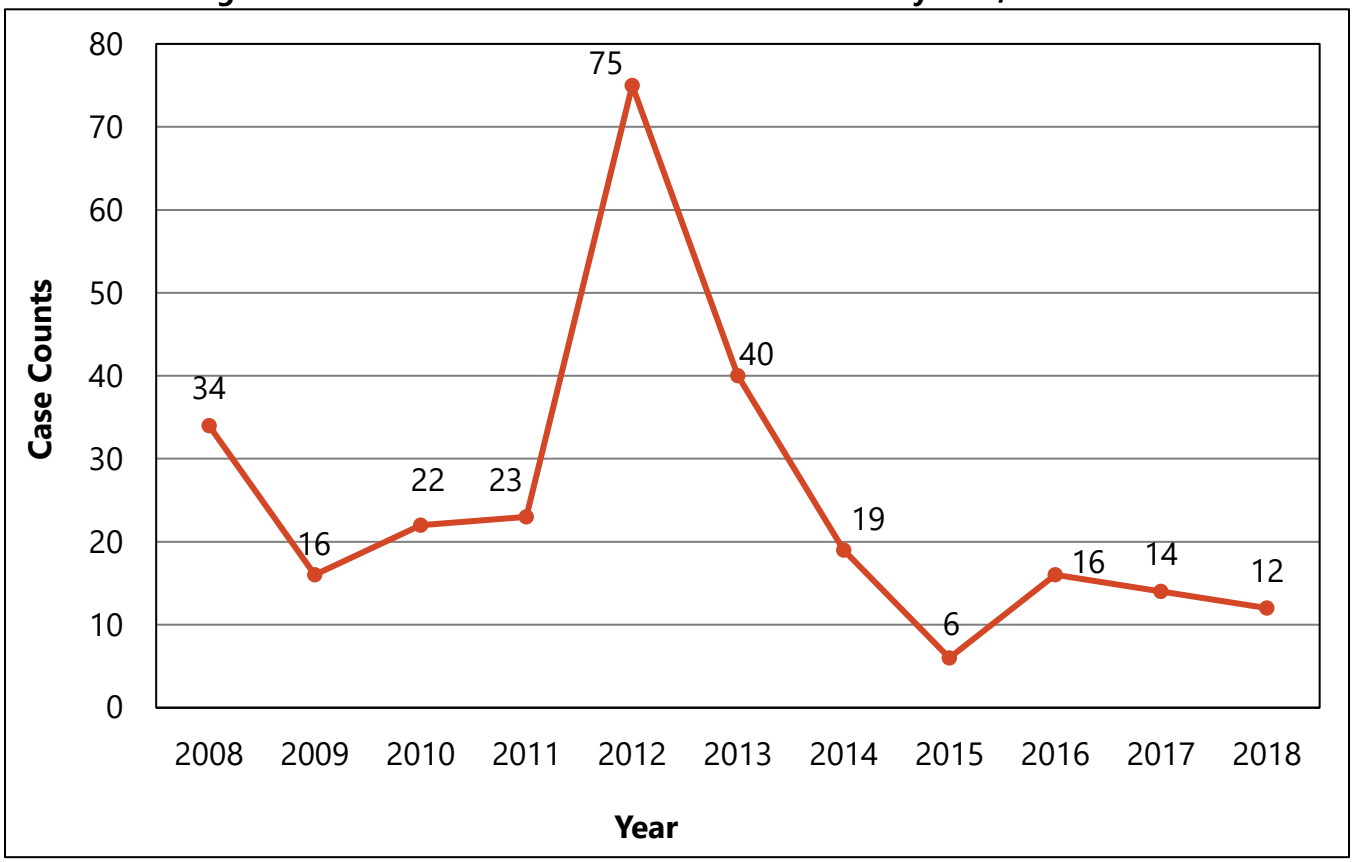
Figure 35: North Dakota Other Zoonotic Disease Case Counts and Incidences, 2018



Animal Rabies

In 2018, 484 animals were tested for rabies. Twelve animals tested positive, a 14% decrease from the fourteen animals that tested positive in 2017 (Figure 36).

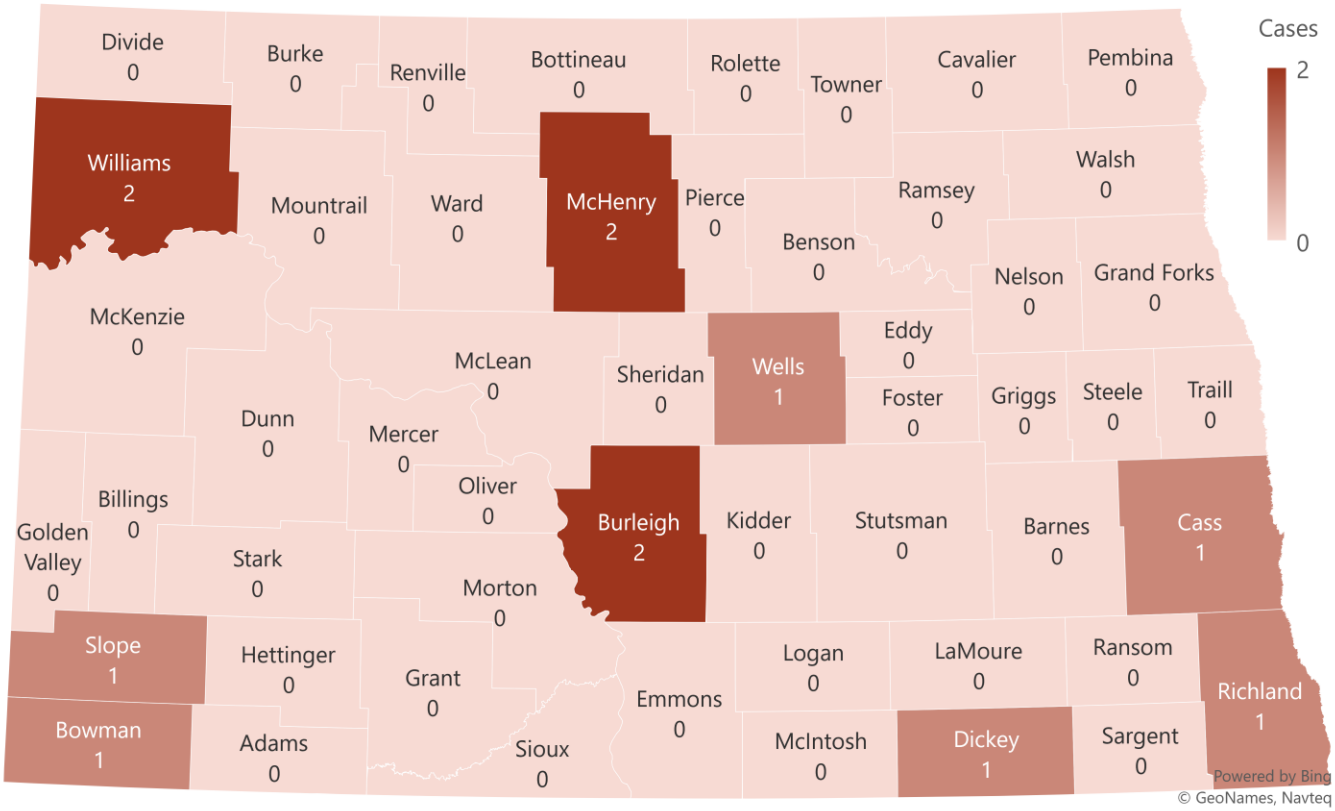
Figure 36: Cases of Animal Rabies in North Dakota by Year, 2008-2018



Animals from nine counties tested positive for rabies. There were no human cases of rabies in 2018. Most of the reported animal cases were skunks (4). Other animals that tested positive included three bats, three bovines, one cat, and one dog.

Positive Animals by County	
County	**Species**
Bowman	Bovine
Burleigh	Bat Skunk
Cass	Bat
Dickey	Dog
McHenry	Cat Skunk
Richland	Bovine
Slope	Bovine
Wells	Skunk
Williams	Bat Skunk

Map 1: Counties with Reported Cases of Animal Rabies in North Dakota, 2018



Carbapenem-Resistant Organisms

Faye Salzer, Healthcare Associated Infections (HAI) Coordinator

Carbapenem-resistant Enterobacteriaceae (CRE) are a family of bacteria that are difficult to treat because they have high levels of resistance to antibiotics. Klebsiella species and E. coli are examples of Enterobacteriaceae, a normal part of the human gut bacteria that can become carbapenem resistant.

One of the more common ways that Enterobacteriaceae become resistant to carbapenems is through the production of *Klebsiella pneumoniae* carbapenemase (KPC) enzyme. KPC breaks down carbapenems making them ineffective. The genes that code for KPC are on a highly mobile genetic element that can be transmitted from one bacterium to another thereby spreading resistance.

CRE are defined as Enterobacteriaceae that are resistant to one of the following carbapenems:

- Doripenem
- Ertapenem
- Meropenem
- Imipenem

Enterobacteriaceae testing positive for carbapenemase via a modified Hodge test, Carba-NP test or identified as a KPC enzyme producer, through PCR testing, OR other documentation that the isolate possesses a carbapenemase are also considered CRE cases. The emergence and dissemination of carbapenem resistance among Enterobacteriaceae in the United States represent a serious threat to public health. These organisms are associated with high mortality rates and have the potential to spread widely.

Healthy people usually do not get CRE infections. In health care settings, CRE infections most commonly occur among patients who are receiving treatment for other conditions. Patients whose care requires devices like ventilators (breathing machines), urinary (bladder) catheters, or intravenous (vein) catheters, and patients who are taking long courses of certain antibiotics are most at risk for CRE infections.

Clinicians, Infection preventionists and all health care workers, as well as environmental cleaning personnel, play a critical role in slowing the spread of CRE. Transmission can be prevented by:

- Recognizing these organisms as epidemiologically important.
- Understanding the prevalence in their region.
- Identifying colonized and infected patients when present in the facility.
- Implementing regional and facility-based interventions designed to stop the transmission of these organisms.

In 2018, 27 cases of CRE were reported, the same as 2017, in 14 counties, with only 13 counties being reported in 2017. CRE incidence was 3.57 cases per 100,000 people in 2018.

The counties with the highest incidence of CRE cases per 100,000 people were Sioux: 91.41, Golden Valley: 55.90 and Oliver: 51.55.

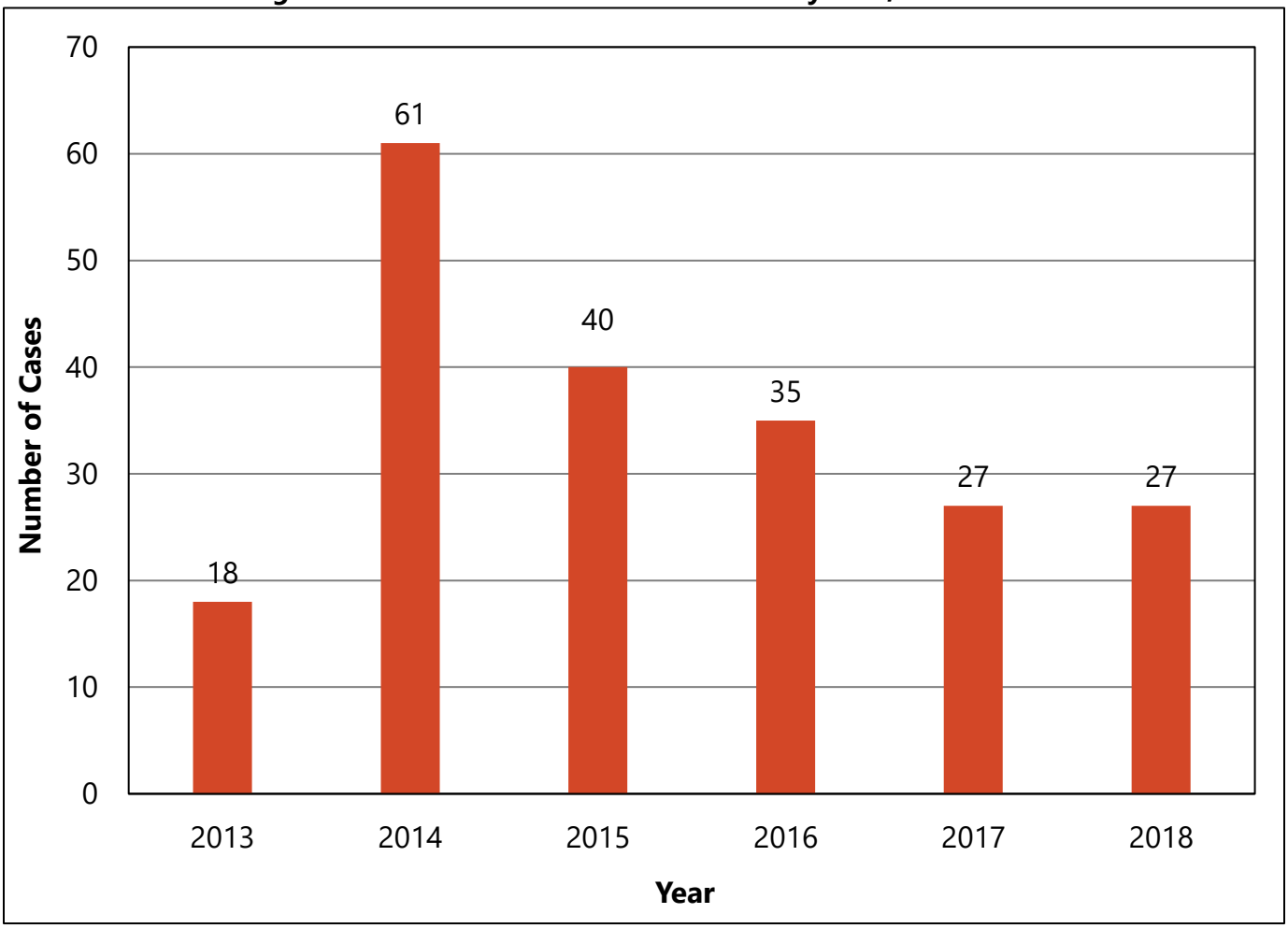
The average age was 61.9 years. People ages 85 and older had the highest age-specific incidence rate (17.88 cases per 100,000 people). Seventeen (62.9%) of the reported cases were female.

Thirteen (76.4%) of the 17 female cases, were 60 years and over, while all ten males were 60 years and under, with 30% of the male cases in their thirties.

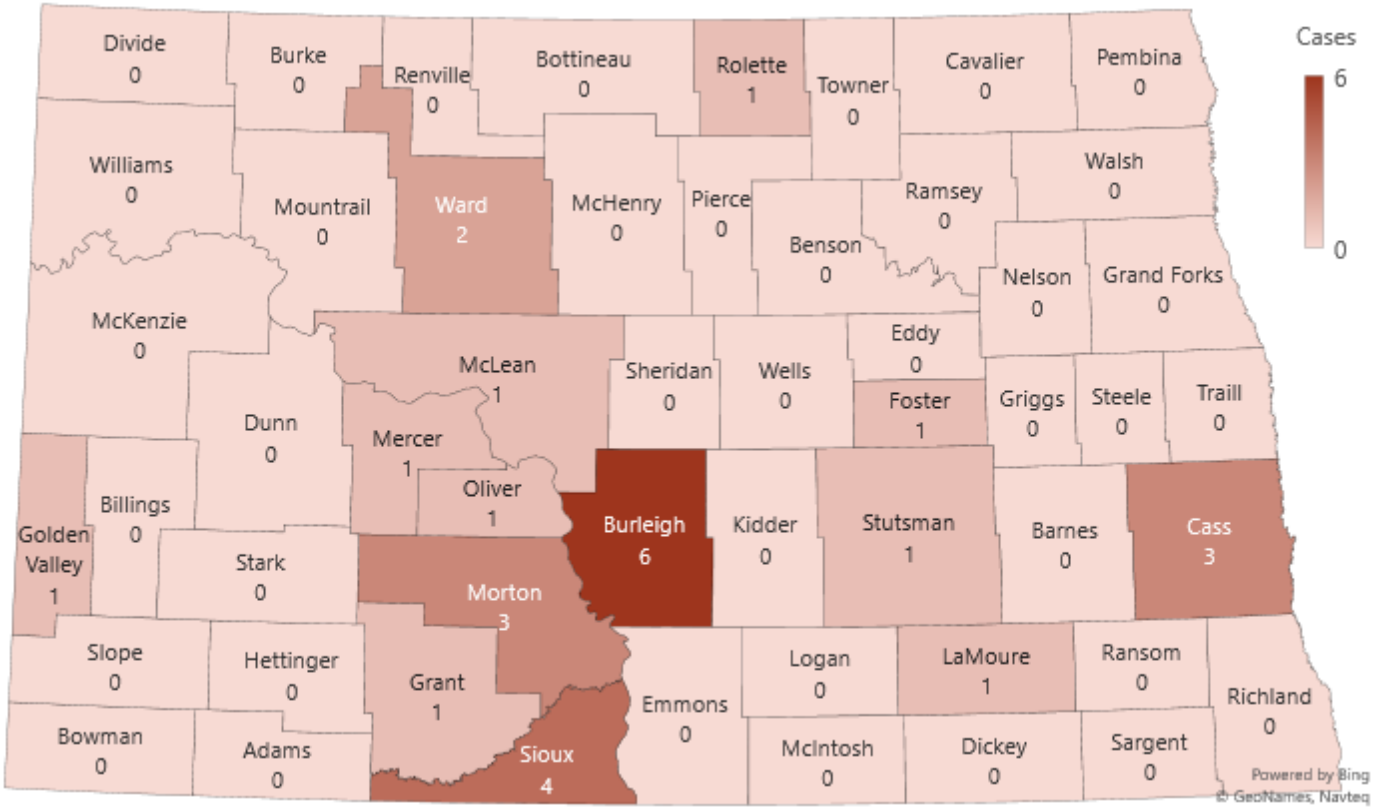
The CRE organisms reported for North Dakota in 2018 include: *Enterobacter cloacae, Serratia marcescens, Citrobacter freundii, Enterobacter aerogenes, Escherichia coli, Klebsiella Aerogenes, Enterobacter amnigenus*

KPC producers were identified in Burleigh, Cass, Mercer and Oliver counties.

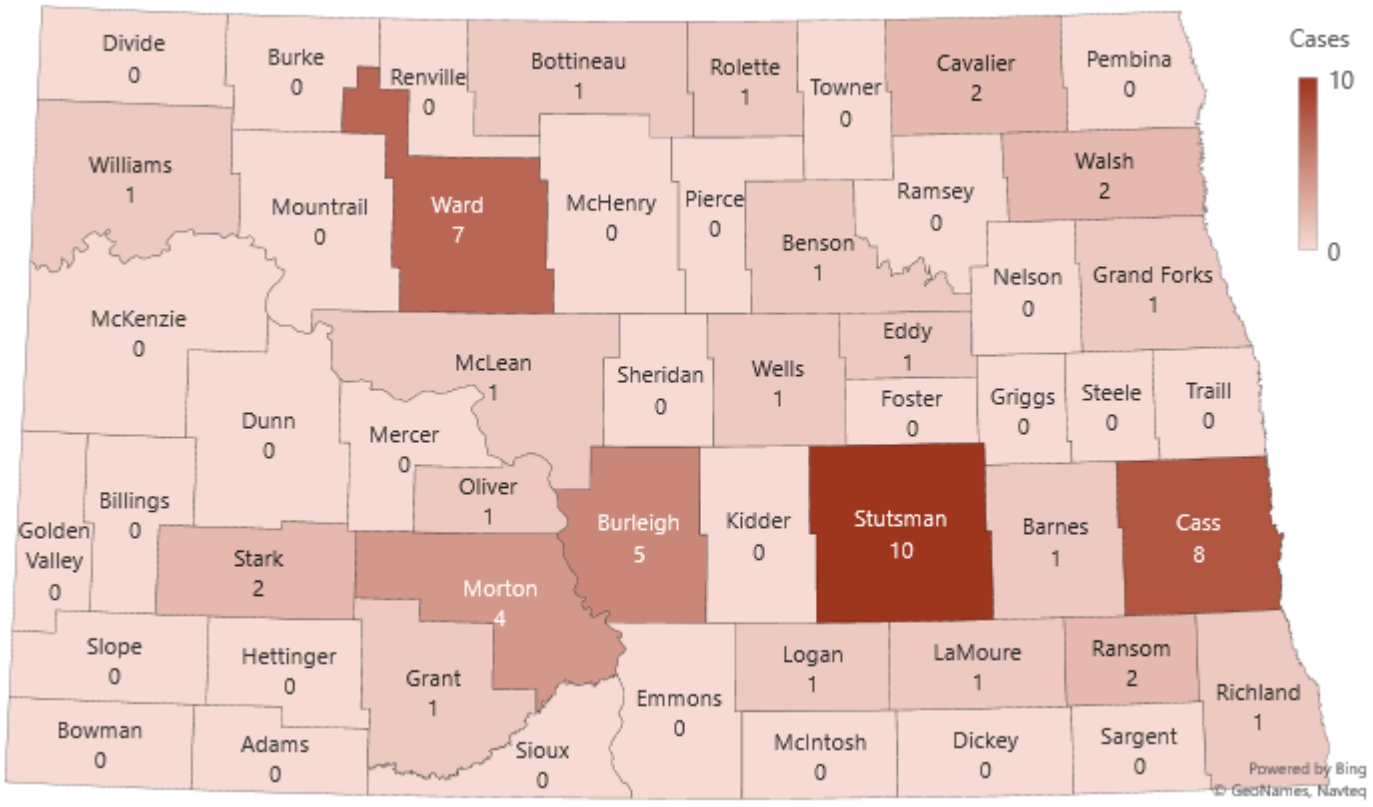
Figure 37: North Dakota CRE Case Counts by Year, 2013-2018



Map 2: Counties with Cases of CRE in North Dakota, 2018



Map 3: Counties with Cases of CRO in North Dakota, 2018



*1 homeless case

Carbapenem Resistant *Pseudomonas Aeruginosa*

Serious *Pseudomonas* infections usually occur in people in the hospital and/or with weakened immune systems. Infections of the blood, pneumonia, and infections following surgery can lead to severe illness and death in these people.

However, healthy people can also develop mild illnesses with *Pseudomonas aeruginosa*, especially after exposure to water. Ear infections, especially in children, and more generalized skin rashes may occur after exposure to inadequately chlorinated hot tubs or swimming pools. Eye infections have occasionally been reported in persons using extended-wear contact lenses.

All Carbapenem Resistant organisms became reportable in 2018.

Patients in hospitals, especially those on breathing machines, those with devices such as catheters, and patients with wounds from surgery or from burns are potentially at risk for serious, life-threatening infections. *Pseudomonas* can be spread on the hands of healthcare workers or by equipment that gets contaminated and is not properly cleaned. *Pseudomonas* infections are generally treated with antibiotics. Unfortunately, in hospitalized patients, *Pseudomonas* infections, like those caused by many other hospital bacteria, are becoming more difficult to treat because of increasing antibiotic resistance. Selecting the right antibiotic usually requires that a specimen from a patient be sent to a laboratory to test to see which antibiotics might still be effective for treating the infection. As with CRE, these organisms can be a KPC enzyme producer.

Pseudomonas infections can be prevented by:

- Careful attention to hand hygiene and environmental cleaning can substantially lower the risk of infection.
- In addition, outside the hospital, avoid hot tubs or pools that may be poorly maintained, and keep contact lenses, equipment, and solutions from becoming contaminated.

57 cases were reported in 2018 in 23 counties and one homeless person. 5 of these cases were KPC producers located in the following counties; Cass, Stutsman and Richland. The incidence rate was 7.55 per 100,000 people.

The counties with the highest incidence rate of carbapenem resistant *pseudomonas* cases per 100,000 people were Cavalier 53.16, Logan 52.14 and Oliver 51.55.

The average age was 65.07 years. People ages 85 and older had the highest age-specific incidence rate 118.85 cases per 100,000 people. 45.6% of the reported cases were male.

Acute Flaccid Myelitis (AFM) Case in North Dakota

Evan Bischoff, Communicable Disease Epidemiologist

The first ever case of AFM was confirmed in North Dakota in October 2018. A child with a previous diagnosis of possible acute AFM by the NDDoH was confirmed as a case of AFM by the CDC. The child was hospitalized in October 2018 and has been released.

AFM is a rare, but serious condition that affects the nervous system, causing muscles in the arms and legs to weaken. It can be a complication following a viral infection, but environmental and genetic factors may also contribute to its development. AFM appears to start with a prodromal respiratory or gastrointestinal illness about one week before limb weakness onset. Pain in the neck or back often directly precedes weakness in one or more limbs, and cranial nerve findings such as slurred speech, difficulty swallowing, and eyelid or facial droop may occur. On exam, the weak limb(s) displays poor tone and diminished reflexes. Cerebrospinal fluid may show a lymphocytic pleocytosis and elevated protein. AFM is an illness characterized by acute onset of flaccid limb weakness and magnetic resonance imaging (MRI) showing lesions in the gray matter of the spinal cord.

AFM has been under investigation by the NDDoH and the CDC for the past five years. Surveillance has shown that AFM cases generally peak in the months of September and October. In the last four years, the majority of cases were reported in 2014 and 2016, and smaller numbers reported in 2015 and 2017 throughout the United States. In October 2018 a cluster of AFM in children was identified in Minnesota. In 2018, 230 cases of AFM were reported in United States.

Many infected individuals have reported respiratory illness in the week prior to the onset of AFM symptoms. It is important to note that although colds are common during that time of year, developing AFM is extremely rare. If people notice potential symptoms of AFM, (for example, if someone is not using an arm) they should contact their health care provider as soon as possible.

The NDDoH requests that all providers submit information about patients that meet the clinical criterion for AFM (sudden onset of flaccid limb weakness). Information should be sent on patients who meet the clinical criterion, regardless of laboratory results or MRI findings. Because AFM is a relatively new condition, information on all patients is needed to help us better understand the spectrum of illness, and all possible causes, risk factors, and outcomes for AFM. There is no age restriction for reporting suspected cases. The case definition includes people of all ages to allow for full spectrum information of the condition in both children and adults. For more information on AFM, visit www.cdc.gov/acute-flaccid-myelitis/afm-surveillance.html.

To notify the NDDoH of any patients being evaluated for acute onset of flaccid limb weakness, please call the Division of Disease Control at 701.328.2378.

Infant Botulism Case in North Dakota

Laura Cronquist, Enteric/Vector-borne/Zoonotic Disease Epidemiologist

In July 2018, the NDDoH was notified of a suspected infant botulism case. The patient presented with constipation, poor feeding, and decreased muscle tone. Epidemiologists from the NDDoH consulted with the California Department of Public Health (CDPH) Infant Botulism Treatment and Prevention Program (IBTPP) to arrange for the infant to be evaluated by an on-call physician. The IBTPP specialist determined the case was highly suspect for infant botulism. While laboratory tests were pending, the child received BabyBIG®, the anti-botulism-toxin antibody treatment for infant botulism types A and B. Laboratory testing performed by the Minnesota Department of Health confirmed infant botulism type B. The patient responded well to supportive care and BabyBIG® treatment. The child recovered without any complications.

Infant botulism is defined as an illness occurring in persons less than one year of age caused by consumption of *Clostridium botulinum* spores, which are found in soils and dust worldwide. The spores can colonize and produce toxins in the digestive tracts of infants. Honey has been identified as a possible source of *C. botulinum* spores and should not be given to children younger than one year of age. The incubation period for infant botulism is estimated to be 3 to 30 days. Signs and symptoms of infant botulism may include constipation, loss of facial expression, poor feeding, diminished suckling and crying ability, neck and peripheral weakness (floppy baby syndrome), and respiratory failure. If untreated, the illness can progress to cause descending paralysis of respiratory muscles, arms, and legs.

Other types of botulism include foodborne botulism, wound botulism, adult intestinal toxemia, and iatrogenic botulism. Foodborne botulism is caused by consuming foods that have been contaminated with botulinum toxin. Homemade foods that have been improperly canned, preserved, or fermented are the most common sources of foodborne botulism. According to the CDC, improperly preserved vegetables that have a low acid content, such as green beans, corn, beets, and asparagus, are the most common cause of botulism outbreaks in the United States. Wound botulism is caused by *C. botulinum* spores that enter a wound and produce toxins. Injection drug use, especially black tar heroin, and contamination of wounds and open fractures with dirt or soil can cause wound botulism. Adult intestinal toxemia can happen if *C. botulinum* spores colonize an adult's intestines and produce toxin. Adult intestinal toxemia is very rare and not well understood, but may be more likely to occur in people who have serious health conditions or altered intestinal flora due to antimicrobial use. Iatrogenic botulism is caused by the injection of too much botulinum toxin for cosmetic or medical reasons. All types of botulism can be fatal and should be considered medical emergencies.

For additional information about botulism, please visit www.cdc.gov/botulism/.

Multistate Outbreak of Salmonella Infections Linked to Kratom

Laura Cronquist, Enteric/Vector-borne/Zoonotic Disease Epidemiologist

Salmonella bacteria are one of the most common causes of foodborne illness in the United States. *Salmonella* infection (salmonellosis) typically causes diarrhea, fever, and abdominal pain. Symptoms usually begin within 12 to 72 hours after ingesting the bacteria, but can take as long as 16 days. Symptoms generally resolve without treatment in four to seven days, but severe cases and cases involving complications may require hospitalization. Severe illness is more likely to occur in infants, the elderly, and those with impaired immune systems.

In January 2018, a *Salmonella* isolate from a blood specimen was received by the NDDoH DM for routine laboratory analysis, including serotyping and pulsed-field gel electrophoresis (PFGE). The isolate was identified as *Salmonella* I 4,[5],12:b:- and the PFGE pattern was linked to a multistate PulseNet cluster. No associated food, animal, or other exposure had been linked to the cluster of illnesses at this point in the outbreak investigation. The ND case was interviewed and did not report any high-risk exposures or contact with ill individuals, however, the case did mention encapsulating and consuming a dietary supplement called kratom that had been purchased online.

The NDDoH enteric disease epidemiologist mentioned the ND case's reported exposure to kratom on a CDC multistate outbreak conference call. Following the call, other states began asking their cases about exposure to kratom. After multiple cases reported exposure to kratom prior to becoming ill, the scope of the investigation was narrowed, and a focused questionnaire was developed by CDC epidemiologists to capture information about exposures to kratom products. The NDDoH epidemiologist worked with the ND case to collect all remaining kratom product for laboratory testing at the DM. The leftover product yielded a *Salmonella* isolate that matched the strain identified in clinical isolates. The NDDoH issued a news release on March 2, 2018, warning the public against consuming kratom.

As the national outbreak investigation progressed, several state and federal public health agencies collected additional kratom products to test for *Salmonella* contamination. Multiple serotypes of *Salmonella* were detected, including *Salmonella* Heidelberg, *Salmonella* Javiana, *Salmonella* Okatie, *Salmonella* Weltevreden, and *Salmonella* Thompson. A total of 85 different DNA fingerprints of *Salmonella* were identified in kratom products. Clinical isolates with matching strains in the PulseNet database were added to the outbreak investigation. The investigation was closed on May 24, 2018, with a total of 199 people infected with the outbreak strains of *Salmonella* from 41 states. Thirty-eight percent of ill people were hospitalized, and no deaths were reported. Several companies issued recalls for kratom products because they could be contaminated with *Salmonella*. Although the outbreak investigation is over, the CDC continues to warn consumers that contaminated products may still be available for purchase because the investigation was not able to identify a single, common source of contaminated kratom.

For information about the uses and effects of kratom, please visit the U.S. Food and Drug Administration (FDA) website at https://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm597265.htm. To learn more about the outbreak of *Salmonella* infections linked to kratom, please visit the CDC's website at https://www.cdc.gov/salmonella/kratom-02-18/index.html.

HIV/STD/TB/
Viral Hepatitis Programs

The NDDoH HIV program is divided into three sections: HIV Surveillance, HIV Prevention, and Ryan White Program Part B.

The HIV Surveillance program summarizes data to help the NDDoH to:

- Monitor the incidence and estimated prevalence of HIV/AIDS in the state
- Assess the risks for HIV infection and develop effective HIV prevention strategies
- Develop surveillance methods to allow for a more current estimate and characterization of HIV/AIDS risks and needs

The HIV Prevention program key activities include:

- Providing information and materials on HIV transmission and how to protect individuals from contracting HIV
- Providing testing to those at risk for contracting HIV
- Collaborate and support the Community Planning Group in identifying HIV prevention needs and targeted intervention in identified priority populations

The Ryan White Part B program serves to:

- Address the unmet health needs of persons living with HIV disease
- Optimize health outcomes by funding health care and support services to enhance health care access and retention in care
- Provide case management to link clients to appropriate resources

The NDDoH STD program key activities include:

- Monitoring the incidence and estimated prevalence of STDs in the state; diseases that are monitored include chlamydia, gonorrhea, and syphilis
- Utilizing surveillance data to better characterize STD risks and identify disproportionately affected populations
- Assessing the risks for STD infection and develop effective STD prevention programs; these programs include partner notification and linkage to care

The NDDoH TB Prevention and Control Program collaborates with clinicians and local public health units to ensure persons with TB receive effective and timely treatment and that contact investigations are performed to minimize the spread of TB. TB data is summarized to help the NDDoH to:

- Monitor the incidence and estimated prevalence of TB in the state
- Utilize surveillance data to better characterize the risks and needs of people infected with TB in North Dakota
- Assess the risks for TB infection and develop effective TB prevention programs

The NDDoH Viral Hepatitis program key activities include:

- Monitoring the incidence and estimated prevalence of viral hepatitis in the state; diseases that are monitored include
- hepatitis A, hepatitis B and hepatitis C
- Educating health care professionals that serve individuals at risk for viral hepatitis and target populations who are at risk for viral
- hepatitis
- Collaborating with the HIV program to integrate viral hepatitis testing into the counseling, testing and referral (CTR)
- program for those at risk for viral hepatitis infections; these individuals are also offered hepatitis A and B vaccinations
- Develop referral services for medical care and case management for chronically infected persons

HIV Program

Shari Renton, HIV Surveillance Coordinator

HIV/AIDS

North Dakota traditionally ranks near the bottom for incidence cases each year of human immunodeficiency virus (HIV/AIDS) in the United States. In 2018, the incident case rate was 5.1 cases per 100,000 people.

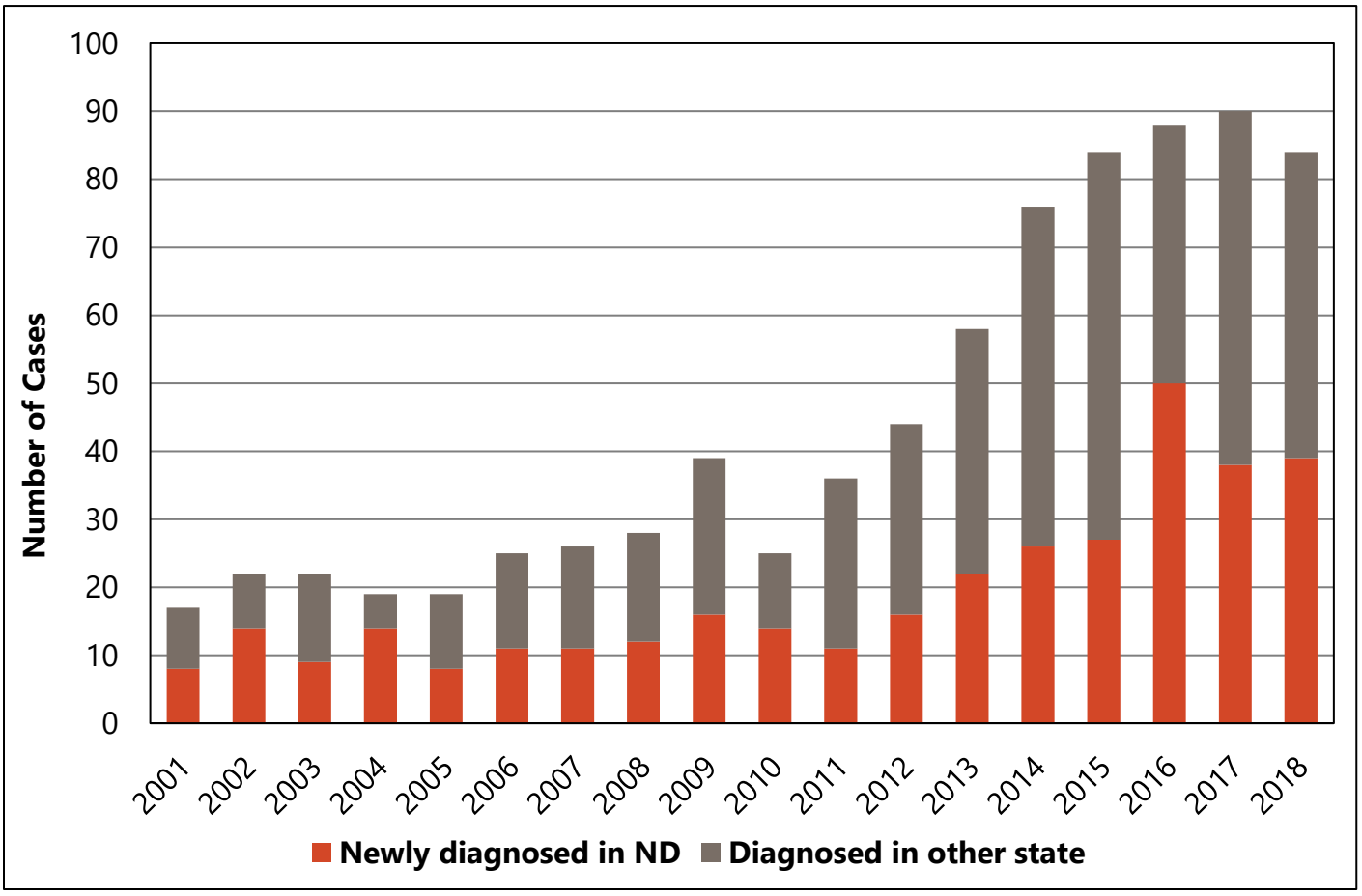
In 2018, 84 HIV/AIDS cases were reported to the NDDoH. This count includes cases being diagnosed for the first time in the state, and cases previously diagnosed elsewhere who moved to North Dakota during the year.

In 2018, 39 North Dakota residents were diagnosed with HIV/AIDS and reported to the NDDoH. Five of those newly diagnosed HIV cases were advanced enough to meet the case definition for AIDS at the time of diagnosis. Seventy-two percent of HIV/AIDS cases reported in 2018 were male.

Cumulative (2001-2018) HIV/AIDS Cases

HIV and AIDS have been reportable conditions in North Dakota since 1984. The cumulative reported infections as of December 31, 2018, stands at 1,065 HIV/AIDS cases.

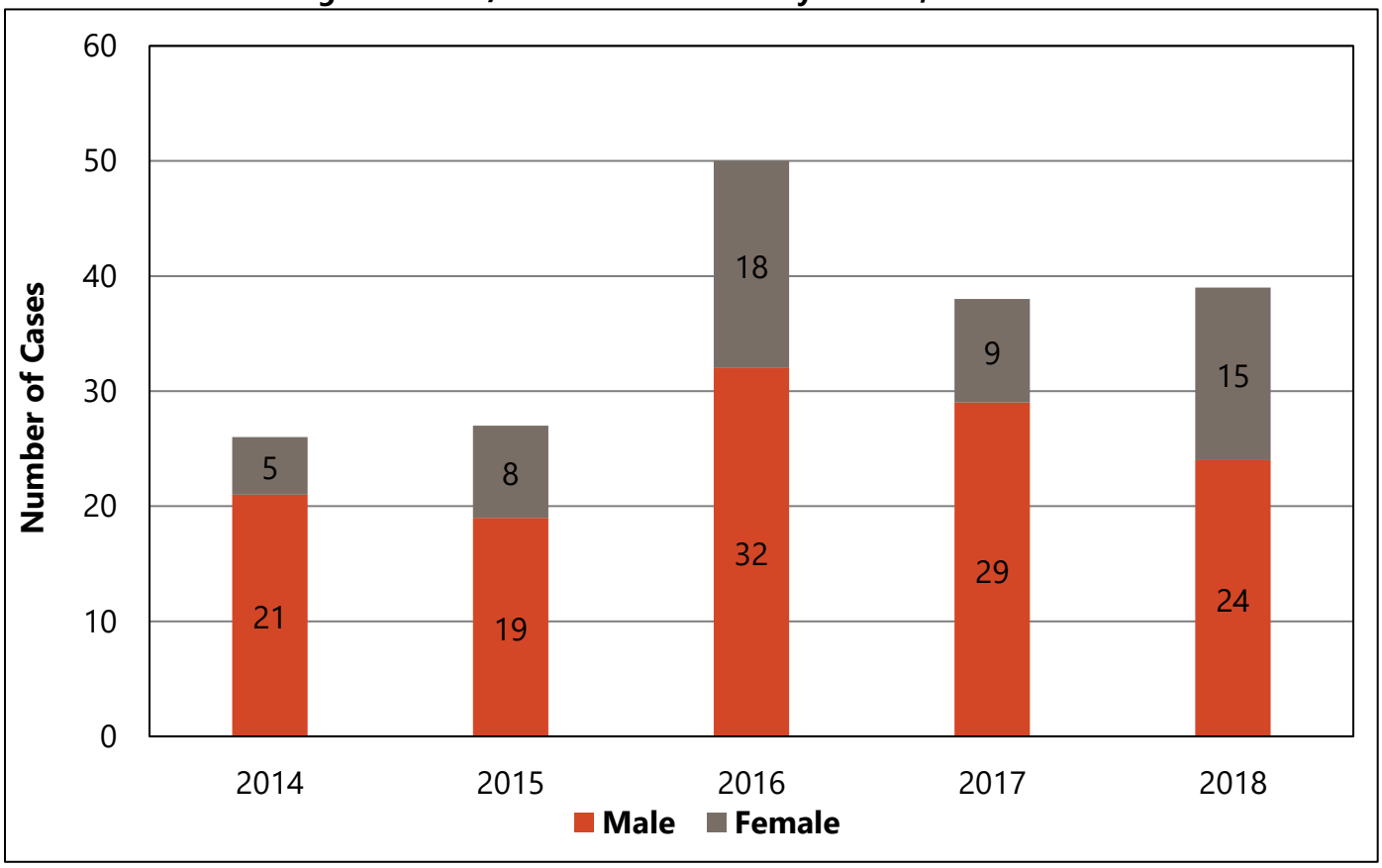
Figure 38: HIV/AIDS Diagnosed in North Dakota and HIV/AIDS Previously Diagnosed in Other States by Year, 2001-2018



HIV/AIDS Incidence: 2014-2018

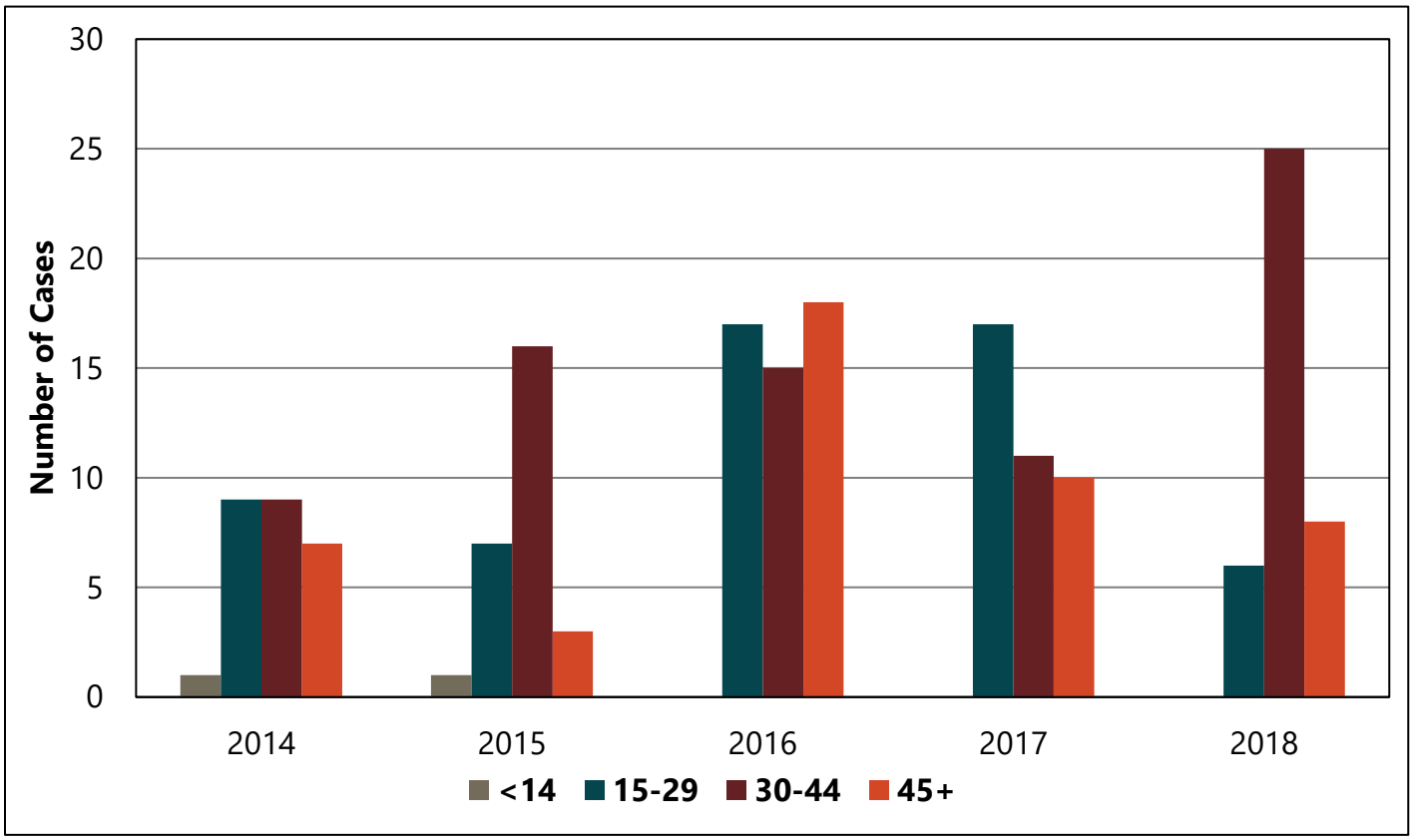
HIV/AIDS incidence refers to cases that were newly diagnosed in North Dakota within a given time frame. AIDS cases reported in this section met the criteria for AIDS at first diagnosis. From 2014 to 2018, 180 HIV/AIDS cases were diagnosed in North Dakota. Twenty-four percent met the criteria for AIDS at time of diagnosis, while the remaining 76% were diagnosed as an HIV infection. Sixty-nine percent were male, and 31% were female.

Figure 39: HIV/AIDS Incident Cases by Gender, 2014-2018



The age groups of HIV/AIDS cases diagnosed for the first time in North Dakota between 2014 and 2018 are shown in Figure 40. Forty-six percent of new HIV/AIDS diagnoses in North Dakota are in individuals ages 20 to 34. The minimum age was 18 years and the maximum age was 64 years.

Figure 40: Incidence Age of HIV/AIDS Cases Diagnosed in N.D. 2014 – 2018



Racial and ethnic minorities disproportionately continue to be affected by HIV in the United States and North Dakota. Black/African Americans represent an estimated 2.9% of the North Dakota population, but accounted for 59% of new HIV infections in 2018. Black/African American North Dakotans are 54 times more likely to have HIV than white North Dakotans.

Figure 41: Race/Ethnicity for HIV/AIDS Cases Diagnosed in 2018

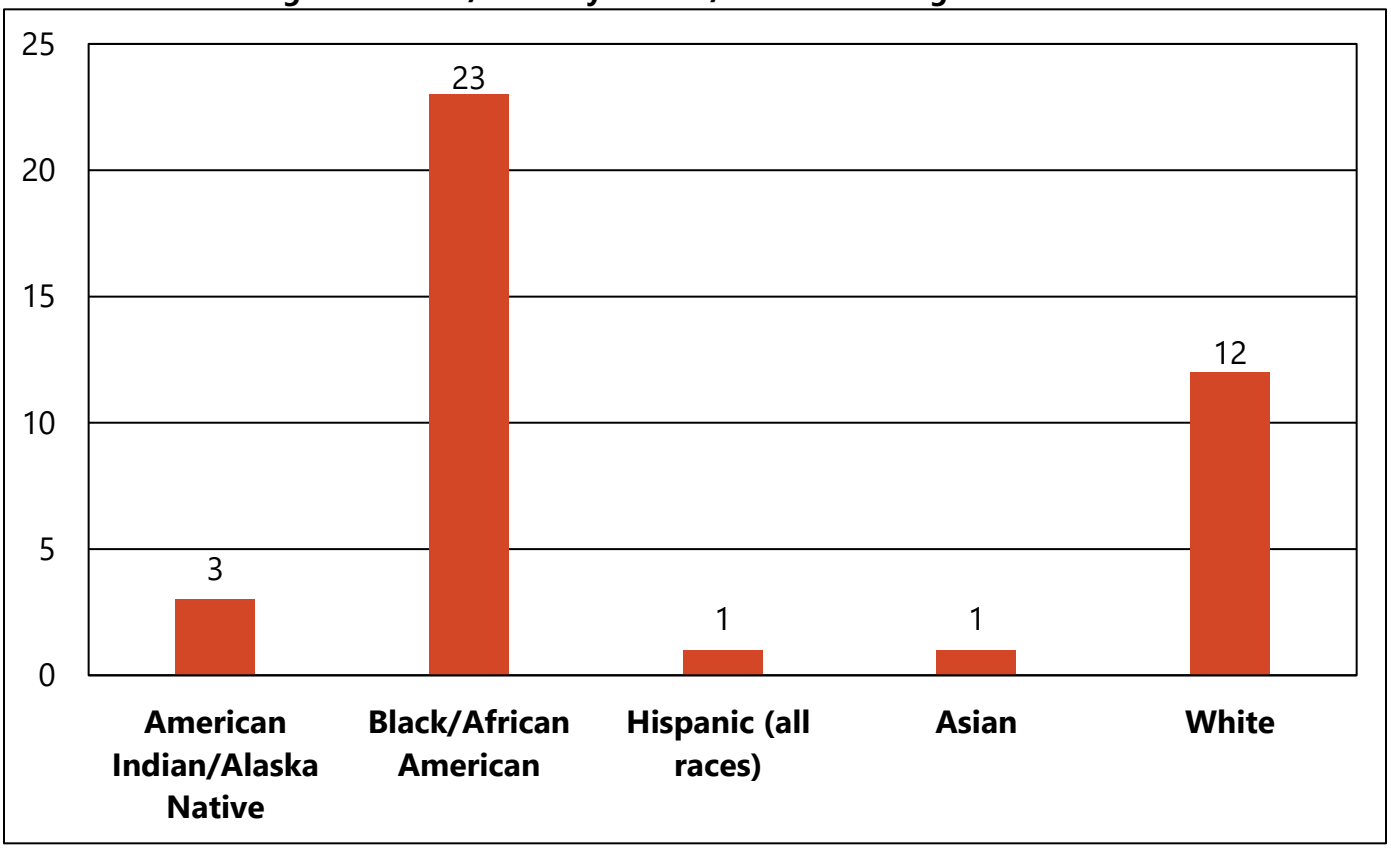
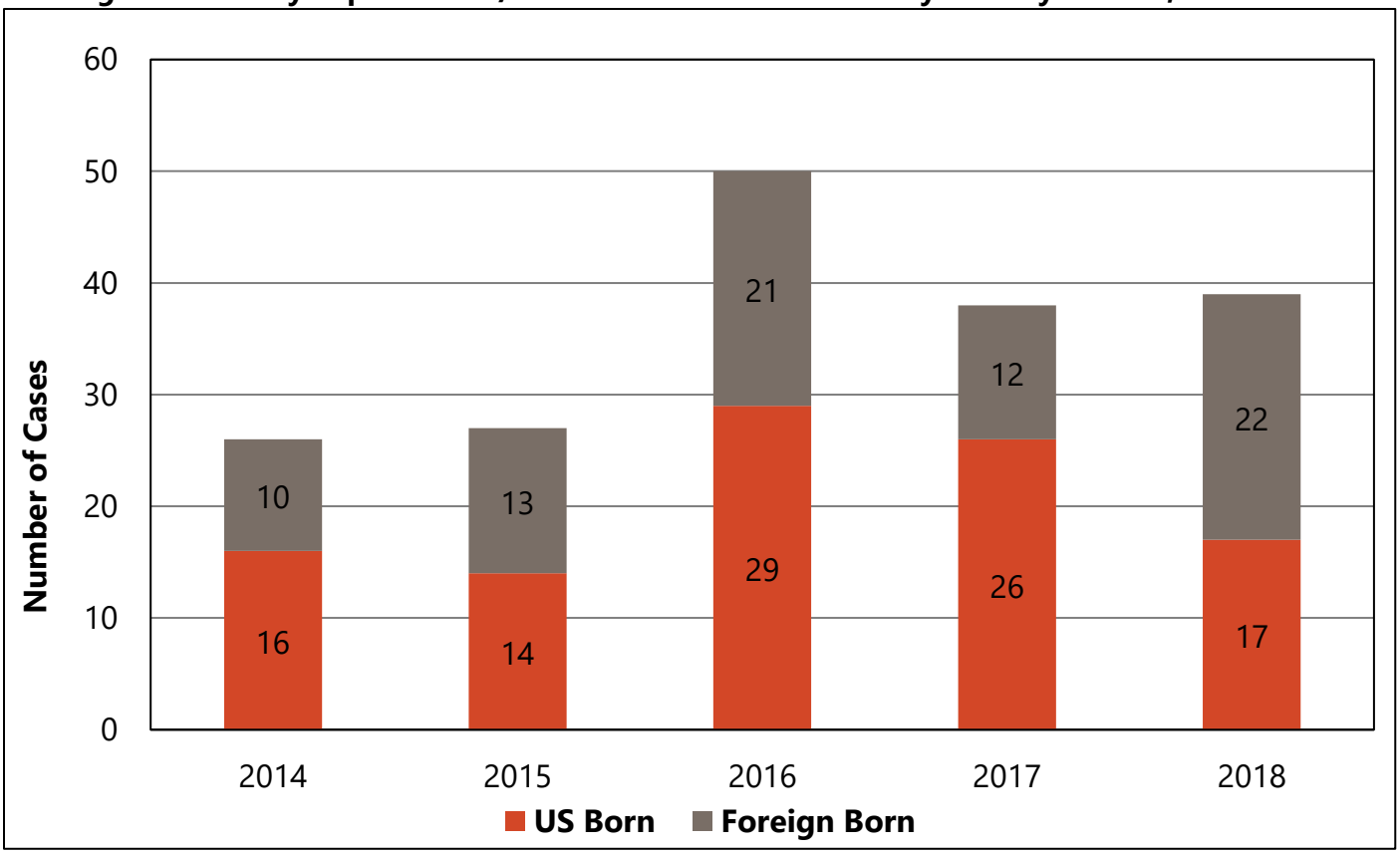
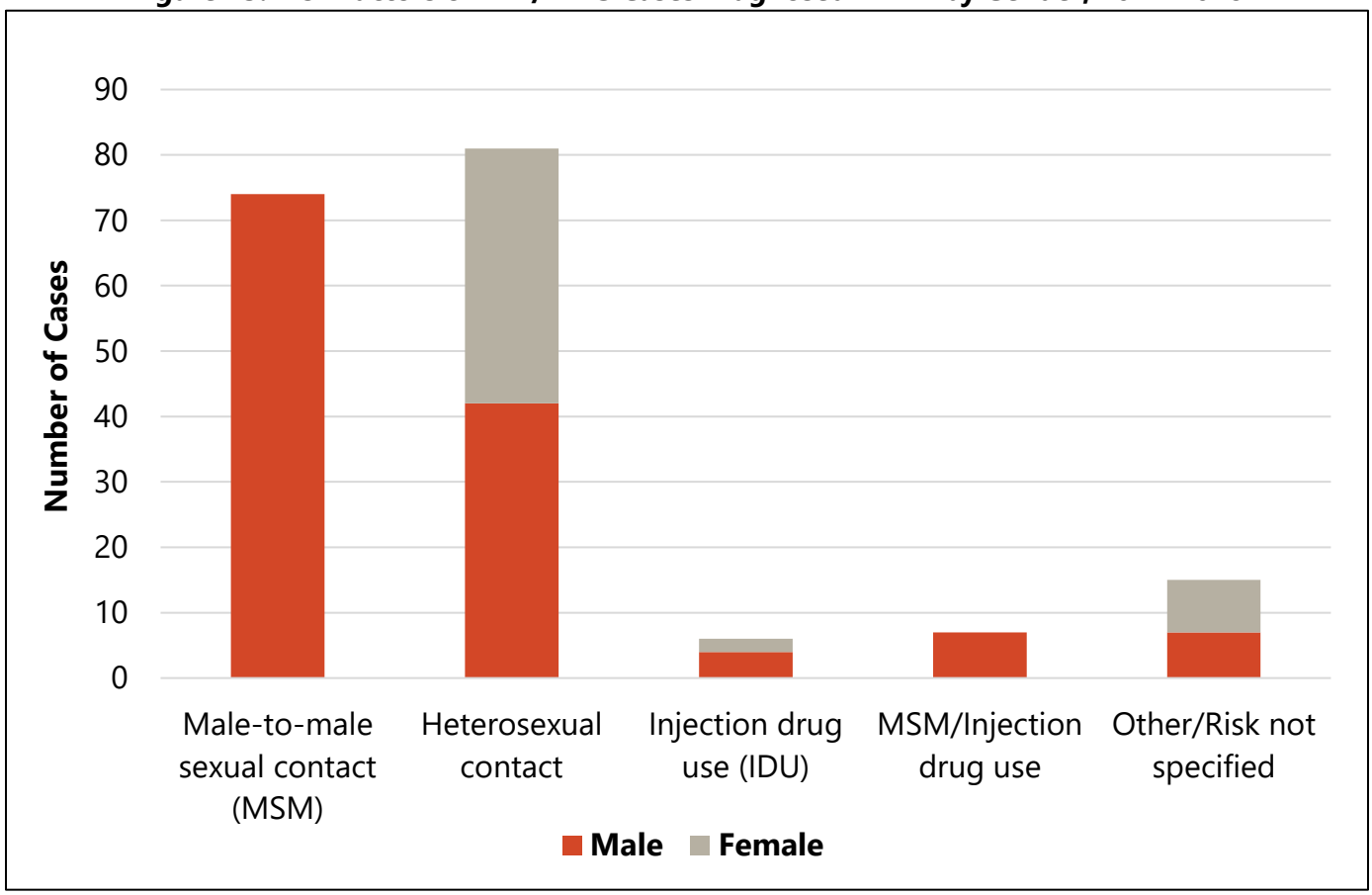


Figure 42: Newly Reported HIV/AIDS Cases in North Dakota by Country of Birth, 2014-2018

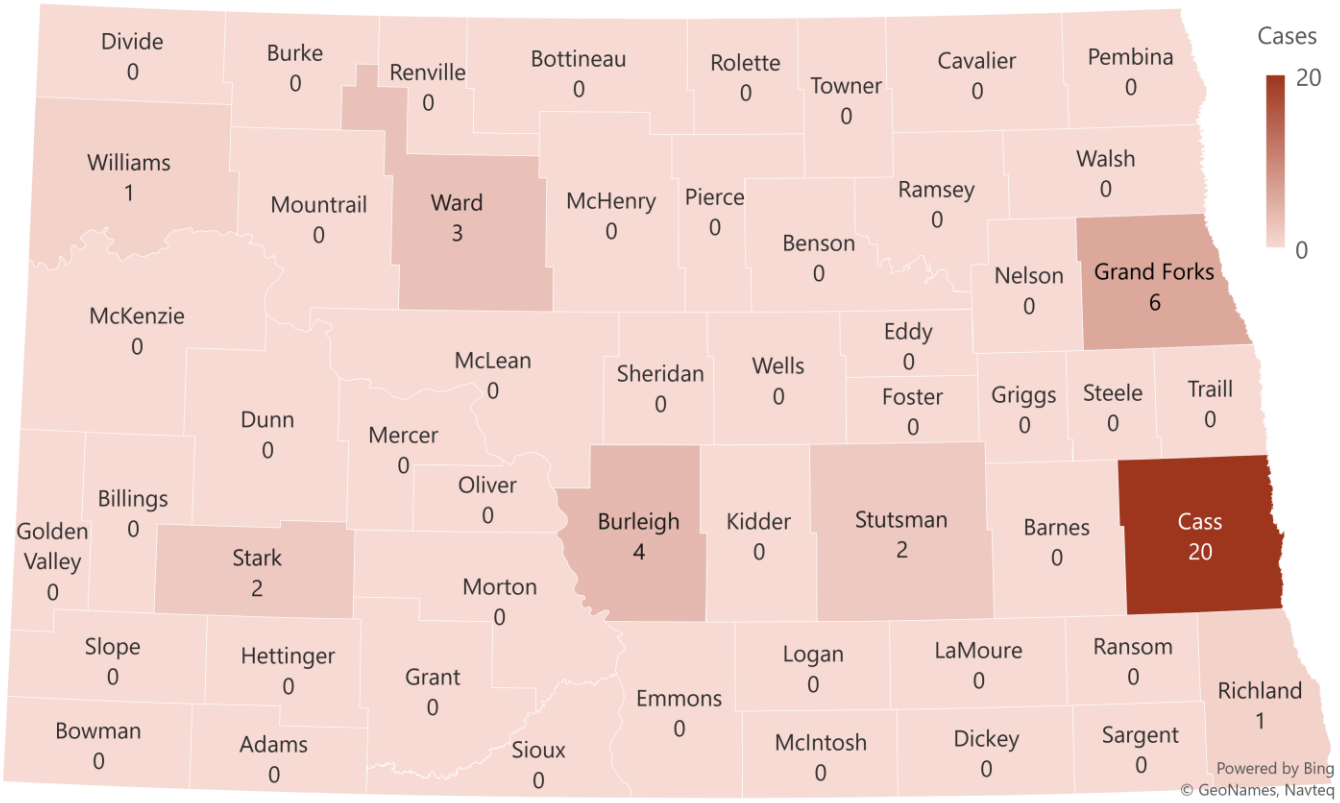


Male-to-male sexual contact continued to be the most frequently self-reported risk factor among males. Sixty percent of male cases diagnosed between 2014 and 2018 reported male-to-male sexual contact. In females, heterosexual contact was the most frequent risk factor. Risk factors of HIV/AIDS cases diagnosed in North Dakota for 2014-2018 separated by gender are shown below (Figure 43).

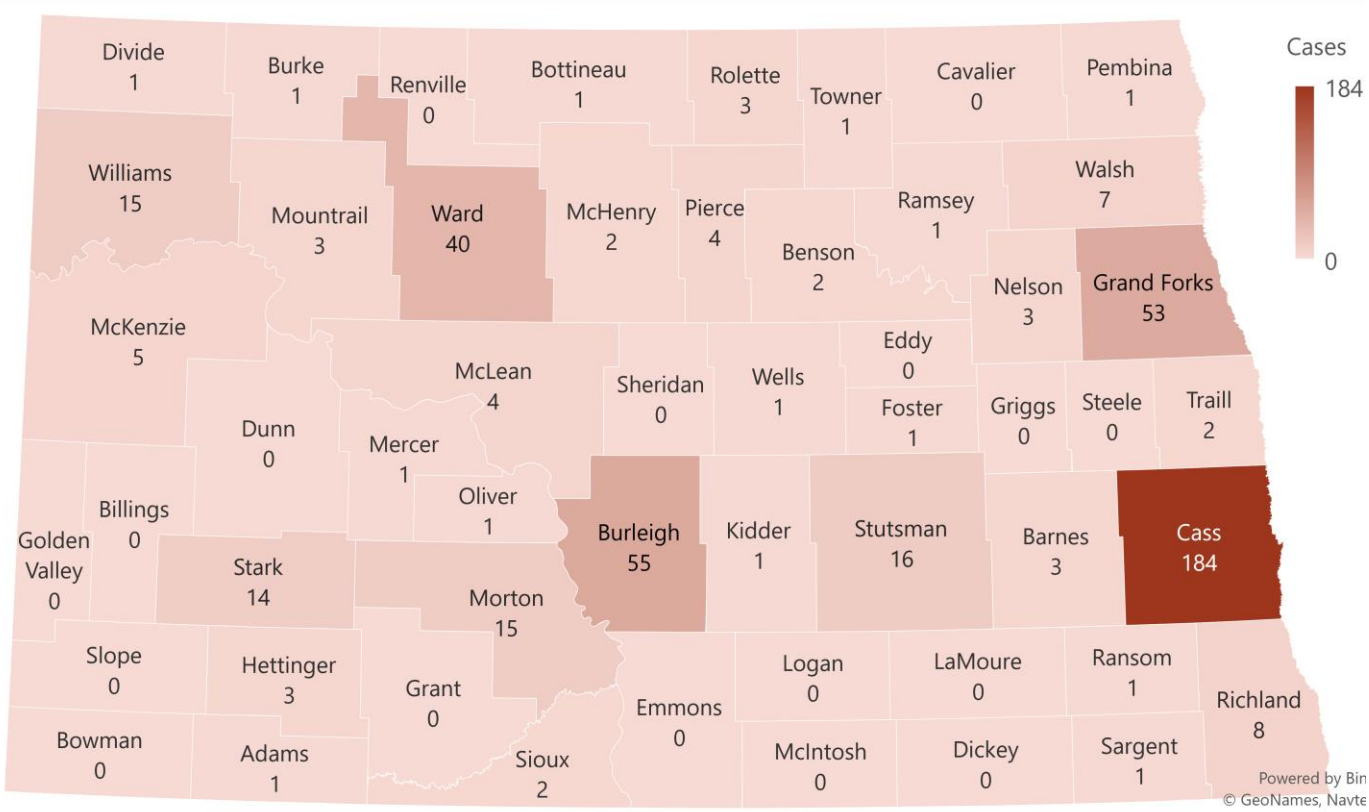
Figure 43: Risk Factors of HIV/AIDS Cases Diagnosed in ND by Gender, 2014-2018



Map 4: Geographic Location of Newly Identified HIV/AIDS Cases Diagnosed in 2018



Map 5: Geographic Location of HIV/AIDS Cases Currently Living in North Dakota, 2018



Tuberculosis

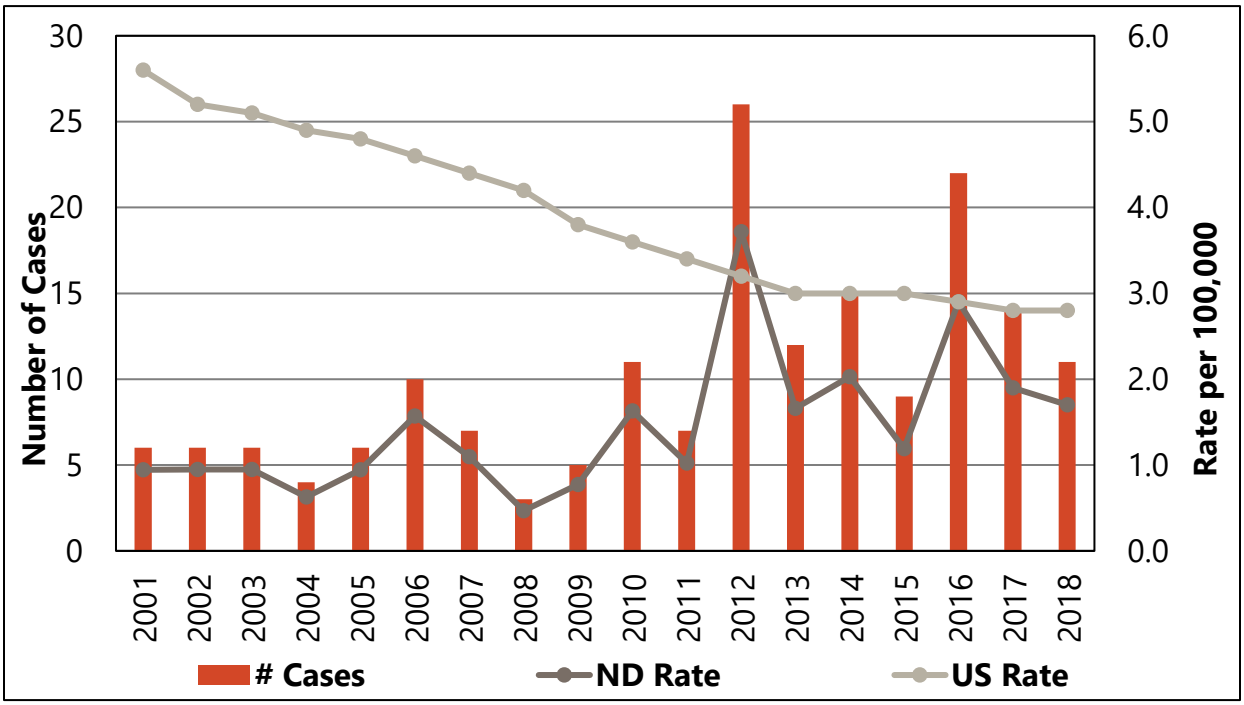
Dee Pritschet, TB Coordinator

Tuberculosis (TB)

Thirteen cases of active tuberculosis (TB) were reported to NDDoH in 2018, a decline from 14 in the previous year with a rate of 1.7/100,000 making North Dakota a low morbidity state.

In 2018, a total of 9,029 cases of active TB were reported in the United States, marking the lowest number of reported cases in a year on record. Even with this decline, however, national trends show that the goal of eliminating Tuberculosis in the United States (annual incidence of <1 case per 1 million persons) will not be attained in the 21st century without greatly increased investment in detection and treatment of latent TB infection (LTBI).

Figure 44: North Dakota Active Tuberculosis Case Counts and U.S. and ND Tuberculosis Disease Rates, 2001–2018

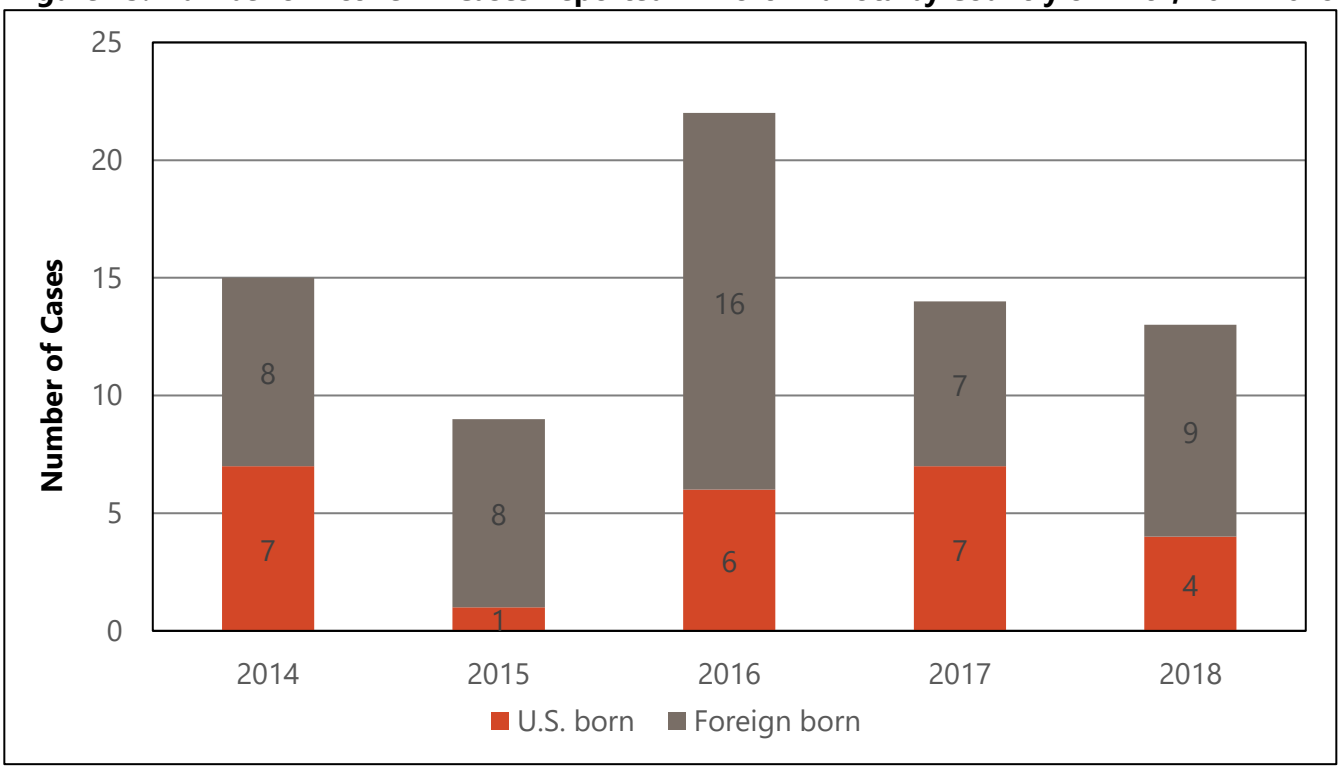


Several medical conditions put people with TB infection at increased risk for developing active TB. People infected with TB who also have HIV infection are 26-31 times more likely to develop active TB than persons without HIV infection. Diabetes triples the risk of developing active TB as well as complicating both the clinical course of TB and worsening glycemic control.

Co-morbidities for the persons who were identified with active TB in North Dakota in 2018: HIV (8% of cases), being prescribed immunosuppressive medication (8% of cases), having low body weight (15% of cases) and diabetes mellitus (31% of cases).

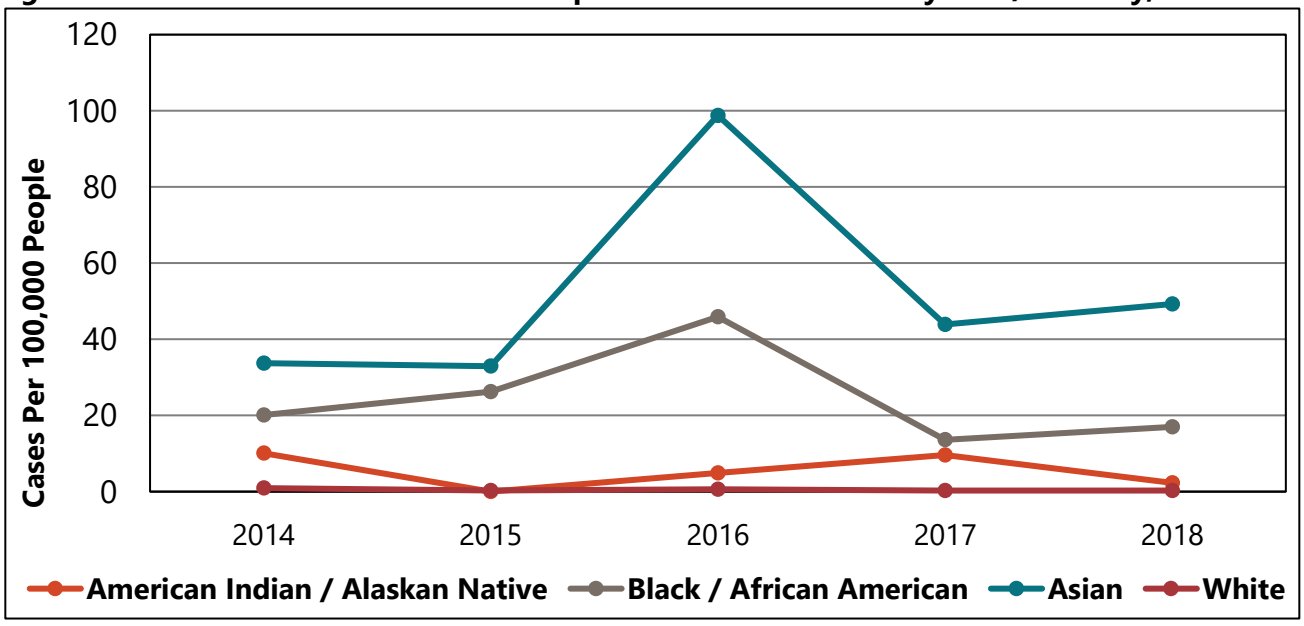
Active TB in the United States is most common among people who travel to or who were born in countries with high rates of TB. From 2014 – 2018, non-US born persons accounted for 66% of reported cases in North Dakota.

Figure 45: Number of Active TB Cases Reported in North Dakota by Country of Birth, 2014-2018



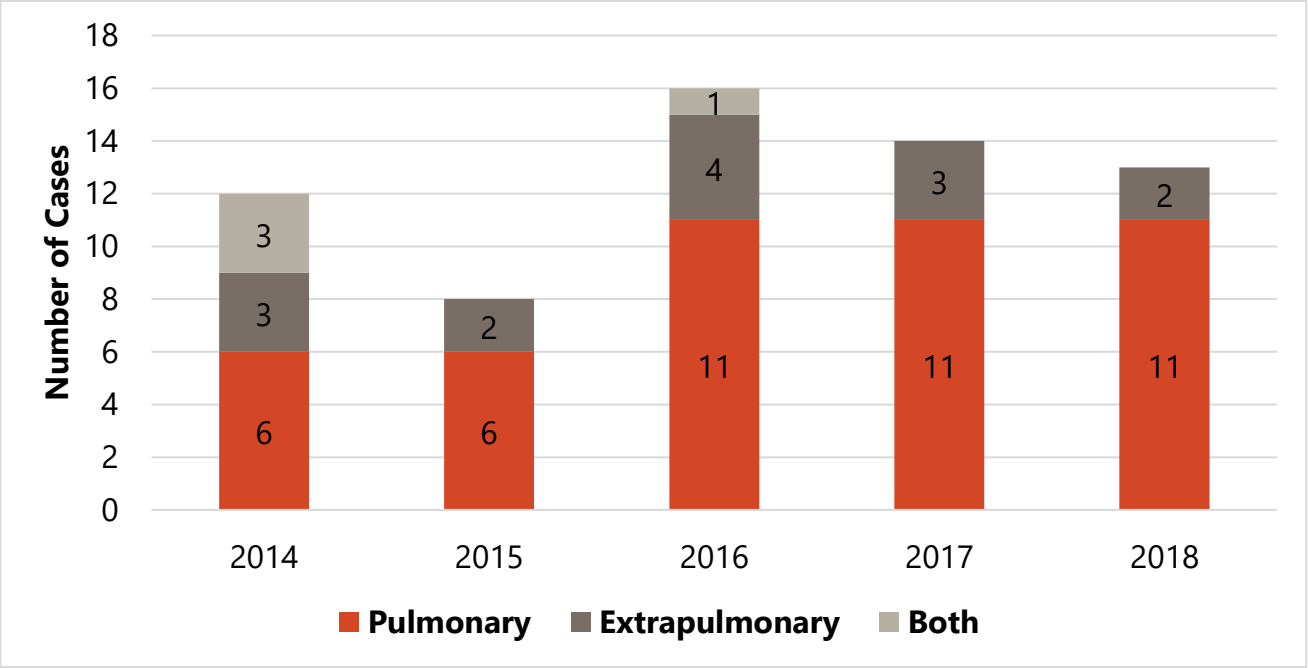
Although incidence of TB in North Dakota is low, cases reported demonstrate a racial disparity. Among foreign-born persons, the highest TB incidence was among Asians (49.3 cases per 100,000) followed by Black/African Americans (17 cases per 100,000).

Figure 46: Rates of Active Tuberculosis Reported in North Dakota by Race/Ethnicity, 2014-2018



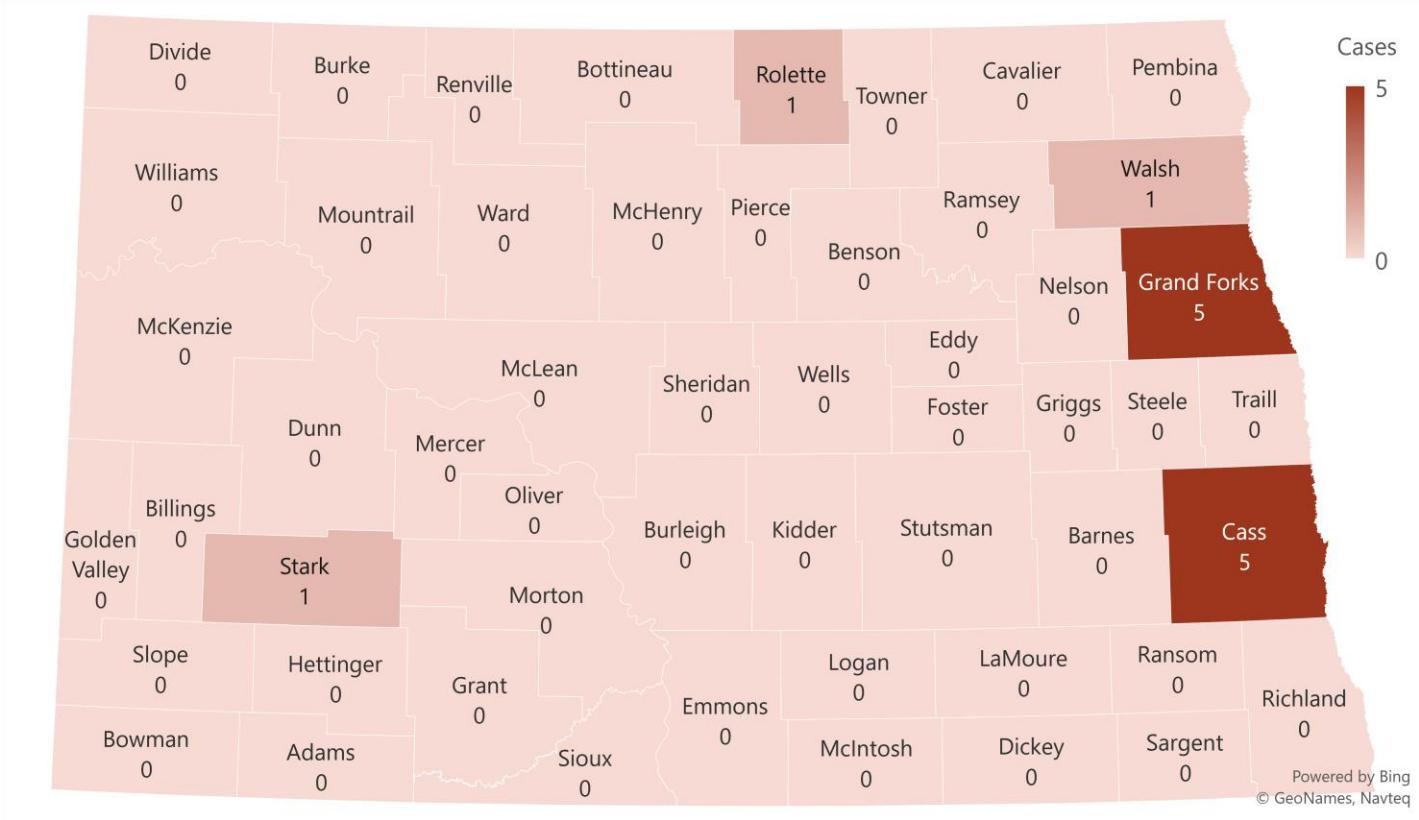
The lungs are the most common site for TB disease, but any organ or body site may be involved. TB of the lymph nodes are the most commonly occurring form of extrapulmonary tuberculosis reported. In North Dakota, pulmonary cases accounted for 67% of the total cases between 2014-2018.

Figure 47: Number of Active Tuberculosis Cases Reported in North Dakota by Site of Infection, 2014-2018



In 2018, counties with larger population centers such as Cass and Grand Forks reported the majority of TB cases. However, three additional counties reported at least one case of active TB; Rolette, Stark and Walsh. The map below lists the number of reported cases by county. The shading indicates the rate of TB per 100,000 persons by county.

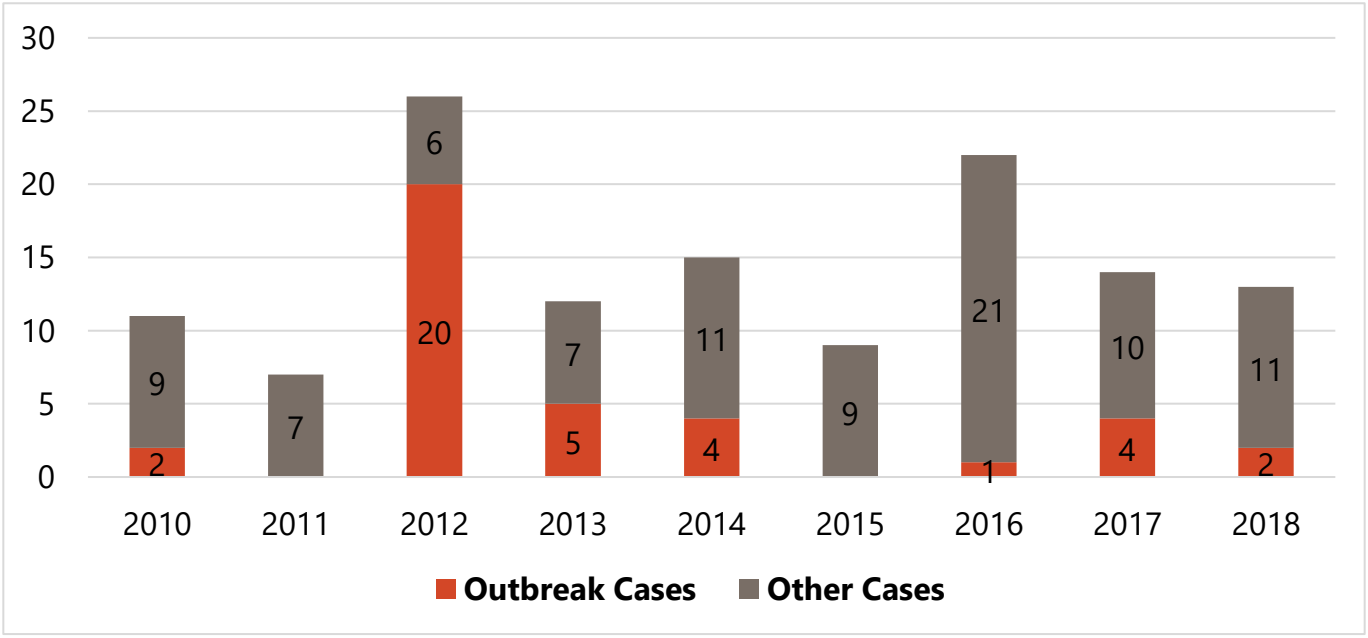
Map 6: Number of Active Tuberculosis Cases Reported in North Dakota by County with Shading by Rates per 100,000 persons, 2018



GRAND FORKS COUNTY OUTBREAK UPDATE

In 2012, 20 cases of genotypically identical TB were identified in Grand Forks County. Since then over 2,000 contacts to active TB cases have been tested. To date, of those tested, 95 people have been diagnosed with LTBI xx diagnosed with active TB. Overall 38 cases have been genotypically linked to this outbreak.

Figure 48: Number of Active Tuberculosis Cases Reported in North Dakota Genotypically Linked to Outbreak, 2010-2018



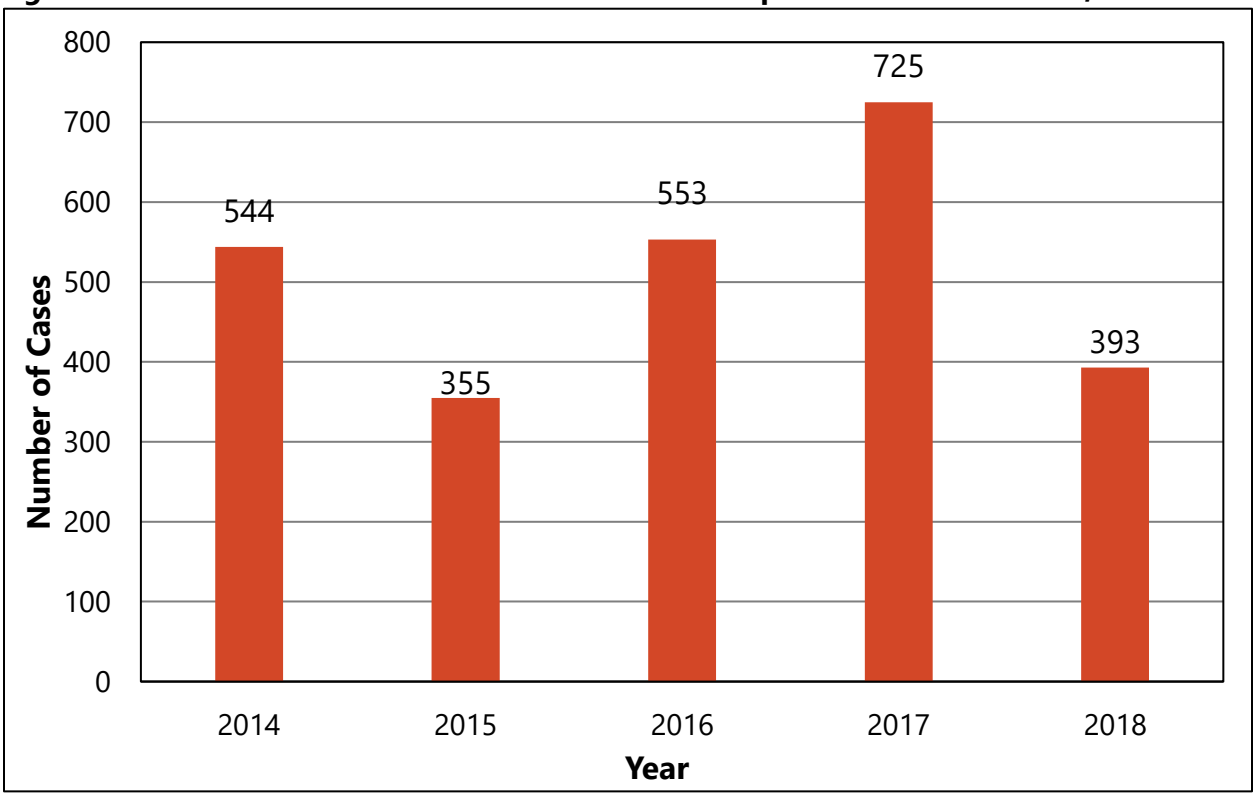
Latent Tuberculosis Infection (LTBI)

It is estimated that one-third of the global population is currently infected with TB. While many of those infected persons will never develop TB disease, identifying and treating those who are infected is the best tool to prevent active TB infections from developing.

While many providers have reported TB infections to NDDoH for many years, LTBI officially became reportable in North Dakota in 2018. The case definition adopted in 2018 was recommended by the Council of State and Territorial Epidemiologists (CSTE).

In order for cases to meet the CSTE case definition, providers must report the results of the laboratory, clinical and radiologic findings as part of the assessment to rule out active TB disease. The data below shows reports of laboratory evidence of TB infection for 2014-2017 and only cases that meet the **confirmed** case definition starting in 2018.

Figure 49: Number of Latent Tuberculosis Infections Reported in North Dakota, 2014-2018



*The decrease in the number of reported LTBI cases in 2018 is due to the establishment of a new LTBI case definition.

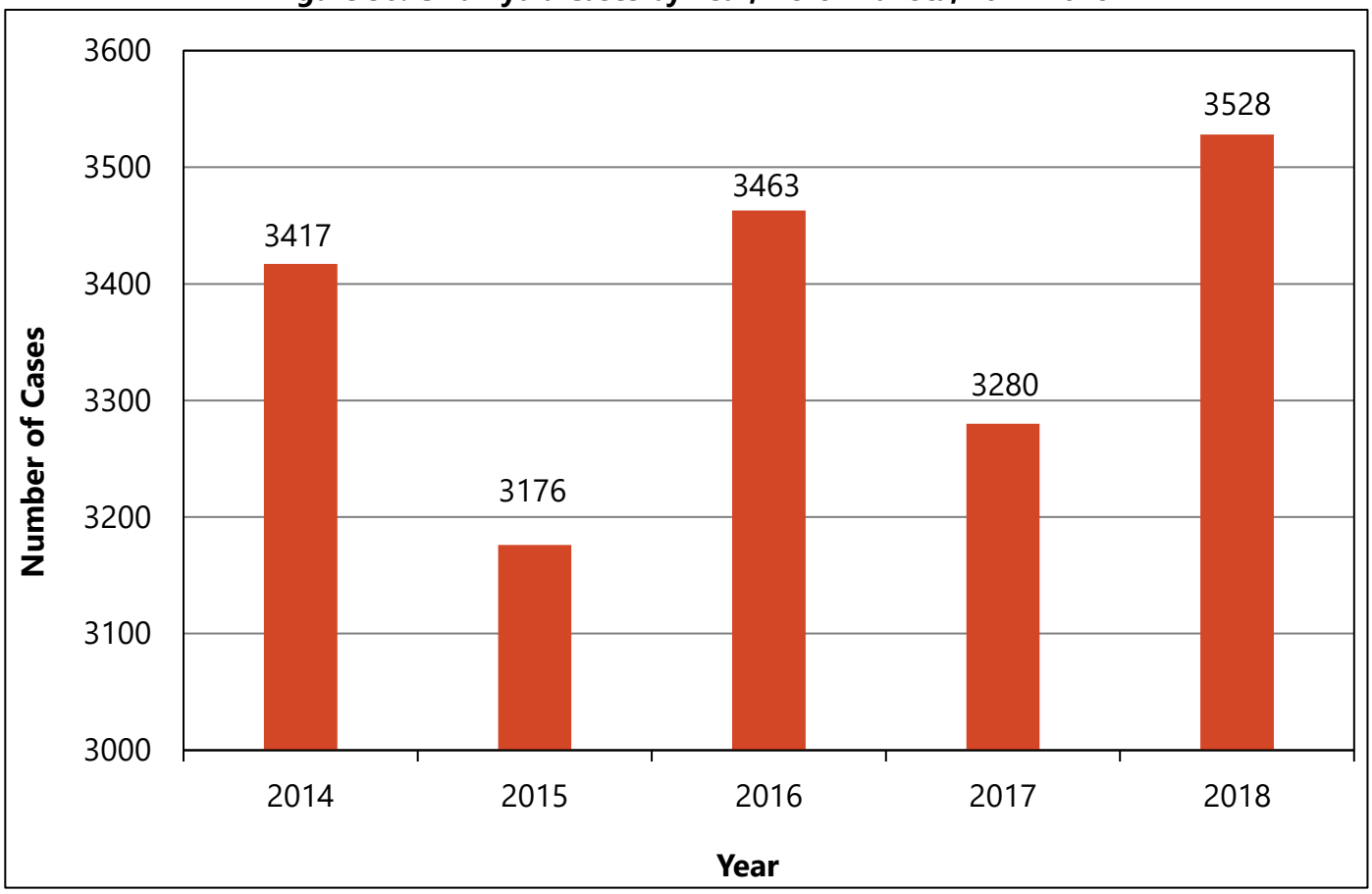
Sexually Transmitted Diseases

Shari Renton, STD Surveillance Coordinator

Chlamydia

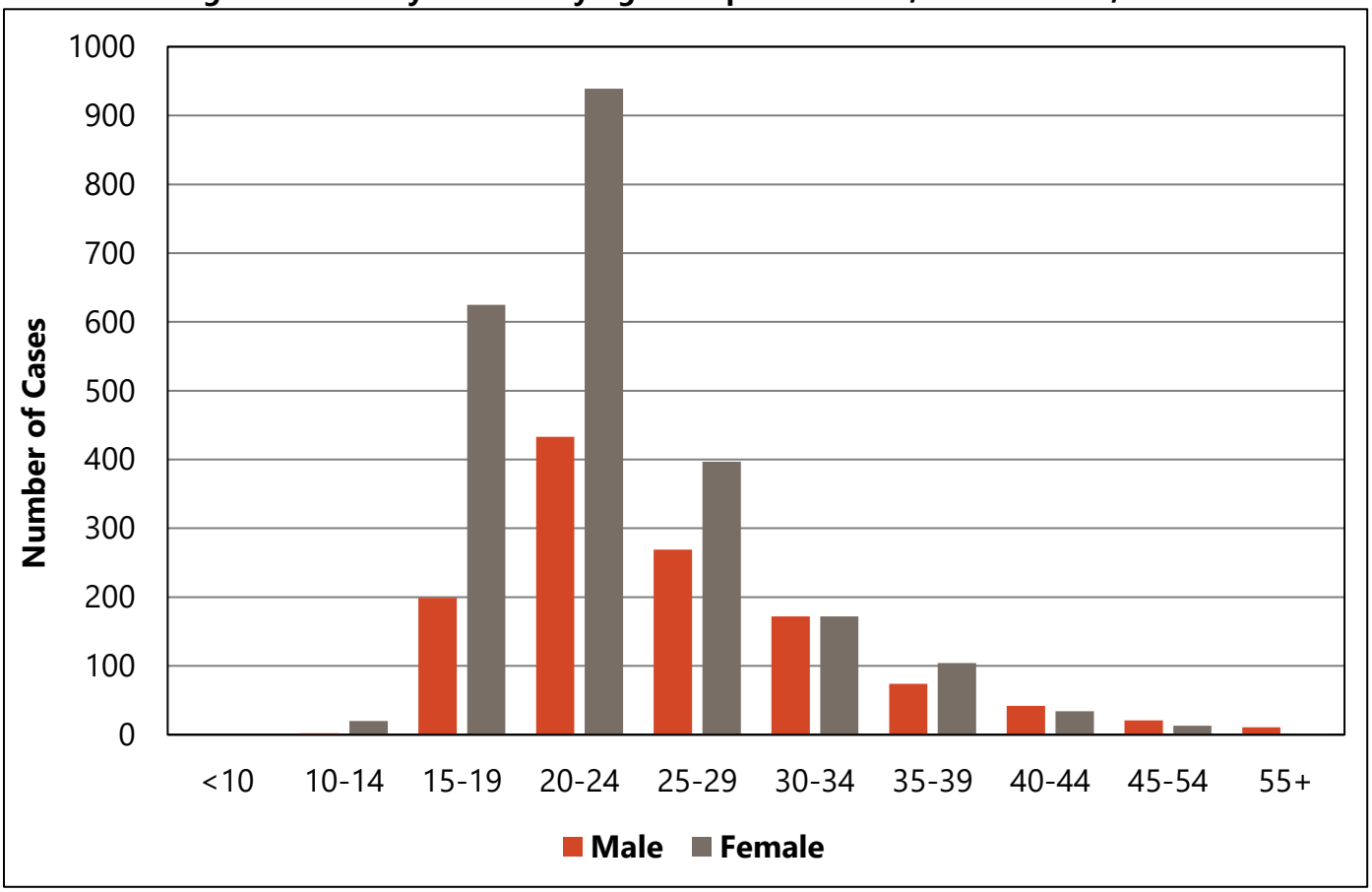
In 2018, 3,528 cases of chlamydia were reported to the NDDoH, a rate of 464.2 cases per 100,000 persons. There was an 8% increase in the number of chlamydia cases from 2017 to 2018, despite a decrease in cases from 2016 to 2017 (Figure 50).

Figure 50: Chlamydia Cases by Year, North Dakota, 2014-2018



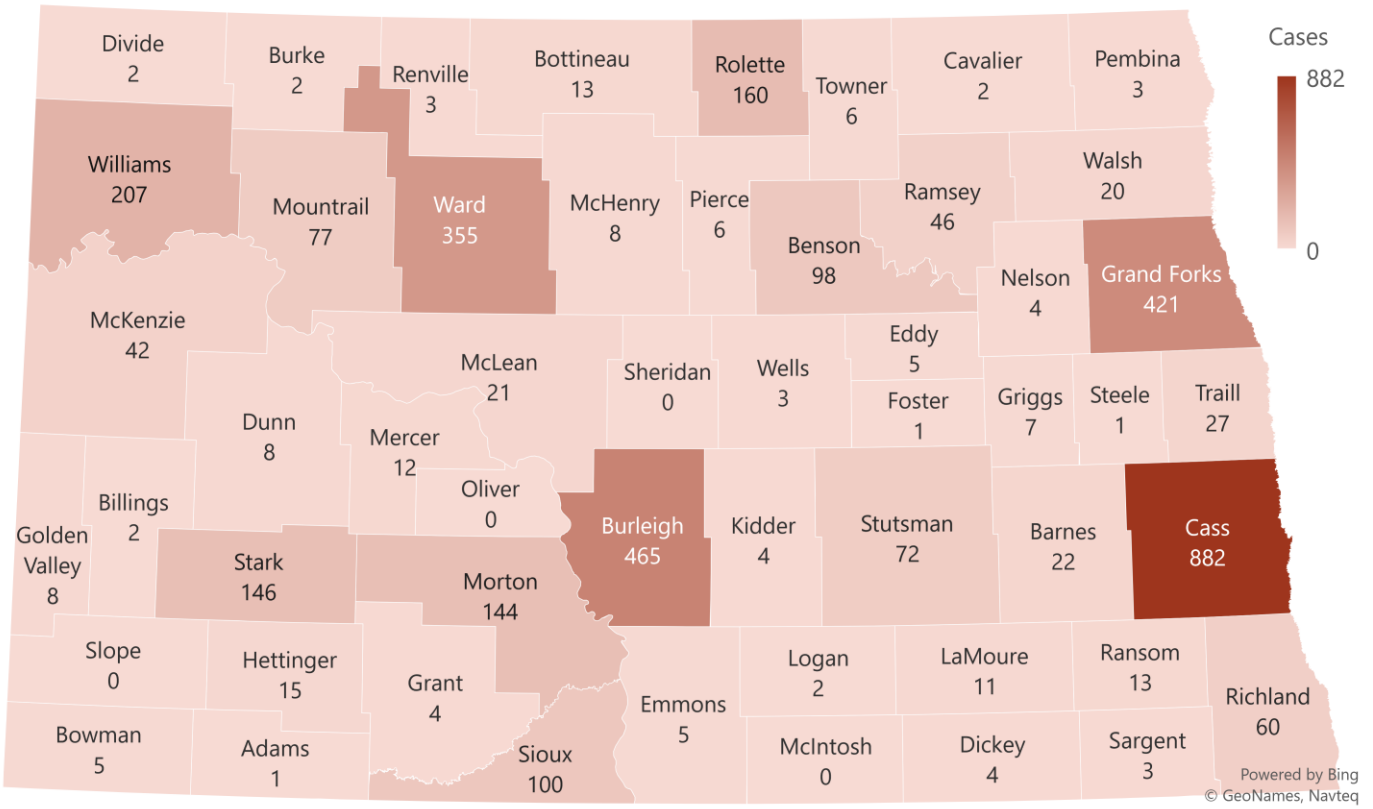
Of the cases reported in 2018, 2,306 (63%) were reported in females. Individuals ages 20-24 represented 39% of cases followed by people ages 15-19, or 22% of the cases (Figure 51).

Figure 51: Chlamydia Cases by Age Group and Gender, North Dakota, 2018



Map 7: North Dakota Chlamydia Cases by County, 2018

Map 7: North Dakota Chlamydia Cases by County, 2018

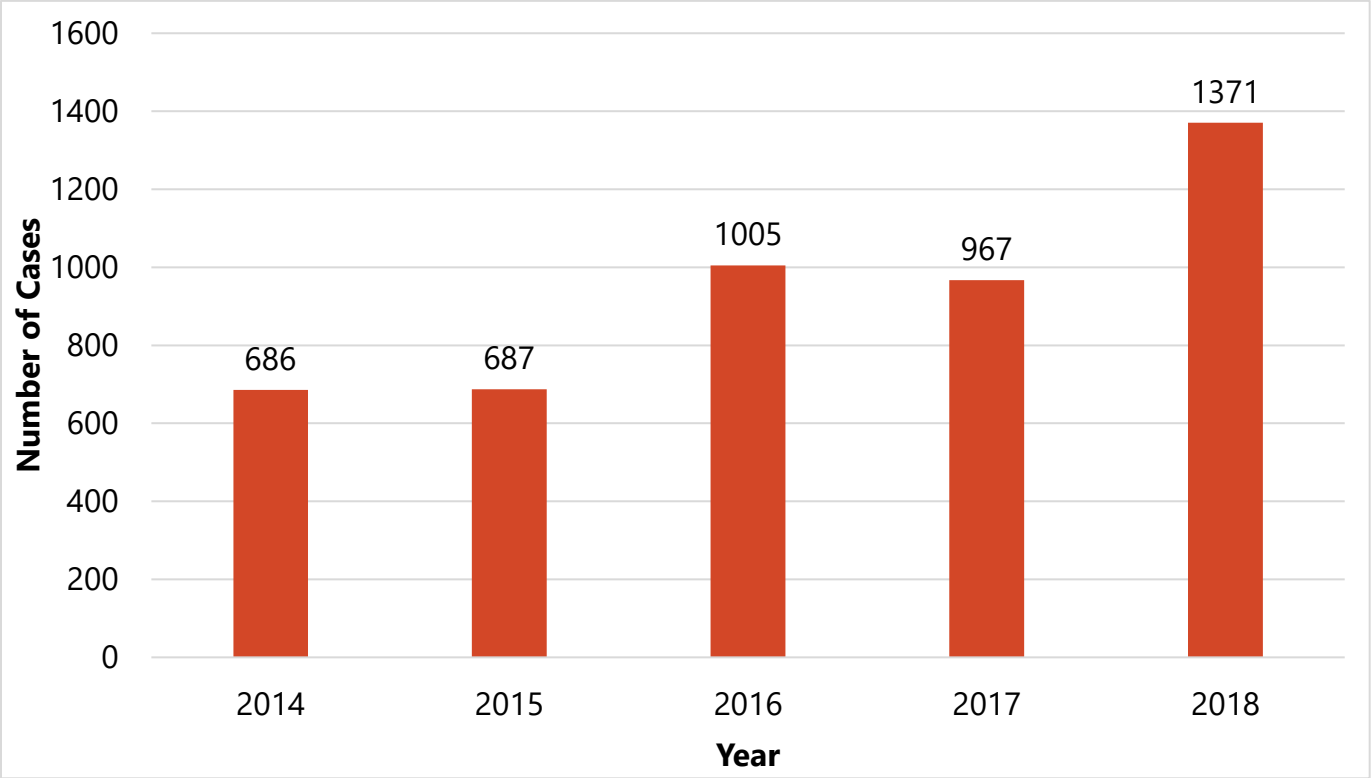


In 2018, 49 of 53 counties had residents diagnosed with chlamydia. Twelve counties in North Dakota had chlamydia rates higher than the overall North Dakota rate of 464.2 cases per 100,000 persons. Counties reporting the highest chlamydia rates in North Dakota are Sioux (2,285 per 100,000 people), Benson (1,412 per 100,000 people), and Rolette (1,101 per 100,000 people).

Gonorrhea

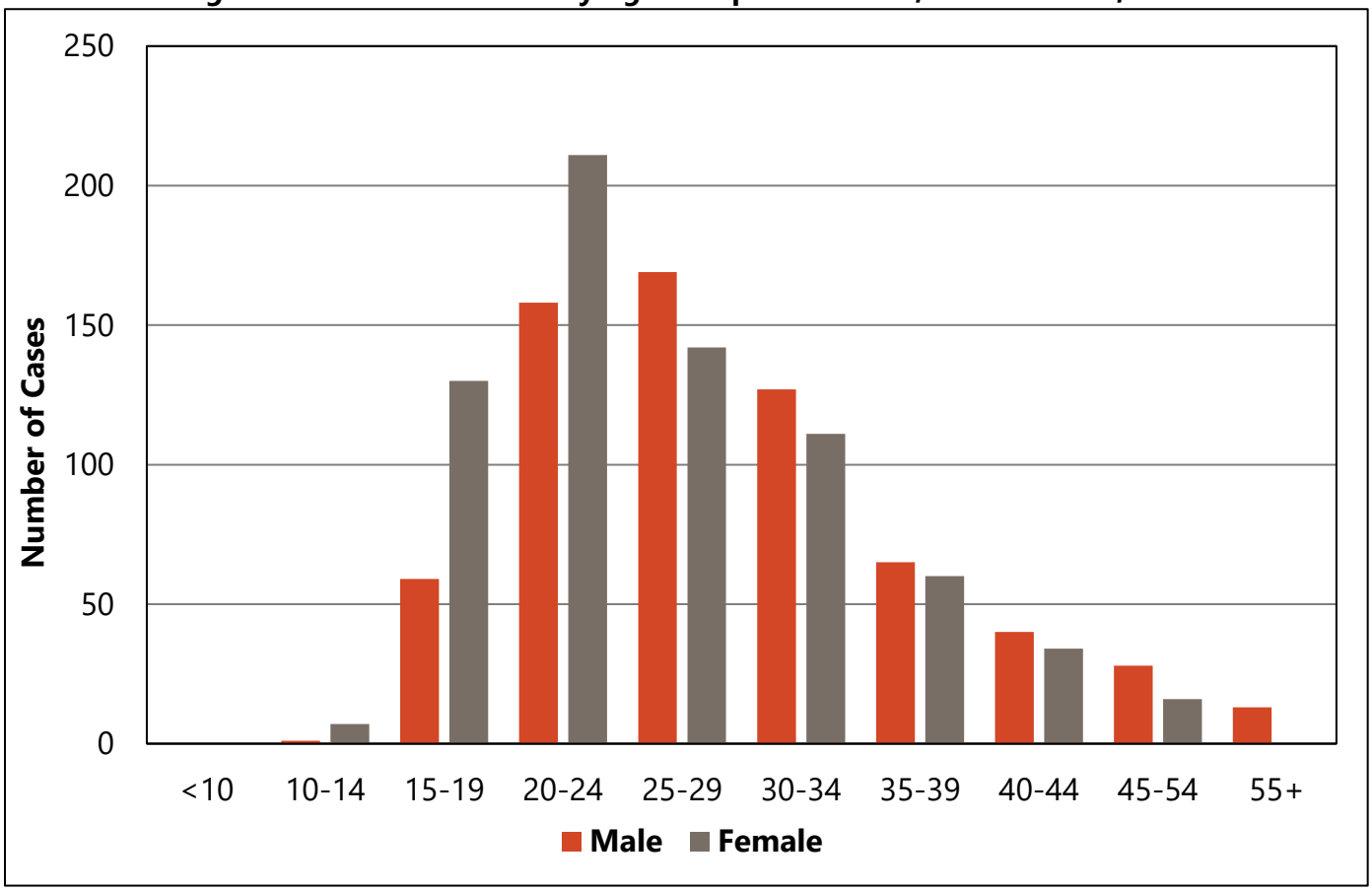
The rise in gonorrhea cases has been seen across the United States, with rates at unprecedented highs. There was a 42% increase in gonorrhea cases from 2017 to 2018. The case count reported in 2018 was 1,371 which corresponds to a rate of 180 cases per 100,000 individuals (Figure 52).

Figure 52: Gonorrhea Cases by Year, North Dakota, 2014-2018



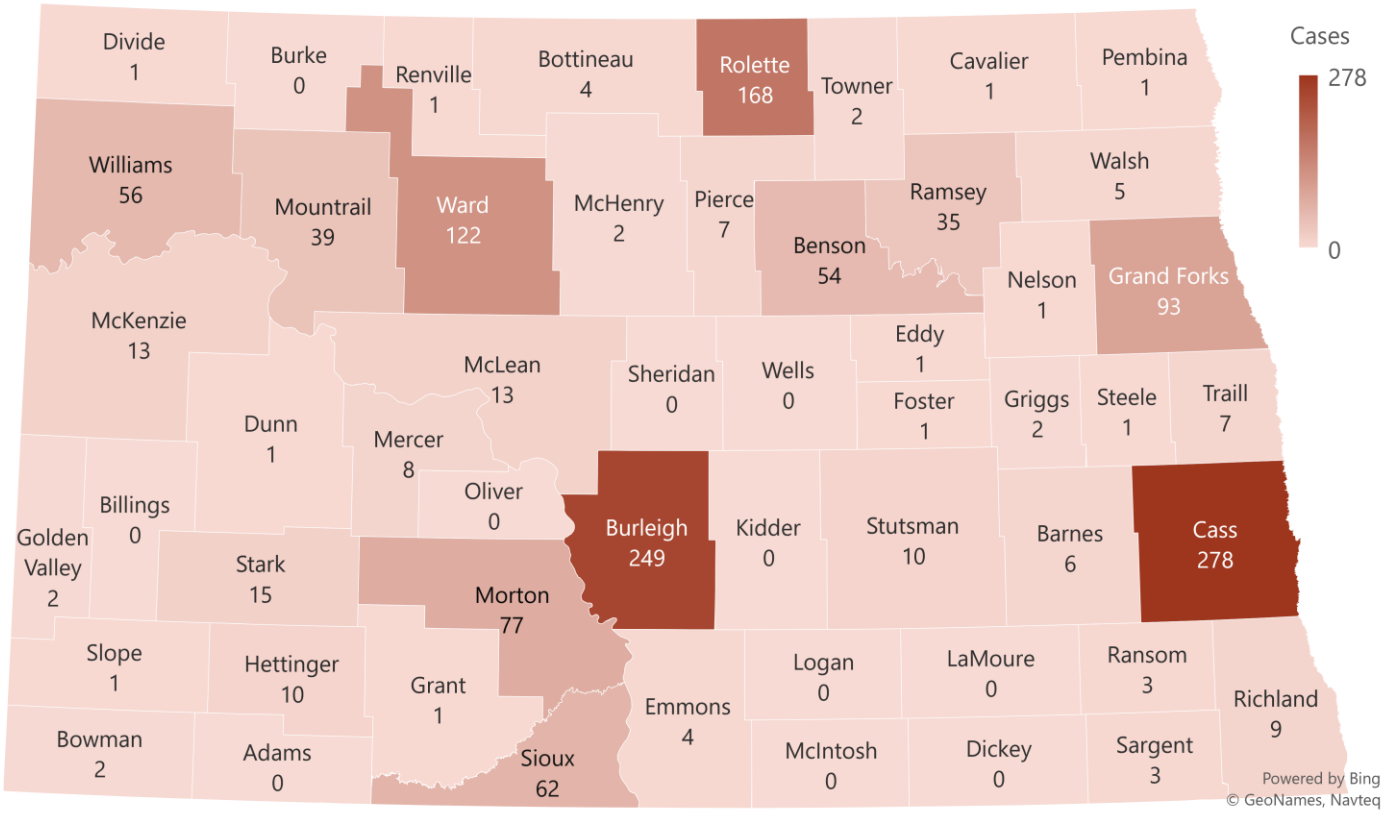
Of the cases reported in 2018, 711 (52%) were reported in females. The majority (50%) of gonorrhea cases were reported in people ages 20 to 29 (Figure 54). However, there was a 66% increase among those ages 30 to 44. Male cases are, on average, older than female cases.

Figure 53: Gonorrhea Cases by Age Group and Gender, North Dakota, 2018



There were 531 cases of gonorrhea reported among white individuals (81 cases per 100,000 individuals) followed by 525 cases among American Indians/Alaskan Natives (1,259 cases per 100,000). Among Black/African Americans, 201 cases were reported (863 cases per 100,000).

Map 8: North Dakota Gonorrhea Cases by County, 2018



Counties reporting the highest gonorrhea rates in North Dakota are Sioux (1,416 cases per 100,000), Rolette (1,156 cases per 100,000), and Benson (778 cases per 100,000) counties. These rates are higher than the rate of 180 per 100,000 people for all of North Dakota. An additional five counties have gonorrhea rates higher than the North Dakota rate.

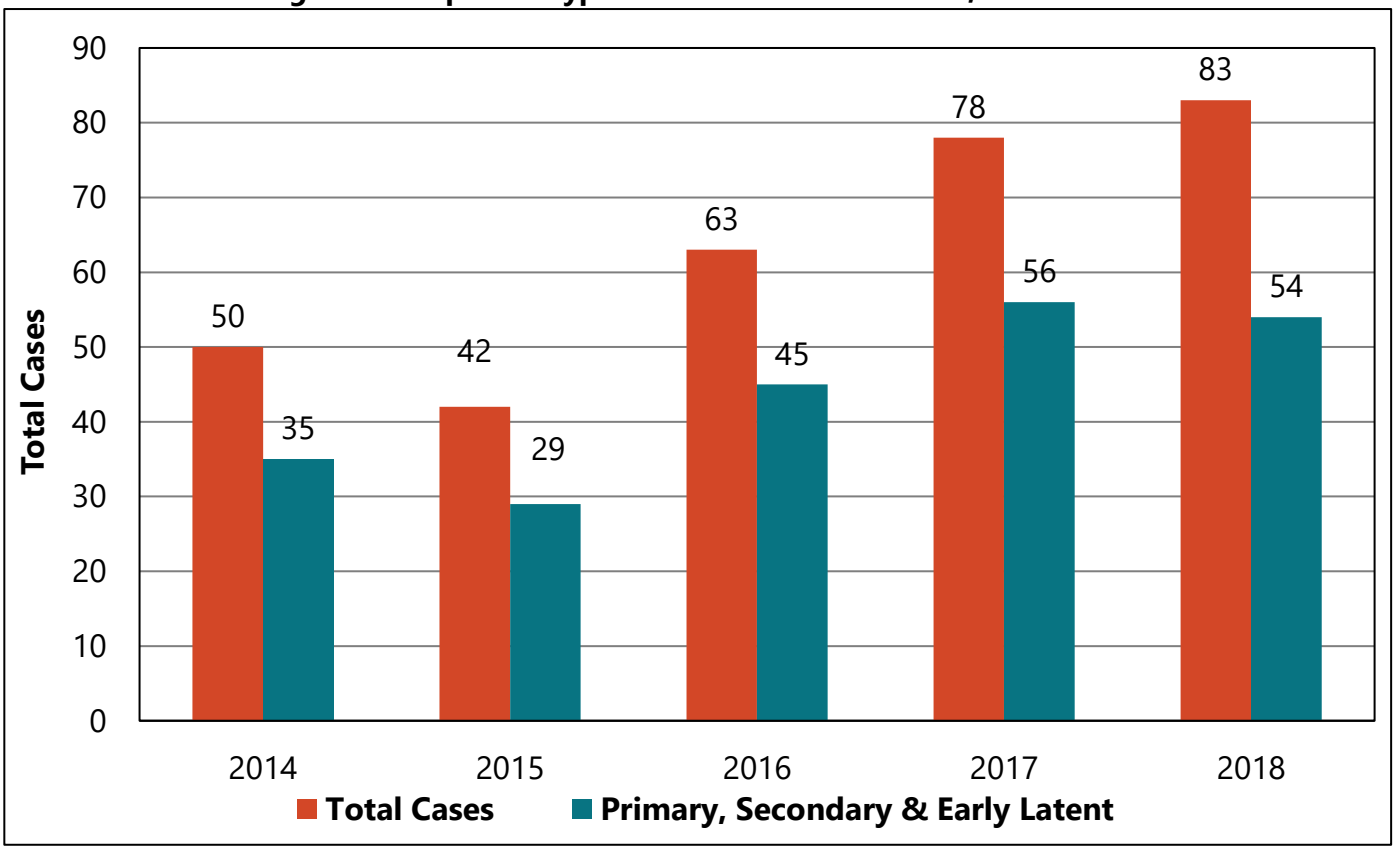
Table 1: Epi Facts of North Dakota Gonorrhea Cases, 2018

How are cases being treated?	**80 (6%) cases were treated <u>inappropriately</u>. *Reminder: the appropriate treatment for gonorrhea is dual therapy of 1 gram azithromycin and 250mg IM ceftriaxone.***
How many cases were interviewed?	64 percent of cases were reported as being interviewed.
How many partners were tested and treated?	48 percent of cases reported no sexual partners. Of reported partners, 375 were referred for follow-up and partner services,
What are the risk factors for gonorrhea?	For cases with risk factor information, 14 percent reported injection drug use, 39 percent reported sex while high or intoxicated, and 17 percent reported having anonymous sex partners.
How many were tested for HIV?	Only 38 percent of cases were reported as being tested for HIV. All gonorrhea cases are recommended to be tested for HIV at time of diagnosis.

Syphilis

In 2018, there was a 6% increase in the number of syphilis cases reported in North Dakota, from 78 to 83 cases (Figure 54). The rate of syphilis infection in North Dakota for 2018 was 10.9 cases per 100,000 persons.

Figure 54: Reported Syphilis Cases in North Dakota, 2014-2018



Of the total cases reported in North Dakota, 72% were male. The average age of syphilis cases decreased in 2017 to 2018 from 34.3 years to 30.4 years. In 2018, 51 syphilis cases were reported in white individuals, 11 were reported in American Indian/Alaskan Natives, and nine were reported in Black/African Americans.

Figure 55: Reported Syphilis Cases in North Dakota by Age and Gender, 2018

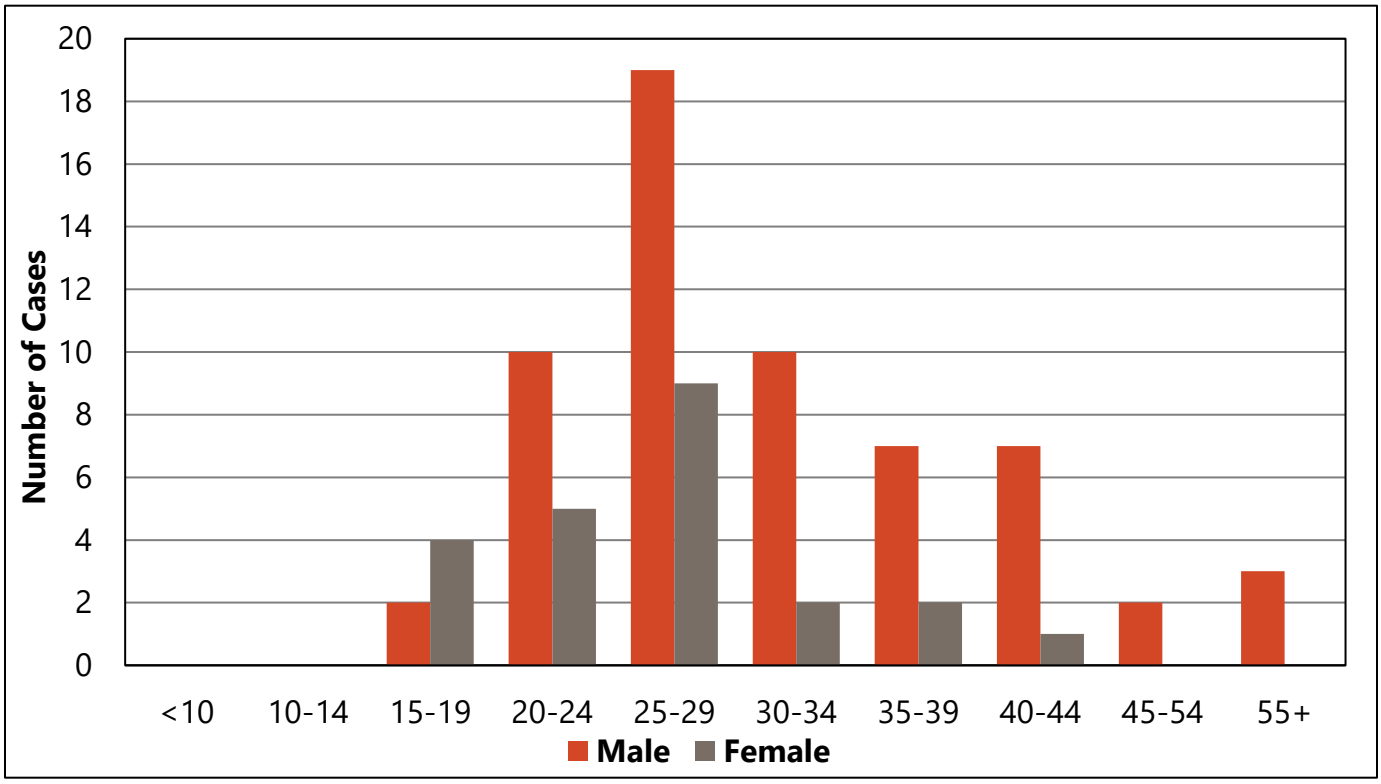
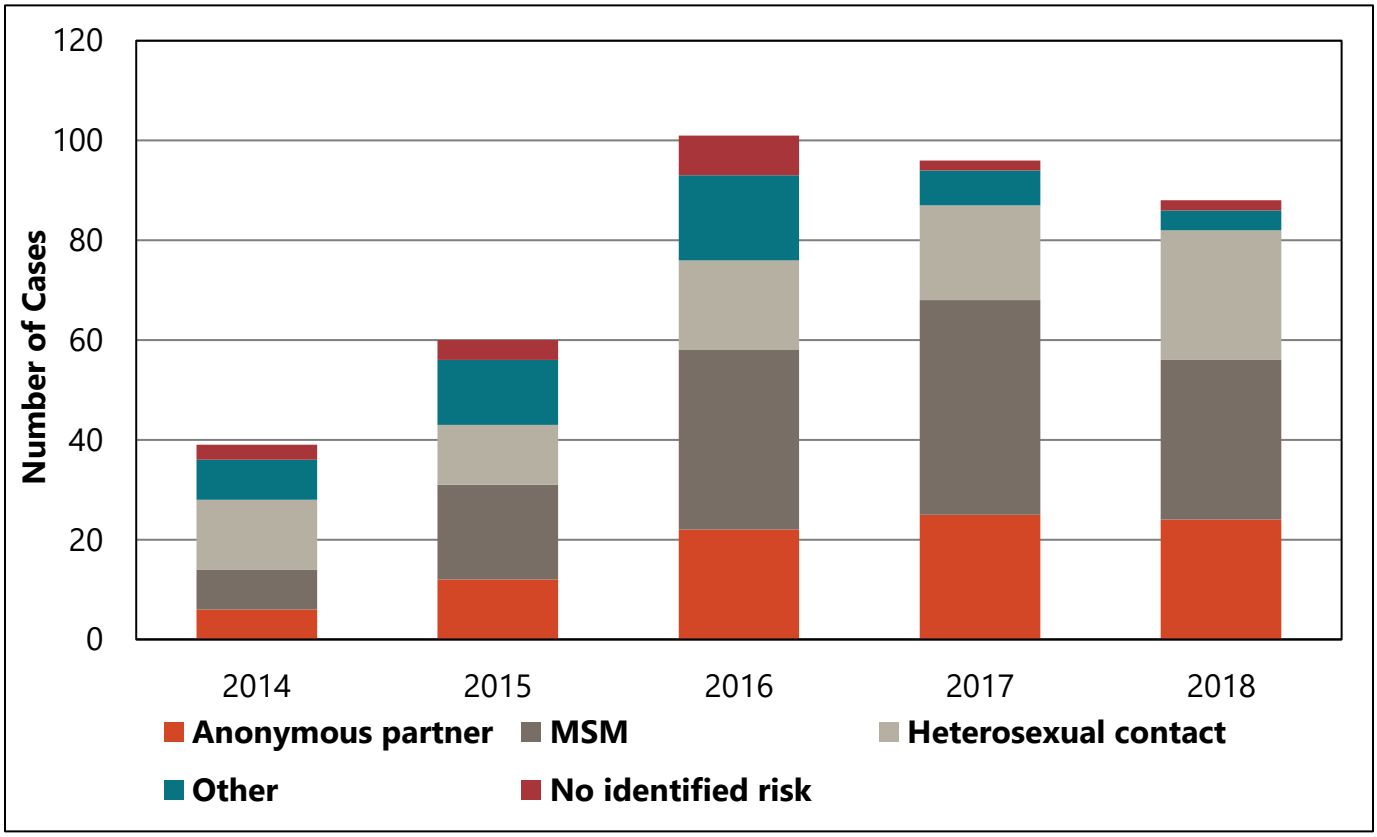
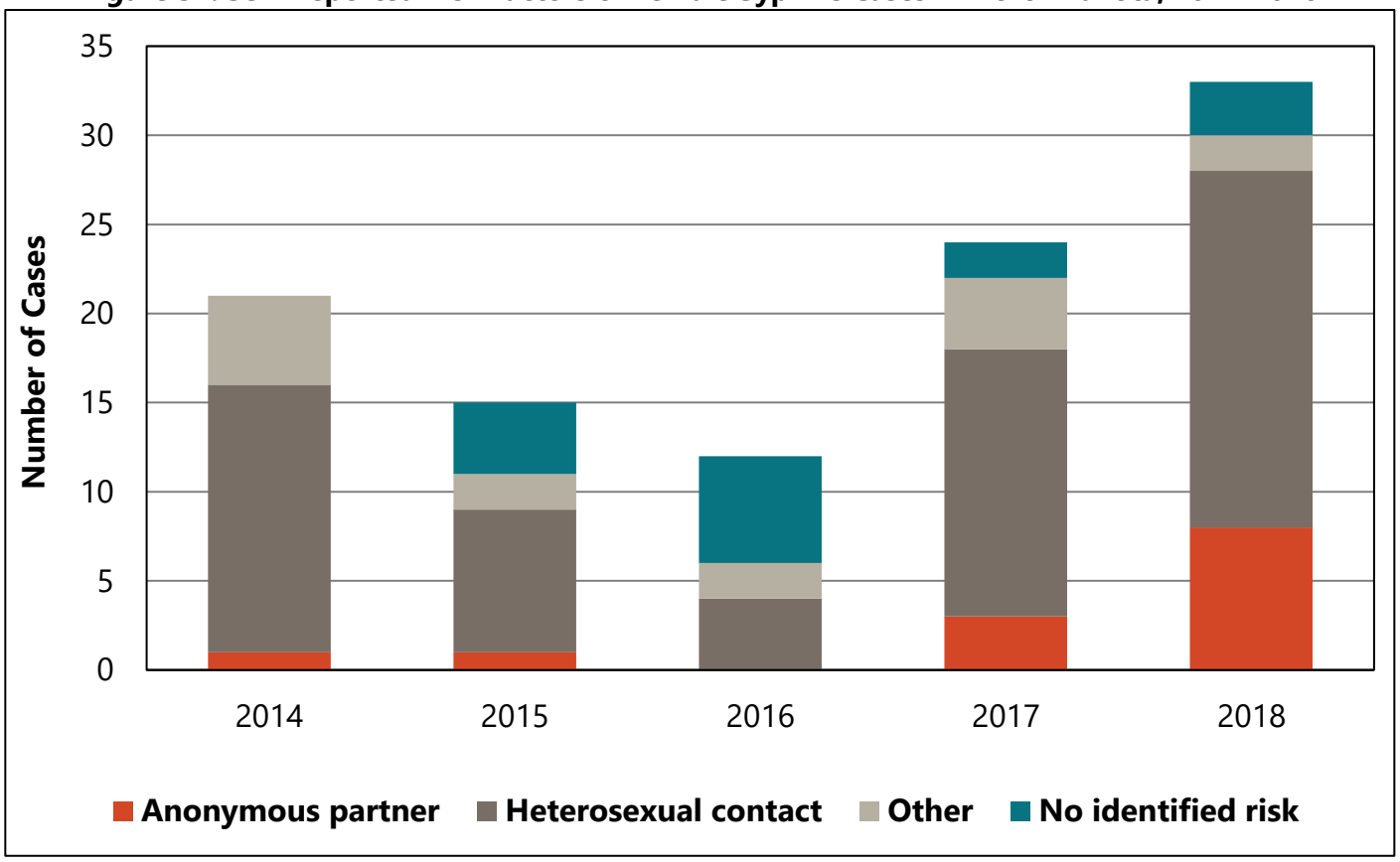


Figure 56: Self-Reported Risk Factors of Male Syphilis Cases in North Dakota, 2014-2018

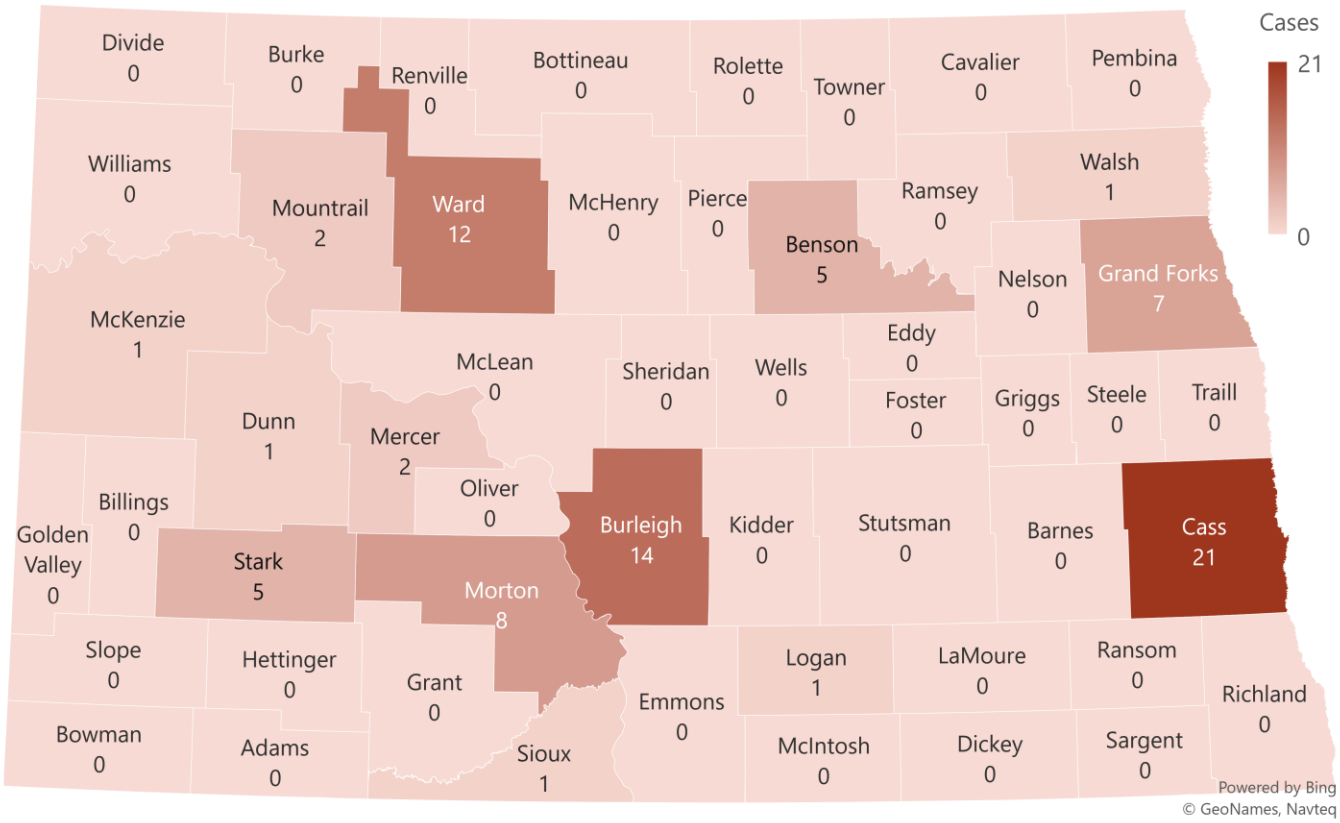


Male-to-male sexual contact continues to be the most often self-reported risk factor for male syphilis cases in 2018. Heterosexual contact has been the most common self-reported risk factor in female syphilis cases.

Figure 57: Self-Reported Risk Factors of Female Syphilis Cases in North Dakota, 2014-2018



Map 9: North Dakota Syphilis Cases by County, 2018



Viral Hepatitis

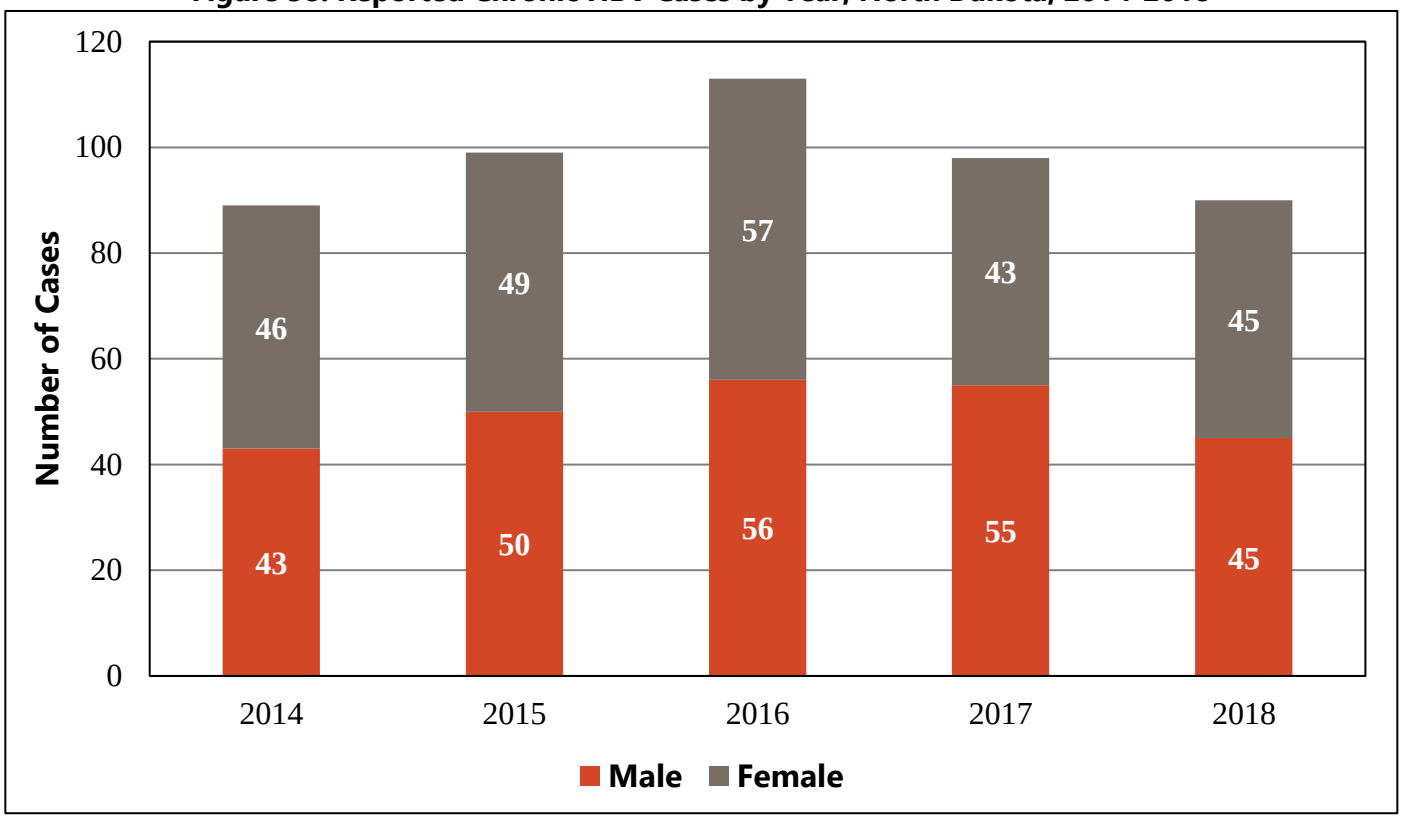
Shari Renton, Hepatitis Surveillance Coordinator

Activities of the viral hepatitis program include testing at-risk individuals for hepatitis C (HCV), vaccinating at-risk individuals for hepatitis A (HAV)/hepatitis B (HBV), providing educational materials for the general public and health care providers, organizing and hosting an HIV/hepatitis conference for health care providers, and contracting with local public health units (LPHUs) to provide the above mentioned viral hepatitis services. In 2018, NDDoH contracted with 24 sites to offer hepatitis C testing and hepatitis A and B vaccinations. A list of sites where at-risk individuals can be tested is available at www.ndhealth.gov/disease/hepatitis.

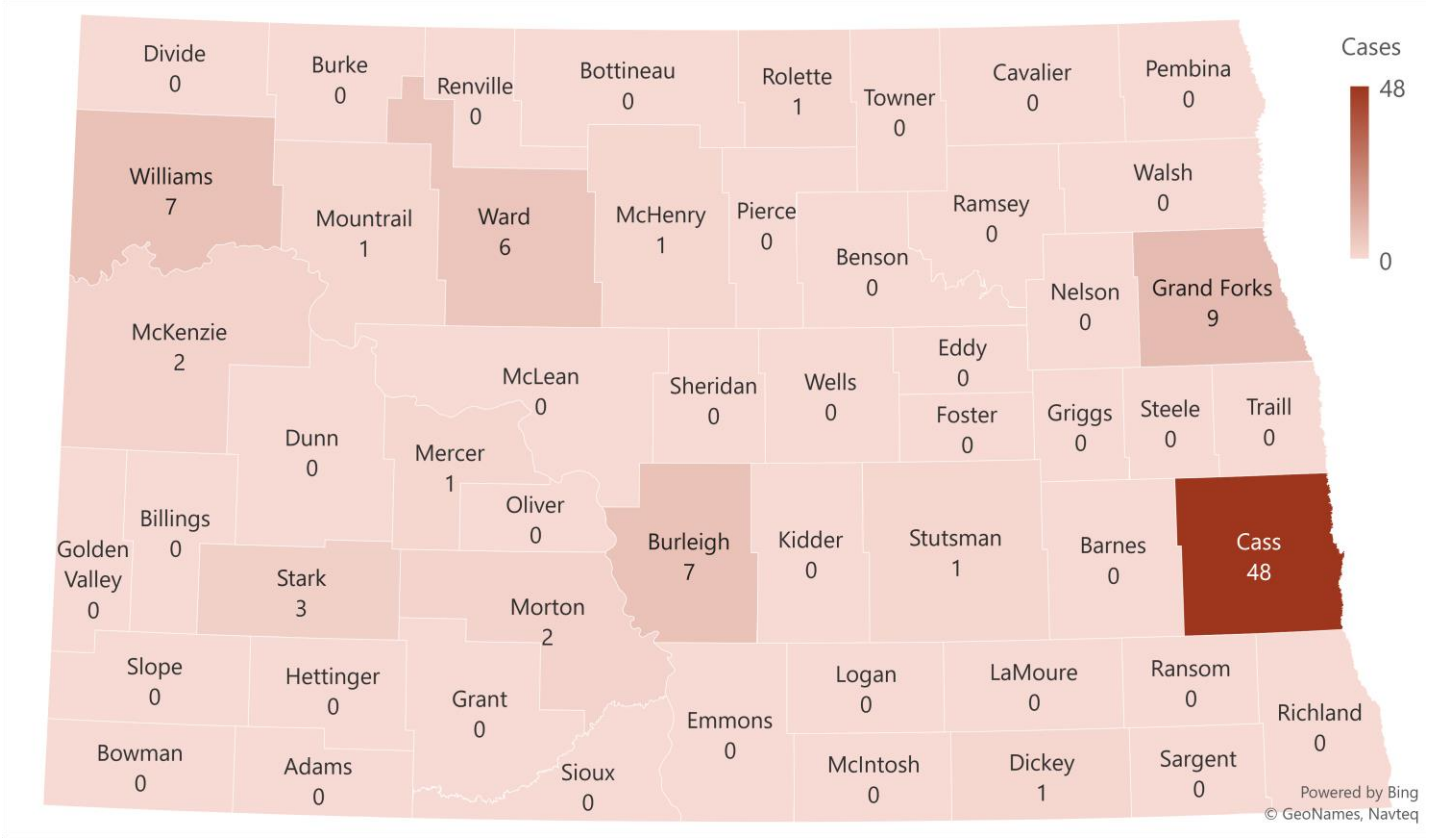
Hepatitis B Virus

In 2018, 90 cases of chronic HBV infection were reported from 14 counties in North Dakota. This was a decrease from the 98 cases reported in 2017. Of the 90 HBV-positive cases reported to the NDDoH, 45 were female and 45 were male. The average age was 33 years.

Figure 58: Reported Chronic HBV Cases by Year, North Dakota, 2014-2018



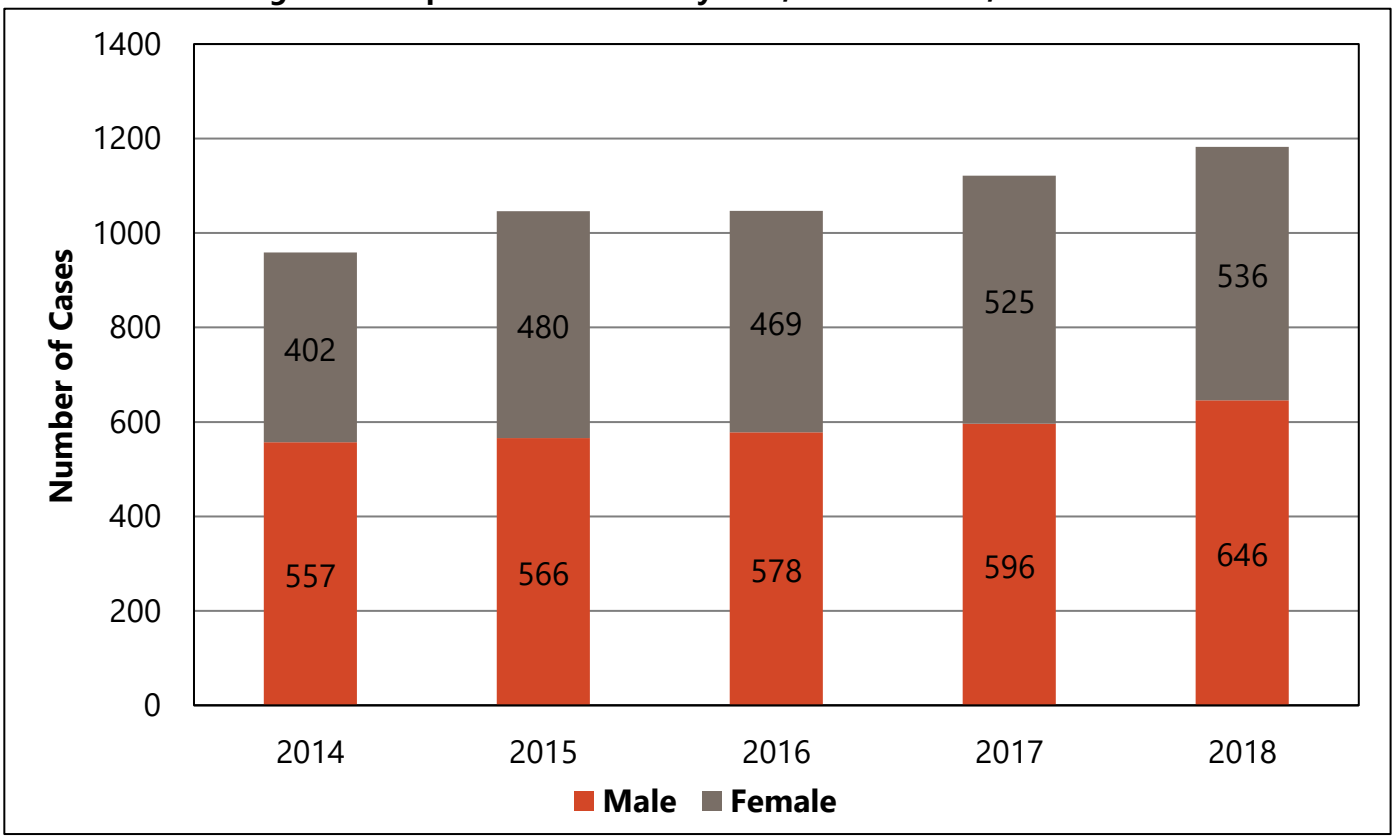
Map 10: North Dakota Hepatitis B Cases by County, 2018



Hepatitis C Virus

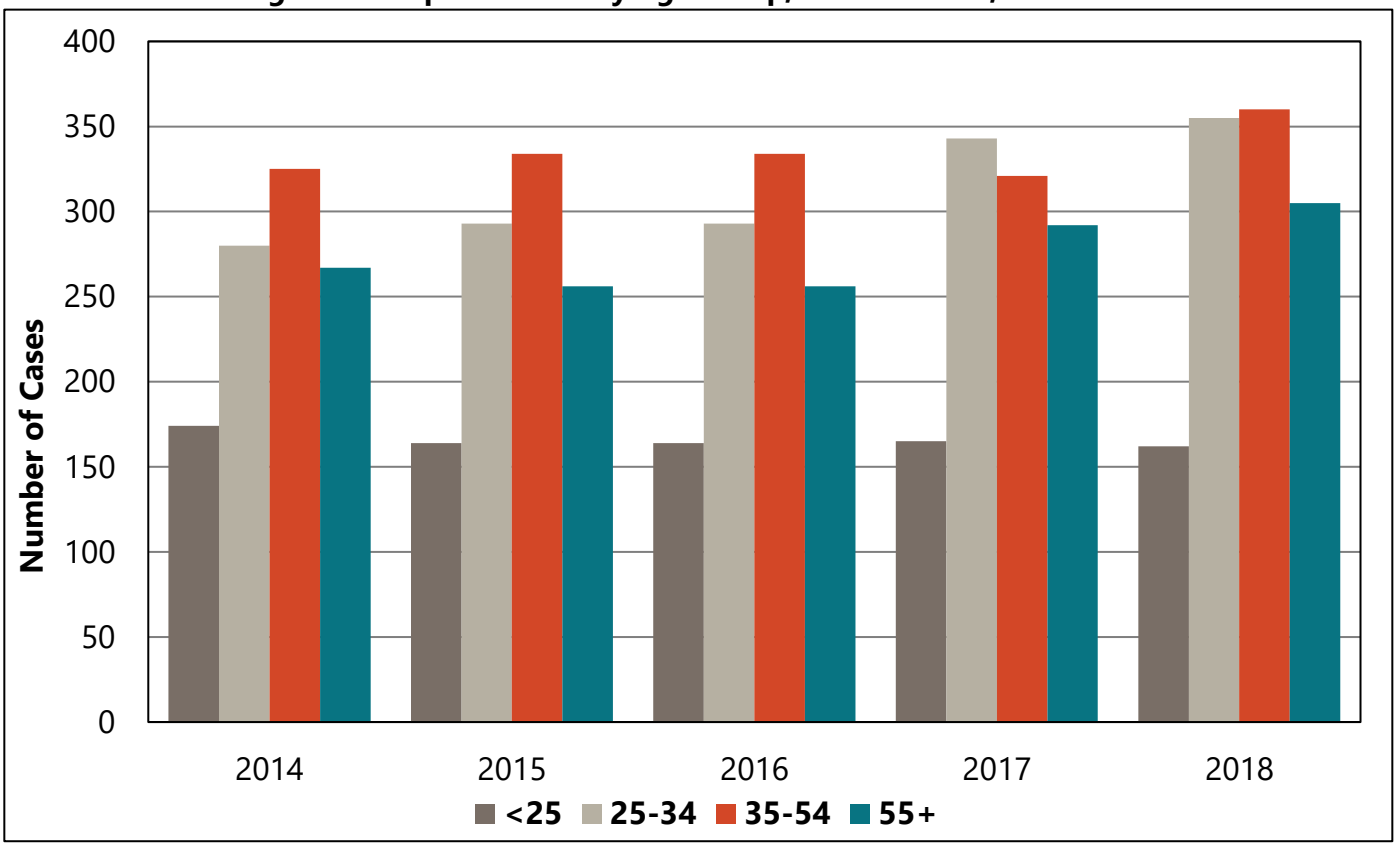
In 2018, the NDDoH received 1,182 reports of newly identified cases having a positive laboratory result that indicates past or present HCV infection. This number does not distinguish between resolved versus current infections.

Figure 60: Reported HCV Cases by Year, North Dakota, 2014-2018



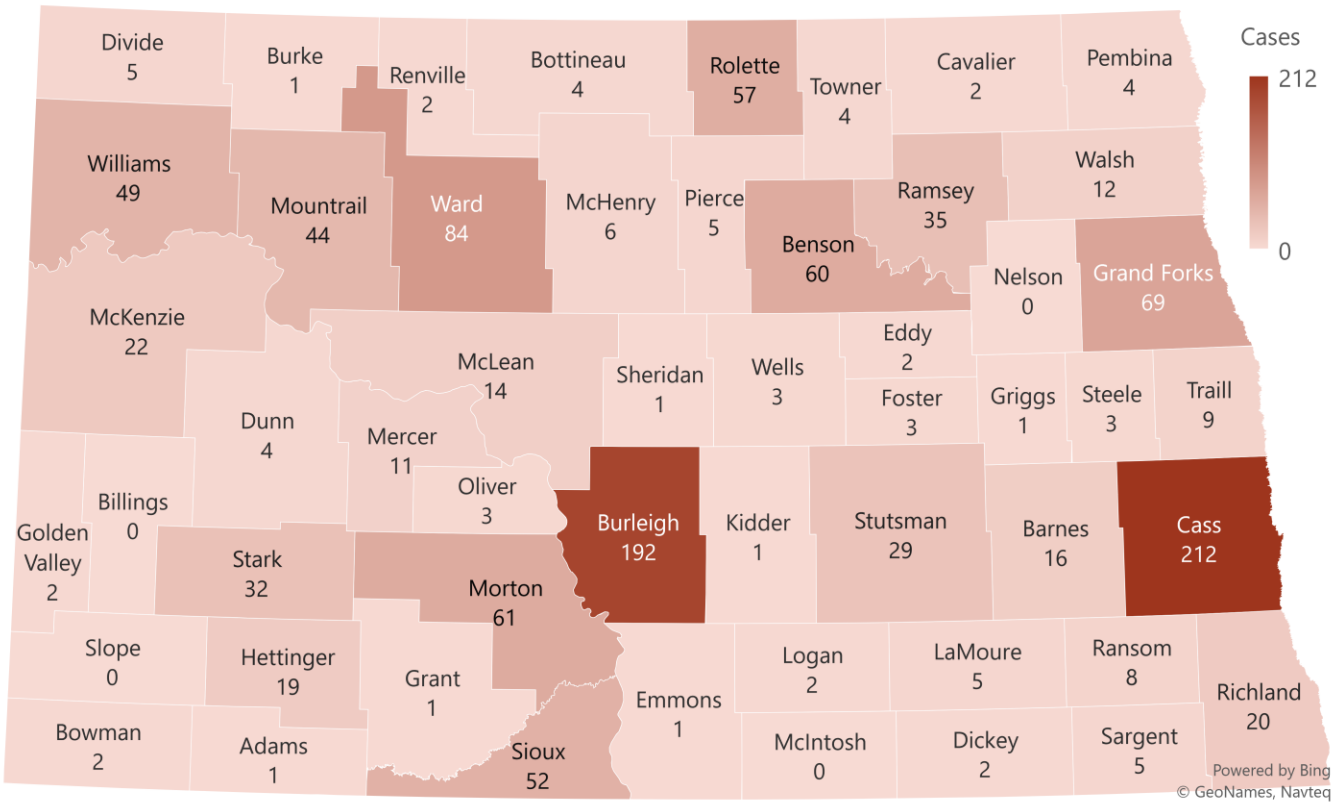
HCV infection in North Dakota is predominantly an adult infection. It is recommended to screen all individuals born between 1945 and 1965. The average age of cases was 41 years (Figure 62), and 55% of cases were male. Of the 1,182 cases in 2018, 786 had a reported race. Among those, the majority were white (63%), followed by American Indians/Alaskan Natives that accounted for 31%.

Figure 61: Reported HCV by Age Group, North Dakota, 2014-2018



Forty-nine counties reported cases of HCV. Cases per county ranged from zero to 212. The counties with the highest rates include Sioux (1188 per 100,000 people), Benson (865 per 100,000 people), and Hettinger (765 per 100,000 people).

Map 11: North Dakota Hepatitis C Cases by County, 2018



Summary of Selected Reportable Conditions
North Dakota

Reportable Conditions	January – December 2017	January – December 2018
Acute Flaccid Myelitis (AFM)	0	1
Anaplasmosis	17	3
Babesiosis	0	1
Botulism	0	1
Brucellosis	0	1
Campylobacteriosis	227	199
Carbapenem-resistant Enterobacteriaceae	27	27
Chickenpox	63	48
Chlamydia	3,280	3,528
Cryptosporidiosis	43	38
Dengue	0	0
***E. coli*, Shiga toxin producing (non-O157)**	28	58
***E. coli* O157**	12	8
Ehrlichiosis	4	5
Giardiasis	36	49
Gonorrhea	967	1,371
***Haemophilus influenza*e (invasive)**	17	19
Hantavirus	1	1
Acute Hepatitis A	0	0
Acute Hepatitis B	0	0
Acute Hepatitis C	2	0
HIV/AIDS (newly diagnosed)	38	39
Influenza (2016-17 and 2017-18 seasons)	7,507	8,530
Legionellosis	8	10
Listeriosis	0	0
Lyme Disease	56	33
Malaria	11	6
Measles	0	0
Meningococcal disease	0	0
Mumps	10	0
Perinatal Hepatitis B	47	48
Pertussis	50	51
Powassan	1	0
Q fever	0	0

Summary of Selected Reportable Conditions
North Dakota (continued)

Reportable Conditions	January – December 2017	January – December 2018
Rabies (animal)	14	12
Rocky Mountain spotted fever	14	10
Salmonellosis	96	117
Shigellosis	2	10
***Streptococcus pneumoniae* (invasive, children <5)**	5	5
Syphilis	78	83
Trichinosis	0	0
Tuberculosis	14	13
Tularemia	1	3
Typhoid fever	1	0
Vibriosis	5	9
West Nile virus disease	62	204
Zika Virus	0	0

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