

# North Dakota Epidemiology Report

# 2016

## The 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 healthcare 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



October 3, 2017

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# **Immunization Program**

The North Dakota Department of Health (NDDoH) Immunization Program serves the state of North Dakota in several ways. The NDDoH Immunization Program supplies free vaccines for children who are eligible for the Vaccines for Children (VFC) program. The program also coordinates investigations of vaccine-preventable diseases, provides education about immunizations and vaccine-preventable diseases, monitors the state's immunization rates and maintains and updates the North Dakota Immunization Information System (NDIIS).

# Vaccine-Preventable Disease Surveillance

**Lexie Barber, Surveillance Epidemiologist**

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## Measles

In 2014, the United States saw the largest number of measles cases since the disease was considered eliminated from the country in 2000. This number decreased in 2015, to 188 cases. In 2016, there were 70 cases of measles reported to the Centers for Disease Control and Prevention (CDC) from 16 states. 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 starts 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. Healthcare 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 puffy cheeks and swollen jaw caused by swollen salivary glands.

The number of mumps cases in the United States vary from year to year, from hundreds to thousands. In 2016, there were 5,833 cases of mumps reported to the 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 10 confirmed or probable cases of mumps reported in 2016. In addition, there were 39 suspect mumps cases reported. Prior to this, there have been very few cases of mumps reported in North Dakota.

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. Healthcare workers, college students, and international travelers are considered high risk.

## Meningitis

There were about 340 cases of meningococcal disease reported to the CDC in the United States in 2016. Additionally, outbreaks involving *Neisseria meningitidis* serogroup B have been reported on college campuses in recent years. North Dakota did not have any reports of meningococcal disease in 2016.

Meningococcal disease is an invasive infection of the bacteria *Neisseria 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 years 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 provisionally recommended for 16 through 23 year olds. Both vaccines are also recommended for people at high risk, including certain international travelers, laboratory workers, and people with certain medical conditions.

## Pertussis

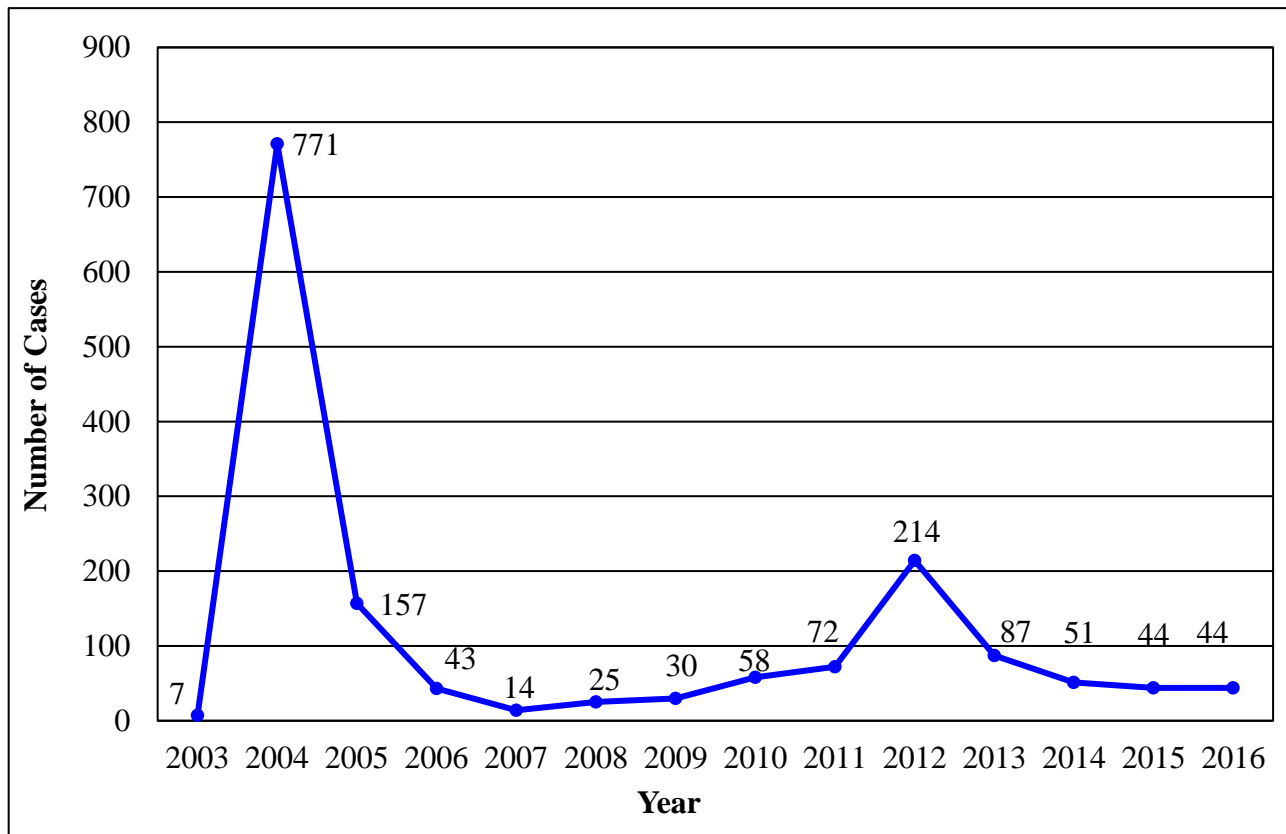
Pertussis, or whooping cough, is a respiratory disease caused by the bacteria *Bordetella pertussis*. The illness usually begins with cold-like symptoms and progresses to a cough, gradually becoming more severe. Pertussis is known for uncontrollable, violent coughing which often makes it hard to breath. 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 is routinely recommended for infants aged 2, 4, 6, and 15-18 months, with an additional dose given at age 4-6 years. Tdap vaccine is routinely recommended for adolescents aged 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 2016, North Dakota reported 44 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 1: Pertussis Cases in North Dakota, 2003-2016**



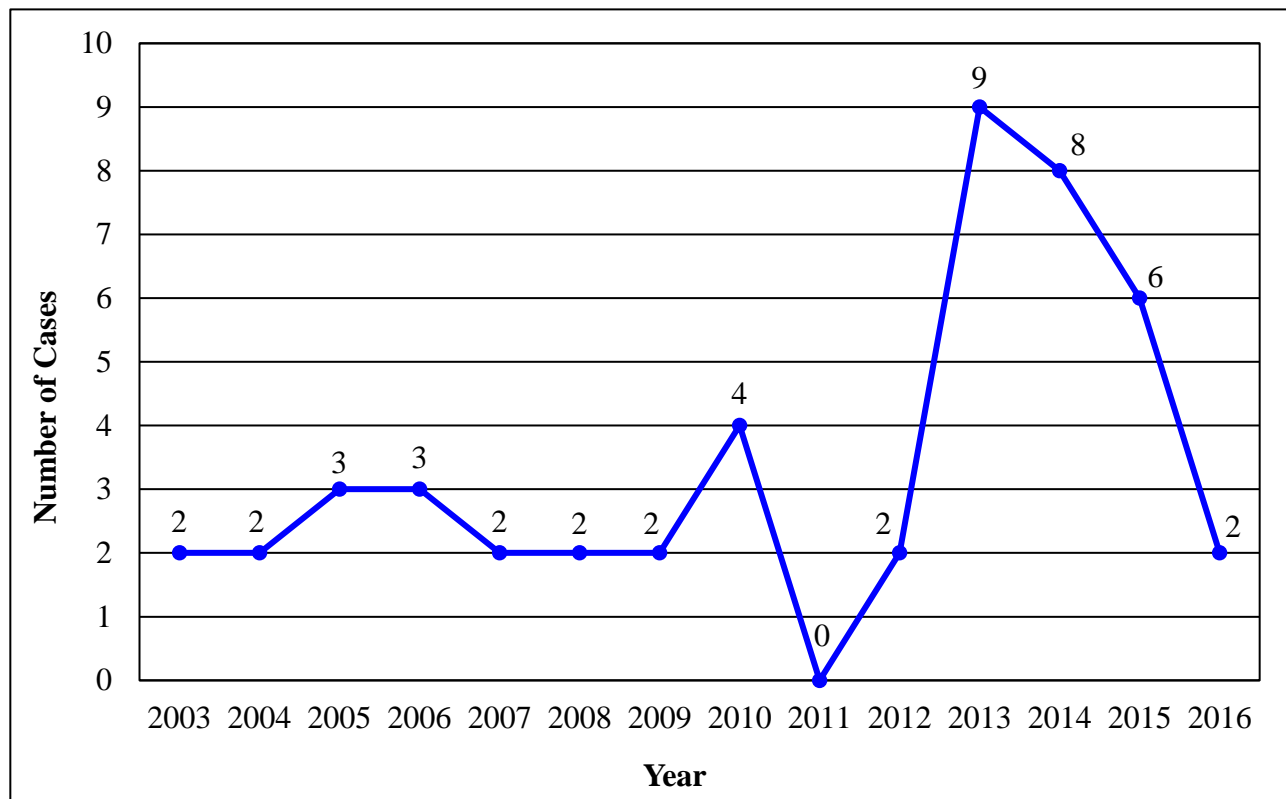
## Hepatitis A

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 transferred by blood.

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, 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. In 2016, North Dakota reported two cases of Hepatitis A.

**Figure 2: Hepatitis A Cases in North Dakota, 2003-2016**



### Perinatal Hepatitis B

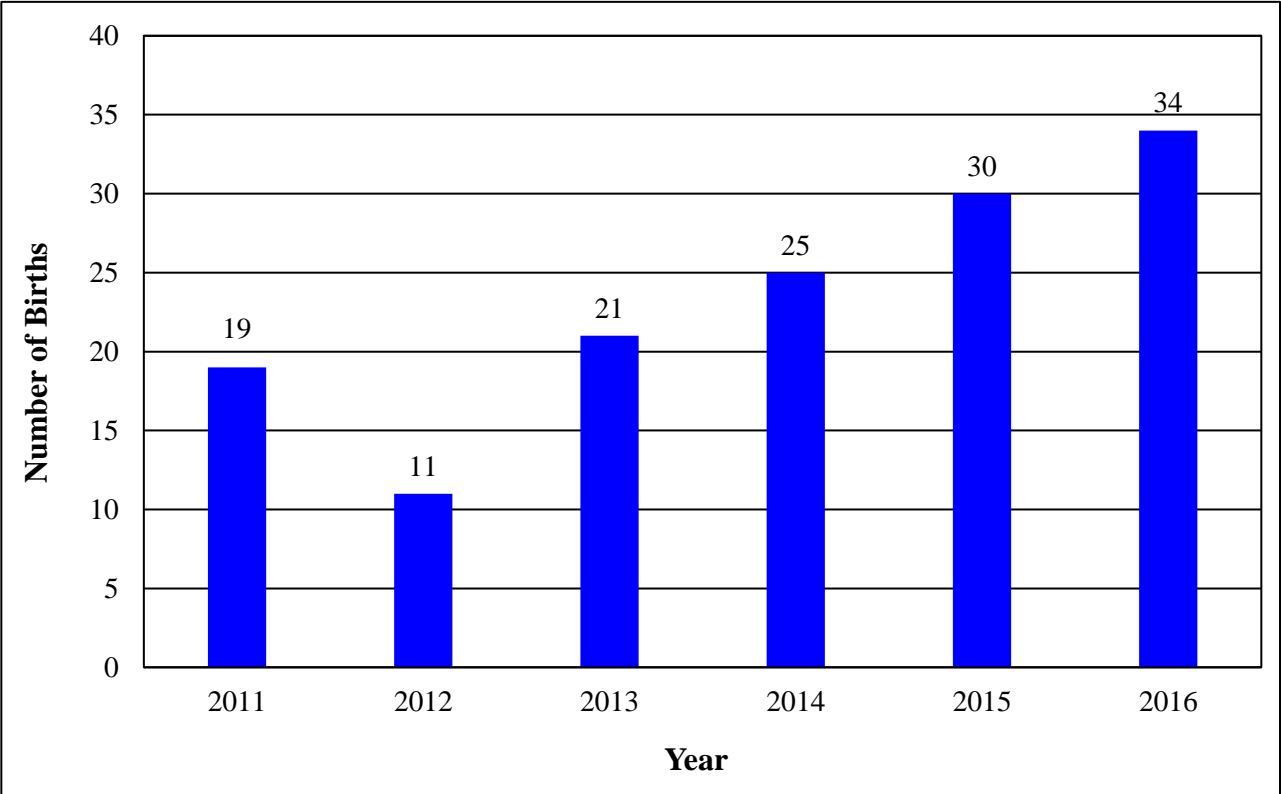
Hepatitis B is a virus that can be transmitted via blood, or other bodily fluids, and sexually. Chronically infected persons are at an increased risk for cirrhosis and liver cancer. Rates of new infection and acute disease are highest among adults, but chronic infections are more likely to occur in people 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 percent 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 percent 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 has increased in North Dakota since 2011.

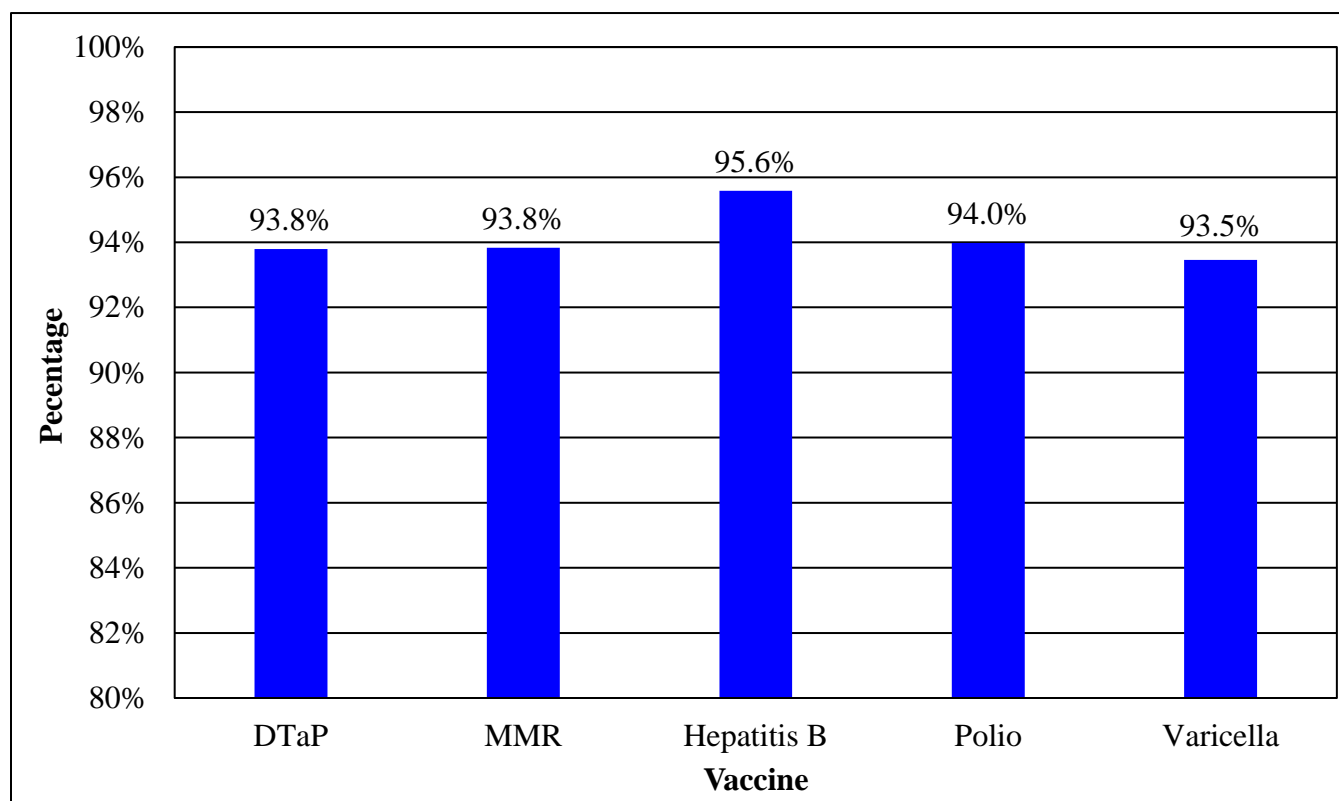
**Figure 3: The number of births to hepatitis B positive women in North Dakota by year, 2011-2016**



## 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 (DPI). The survey is submitted online, and is due around mid-November. Though still below the Healthy People 2020 goals of 95 percent coverage for all school entry vaccinations, kindergarten vaccination rates for the 2016-2017 school year increased for all five of the required vaccinations. Prior to the 2016-2017 school year, vaccination coverage rates have remained low.

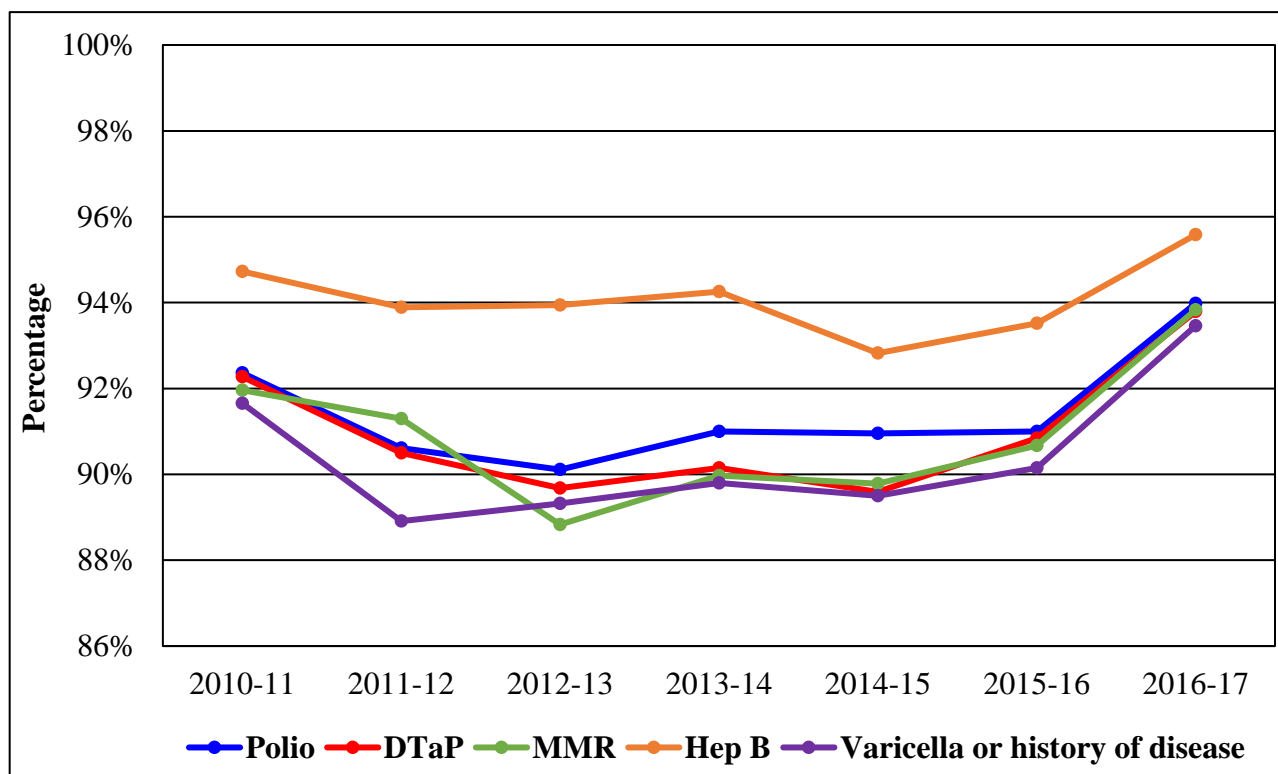
**Figure 4: North Dakota kindergarten entry immunization rates for the 2016-2017 school year**



In the past, there was a large percentage of students unaccounted for in the survey, meaning they were not up-to-date, but also did not have an exemption on file. These children may truly have been up-to-date, but the schools were not collecting updated immunization records, schools may not have been reporting exemptions, or schools were not enforcing requirements and allowing children not up-to-date to attend school. Results from the 2016-2017 School Immunization Survey show that this number of unaccounted for kindergarten students decreased from about six to seven percent during the 2015-2016 school year to about three percent during the 2016-2017 school year.

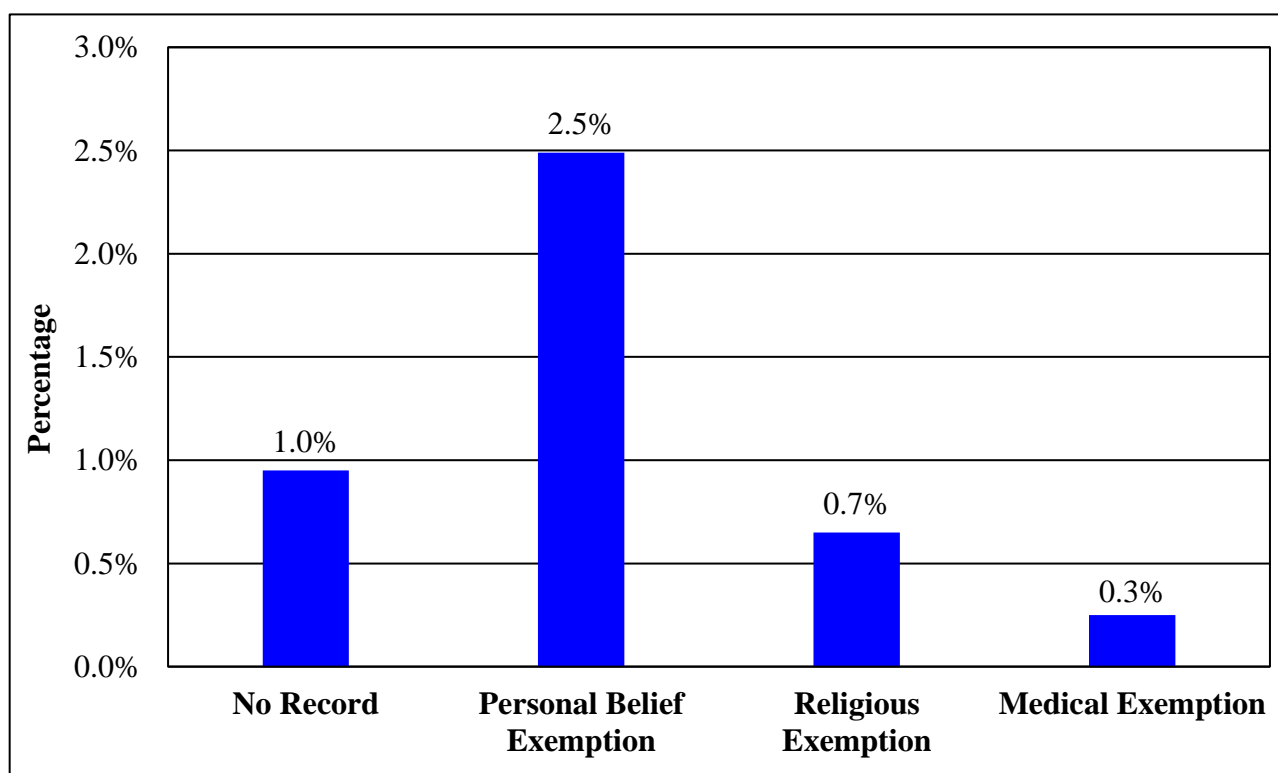
The survey also indicated that schools that exclude students who are not up-to-date on immunizations have higher kindergarten vaccination rates than schools that do not exclude students who are not up-to-date.

**Figure 5: North Dakota kindergarten entry immunization rates from 2010 to 2016**

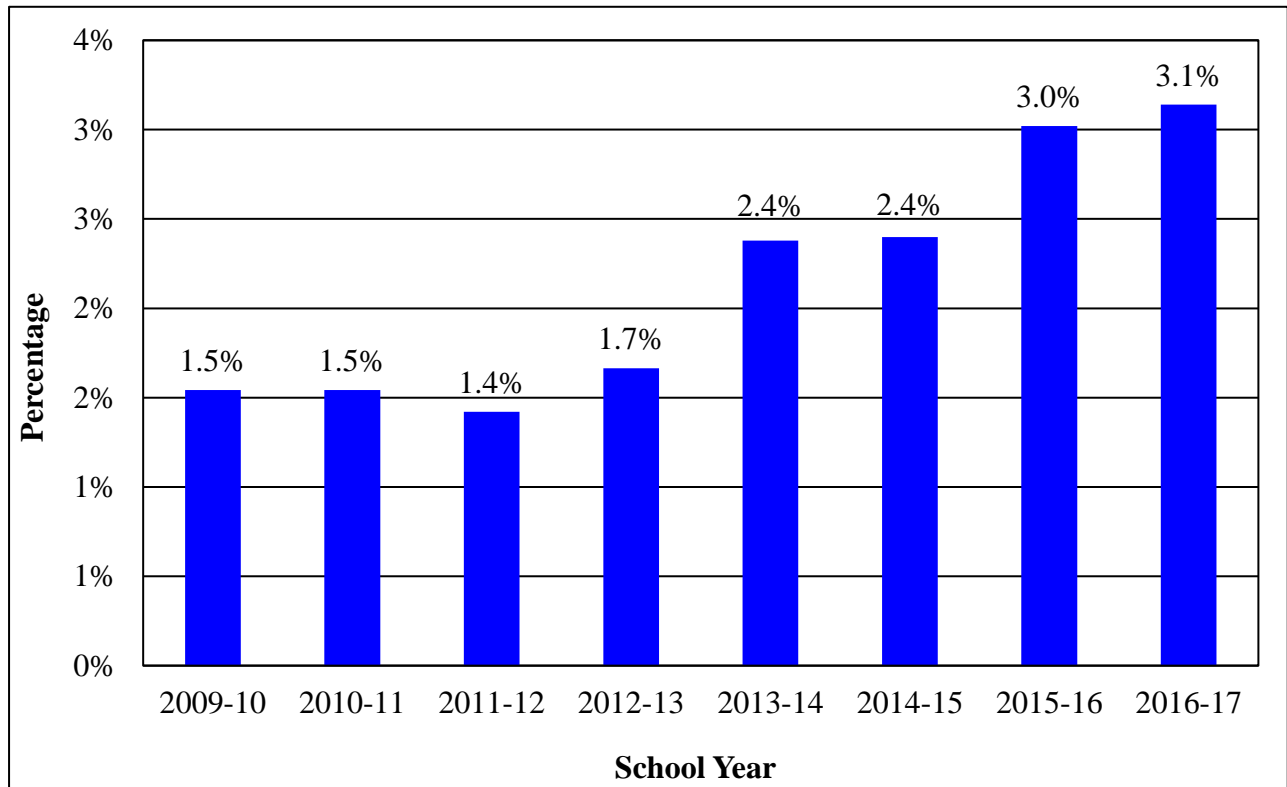


Kindergarten vaccination rates are beginning to increase; however, exemption rates are also continuing to increase.

**Figure 6: North Dakota kindergarten entry exemption rates for the 2016-2017 school year**

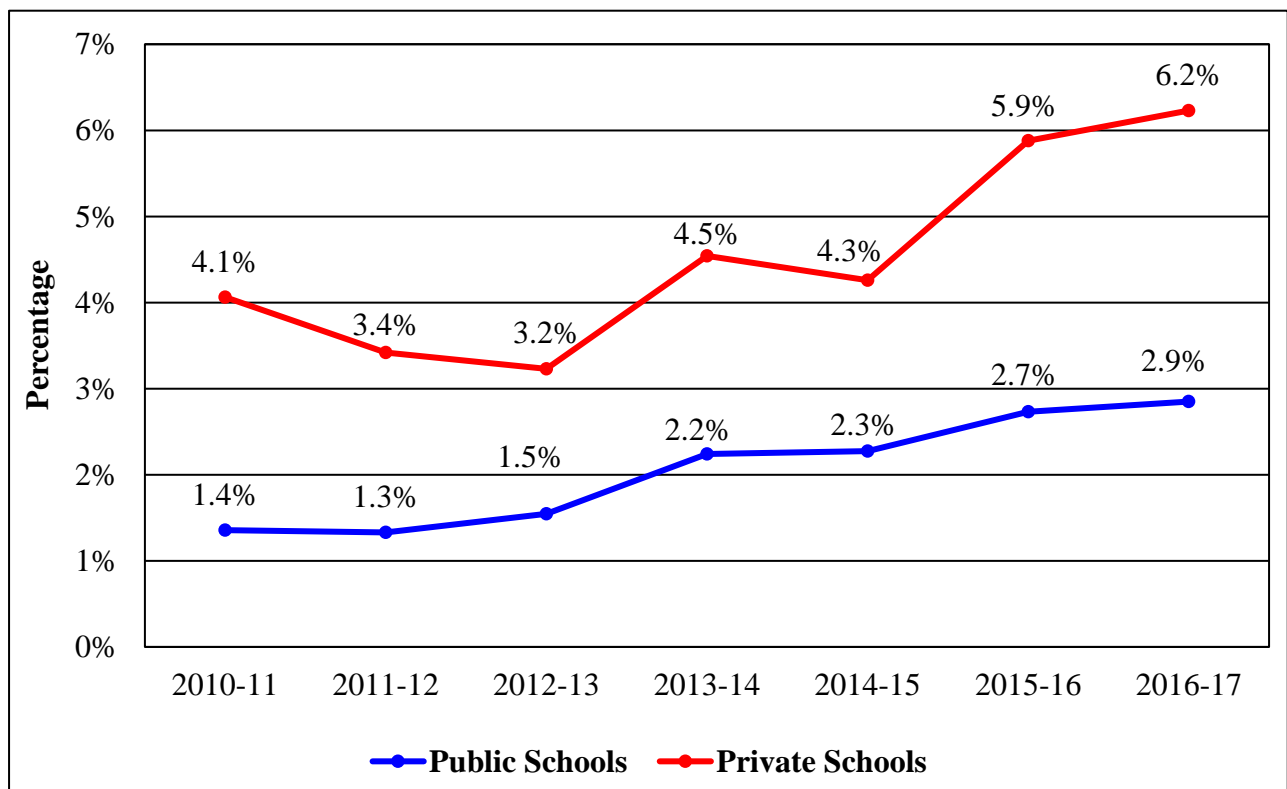


**Figure 7: North Dakota kindergarten entry exemption rates from 2009 to 2016**



The rise in exemptions becomes more apparent when kindergarten data is separated by school type (Figure 8).

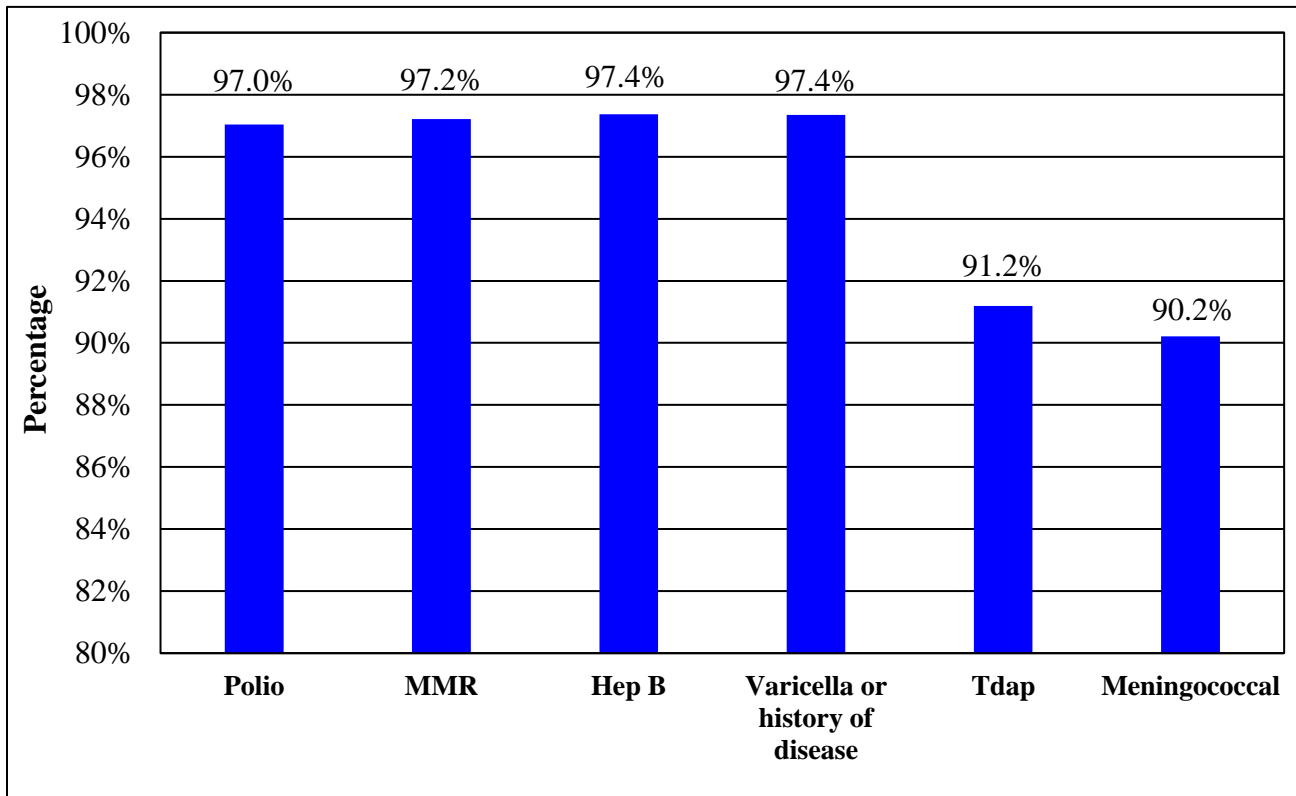
**Figure 8: North Dakota kindergarten entry exemption rates from 2010 to 2016, stratified by school type**



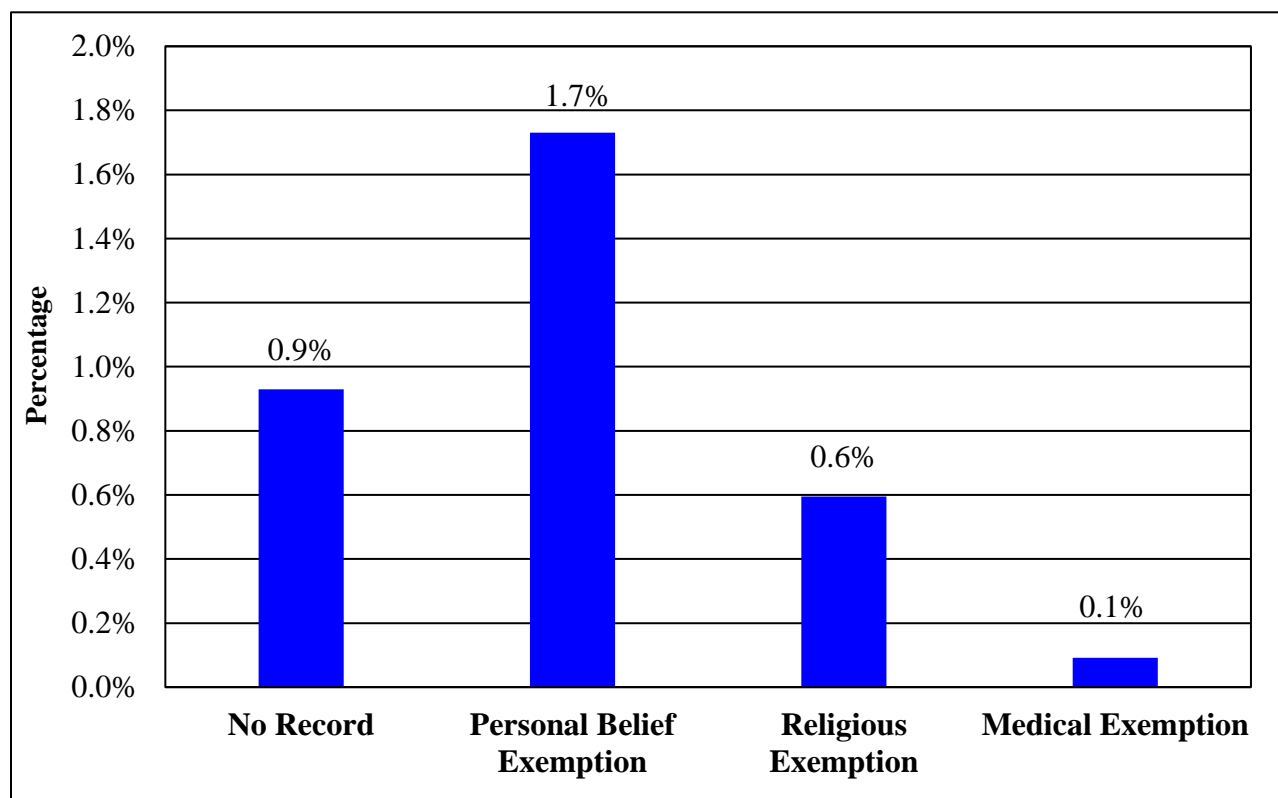
## Seventh Grade Vaccination Rates

Tetanus, diphtheria, and pertussis (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 in order to standardize the recommendations. For the 2016-2017 school year, Tdap and MCV4 coverage rates both increased to about 91 percent and 90 percent respectively. Seventh grade entry exemption rates for Tdap and meningococcal are lower than kindergarten entry exemption rates.

**Figure 9: North Dakota seventh grade entry immunization rates for the 2016-2017 school year**



**Figure 10: North Dakota seventh grade Tdap and meningococcal entry exemption rates for the 2016-2017 school year**



# Immunization Coverage Rates

**Mary Woinarowicz, NDIIS Manager**

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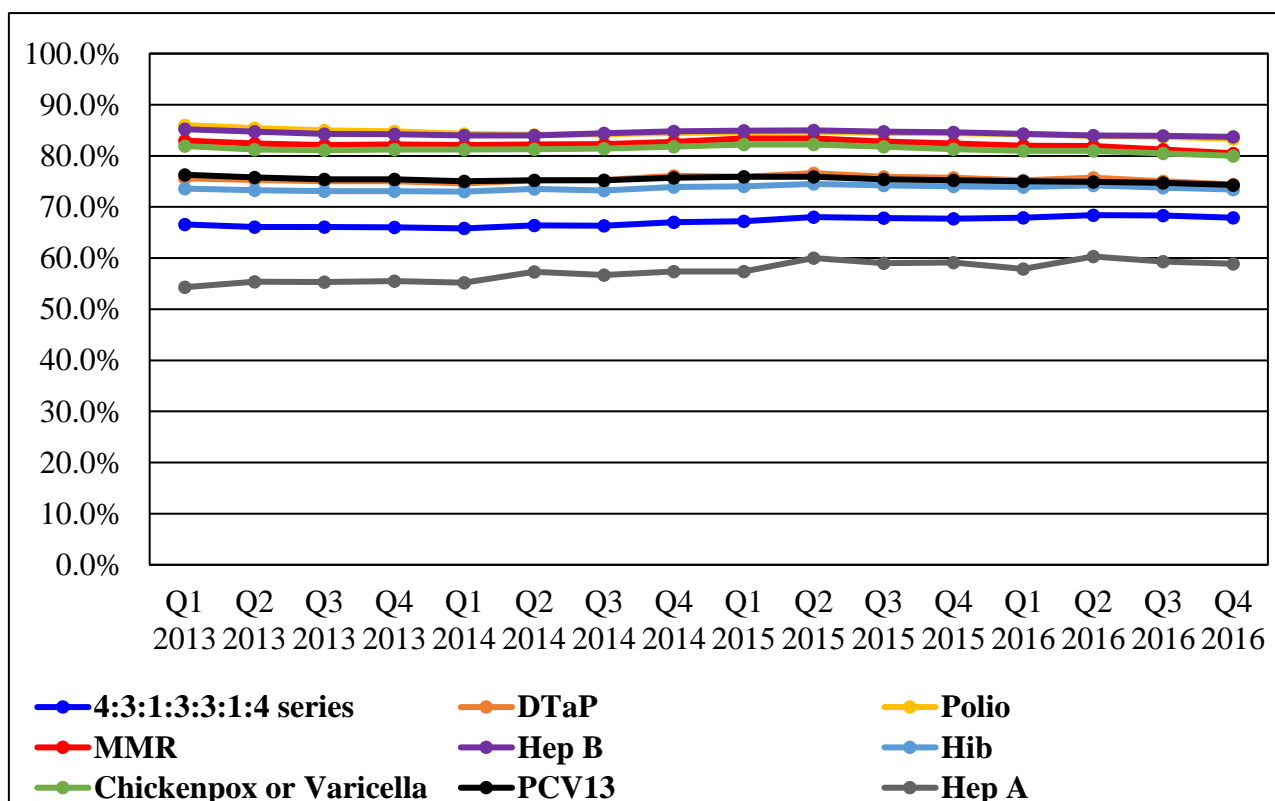
Maintaining high immunization coverage helps protect all North Dakotans from vaccine preventable disease. With timely, detailed immunization data, the ability of all stakeholders to coordinate effective vaccination strategies and help maintain high coverage rates is greatly increased. A widely used and 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.<sup>1</sup> Using data from the North Dakota IIS (NDIIS), the NDDoH Immunization Program is able to monitor immunization coverage rates by healthcare provider or geographical area (i.e. county and state) in real time. North Dakota healthcare 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 92% 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 but 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 to the NDIIS. There are also two U.S. Air Force Bases in North Dakota that do not report any immunizations to the NDIIS so 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.

## 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 measles, mumps and rubella (MMR), three doses of hepatitis B, three or four doses of *Haemophilus 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 did increase slightly (< 1%) in 2016 compared to 2015. Coverage rates for hepatitis A saw an increase in the second quarter of 2016 but decreased again in quarters three and four.

**Figure 11: North Dakota immunization rates for infants ages 19 – 35 months using the 4:1:3:3:3:1:4 vaccine series, 2013-2016**



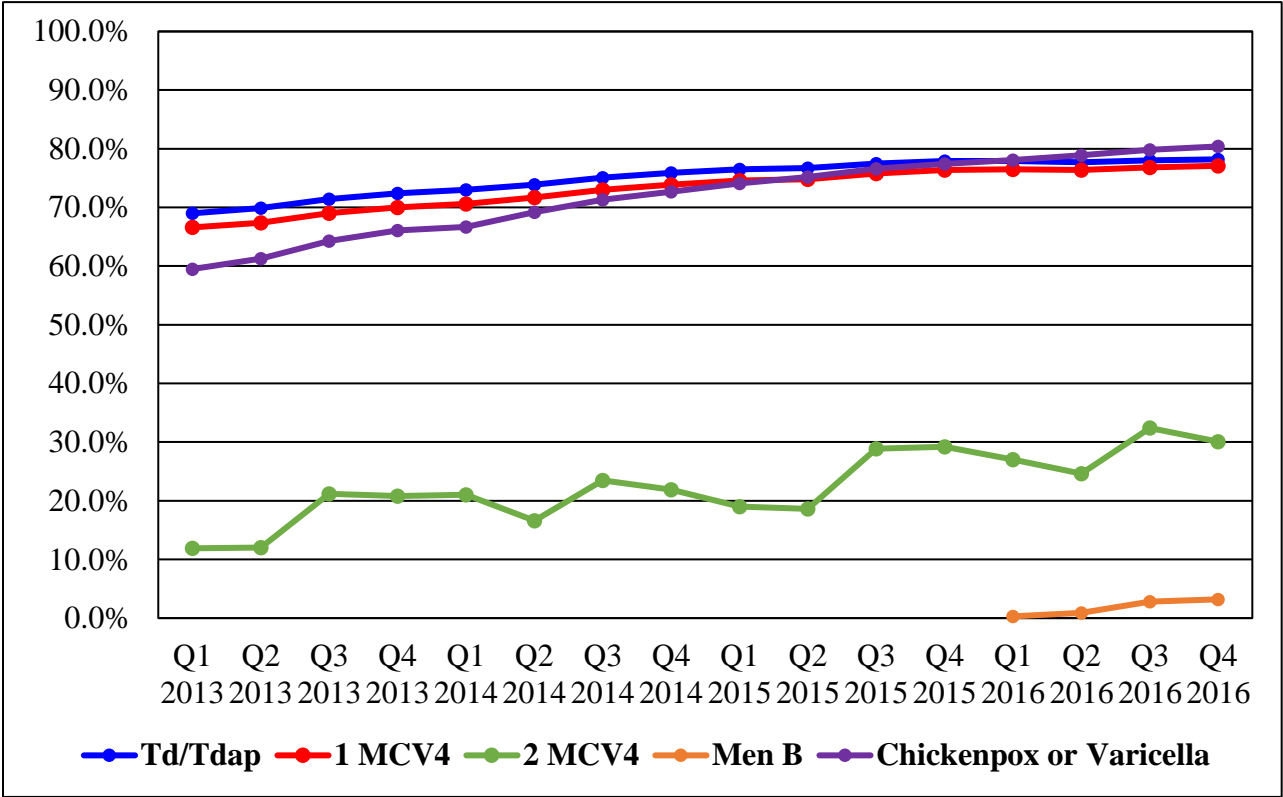
## Adolescent Immunization Coverage

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 provisional recommendation was made for administering meningococcal B vaccine. Since 2013, North Dakota has seen a steady increase in coverage rates for recommended adolescent immunizations. At the end of 2016, 78.2% of adolescents 13-17 years of age were up-to-date with one dose of Tdap and 77.1% were up-to-date with one dose of MCV4 vaccine. Approximately 30.1% 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, but 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 2016, 80.4% of adolescents 13-17 years were up-to-date with two doses of varicella vaccine compared to only 66.1% in 2013.

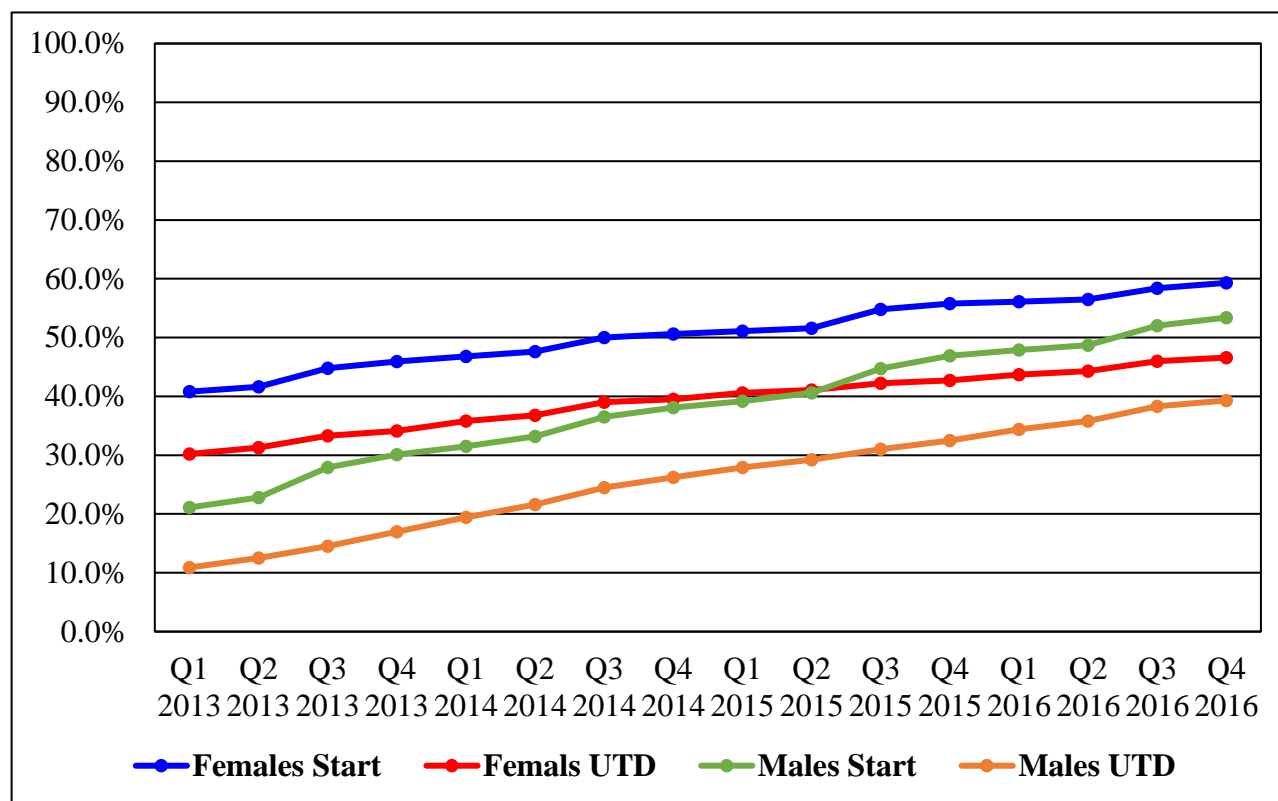
**Figure 12: North Dakota immunization rates for adolescents ages 13 – 17 years, 2013-2016**



Coverage rates for HPV, although lower than Tdap and MCV4, have seen much greater increases over the last four years. By the end of 2016, 59.3% of females and 53.4% of males 13 to 17 years had started the HPV vaccine series. This is an increase of almost 19% for females and more than 30% for males since 2013. Additionally, 46.6% of females and 39.3% of males are up-to-date with the complete HPV vaccine series. This is an increase of approximately 16% for females and 29% for males since 2013.

**Figure 13: North Dakota HPV immunization rates for adolescents ages 13 – 17 years, 2013-2016**

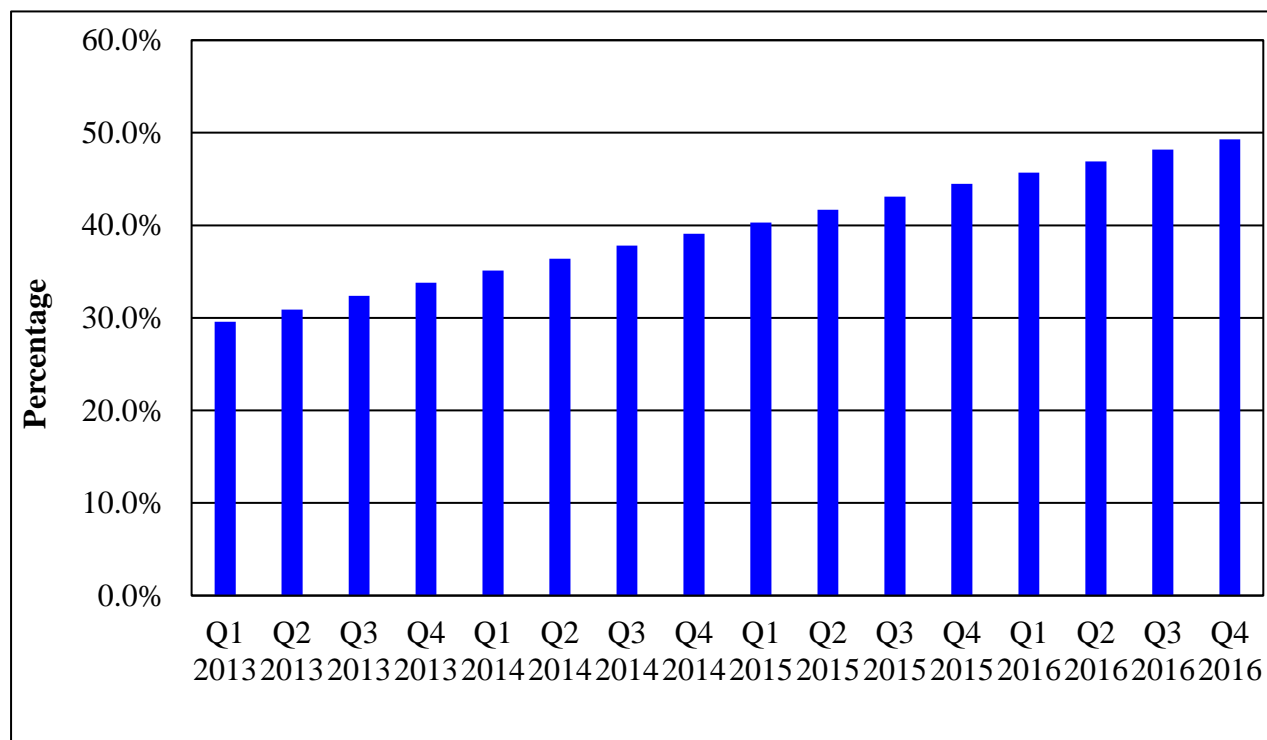
*(UTD = up-to-date)*



## Adult Immunization Coverage

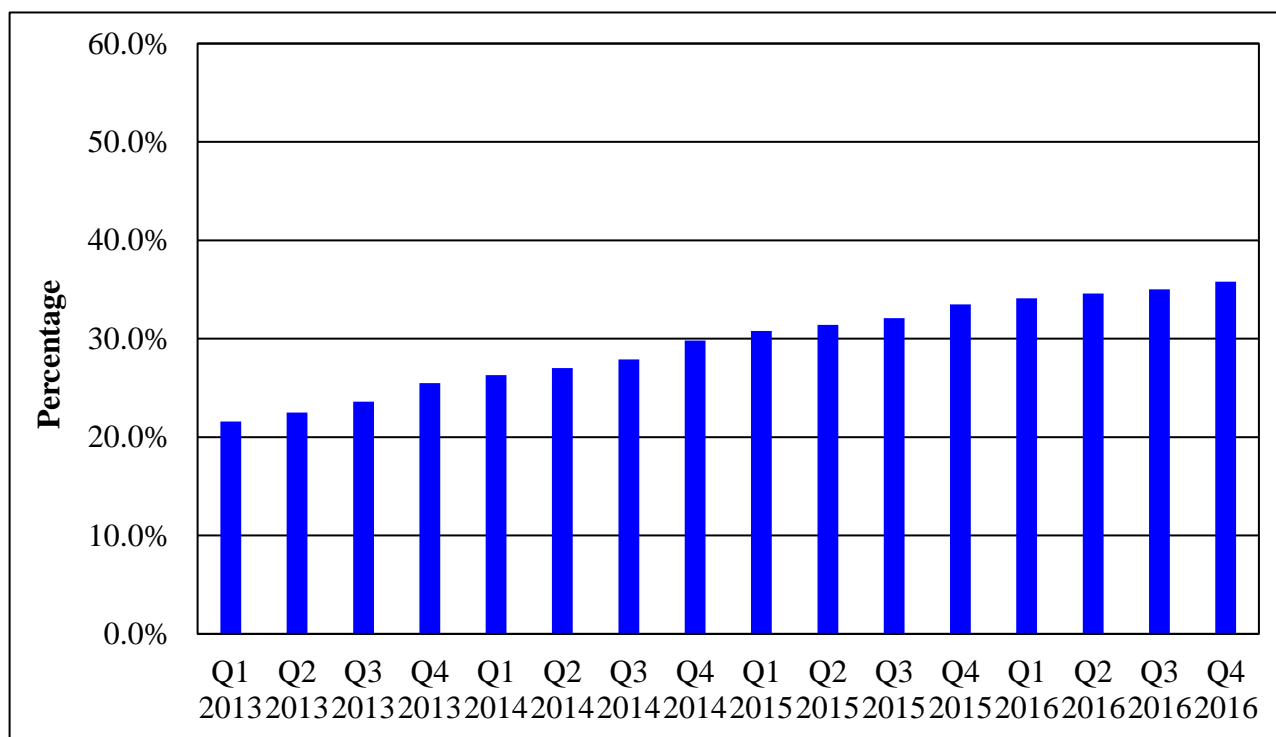
There are also routine vaccine recommendations for adults 19 years of age and older. All adults are recommended to receive one dose of Tdap vaccine. At age 60, adults are recommended to receive zoster (shingles) vaccine. Pneumococcal conjugate vaccine (PCV13) is recommended for all adults at age 65 followed 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, 49.3% of adults had received their Tdap vaccine as of the end of 2016. This is a 20% increase since 2013 and a 6% increase since 2015.

**Figure 14: North Dakota Tdap immunization rates for adults 19 and older, 2013-2016**



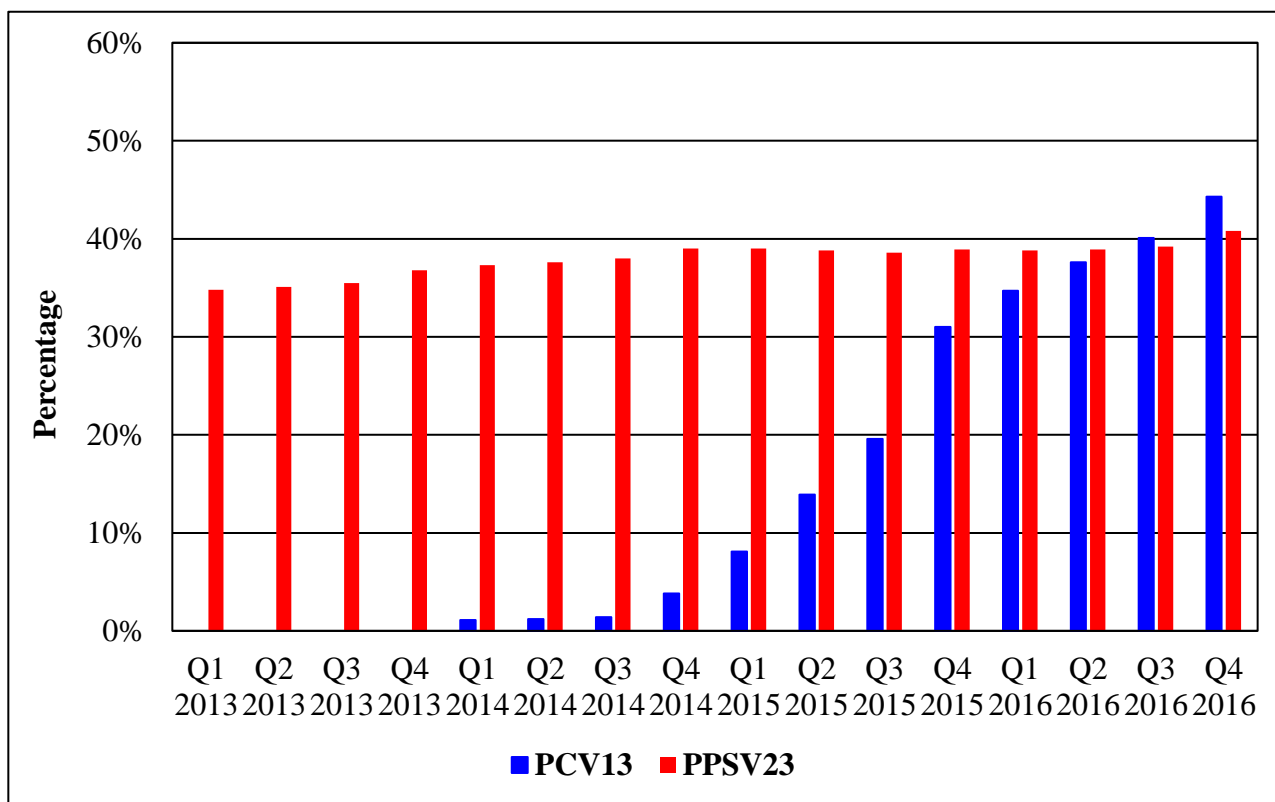
The coverage rate for zoster vaccine for adults has increased approximately 14% since 2013 to 35.8% at the end of 2016. The Health People 2020 Goal for zoster is 30%. North Dakota met this goal in quarter one of 2015 and has continued to exceed it every quarter since.

**Figure 15: North Dakota zoster immunization rates for adults 60 and older, 2013-2016**



Approximately 44.3% of all adults were up-to-date with one dose of PCV13 at the end of 2016. Since 2013, the coverage rate for PPSV23 has seen a slower increase from 34.8% to 40.8%. 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 16: North Dakota pneumococcal immunization rates for people 65 and older, 2013-2016**



# **Epidemiology and Surveillance**

## **Program**

The Epidemiology and Surveillance Program is responsible for the management and surveillance of infectious disease activities, such as enteric/foodborne, vectorborne, zoonotic, influenza, antibiotic resistant infections, parasitic infections, waterborne diseases, non-flu respiratory viruses, healthcare-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.

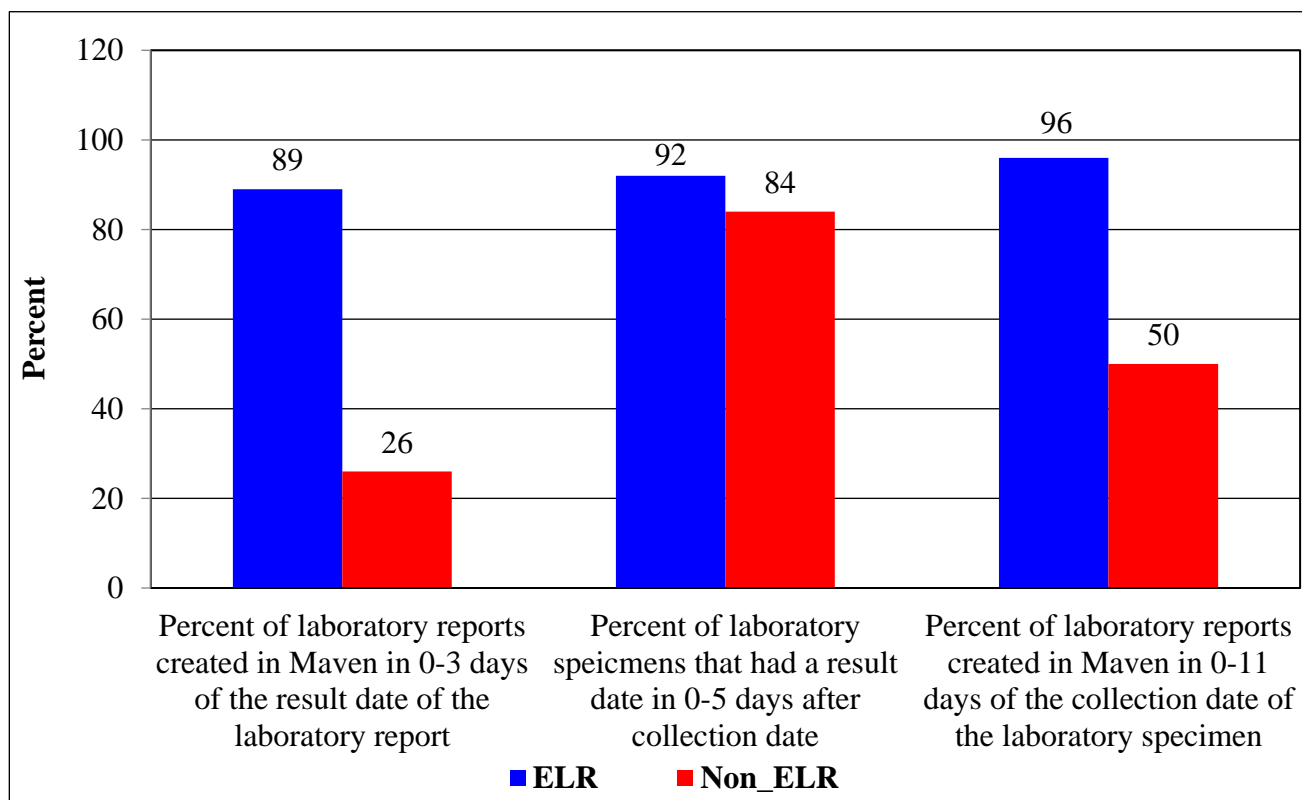
# Electronic Laboratory Reporting (ELR)

Alicia Lepp, 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 Laboratory Services (DLS). At the end of 2016, NDDoH had 12 laboratories in production with ELR, two of which had been added in 2016. Laboratory reports are electronically sent to the NDDoH disease surveillance system, Maven.

The total numbers of laboratory results received in 2016 were 29,963. Of those, 24,212 (80%) were reported through ELR. Of the laboratory reports created in Maven by ELR, 89% were created in Maven in zero to three days of the result date of the initial laboratory report, 92% 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), 26% were created in Maven in zero to three days of the result date of the initial laboratory report, 84% had zero to five days between the collection date of the laboratory specimen and the date of result of the initial laboratory report, and 50% were created in Maven in zero to eleven days between collection date of the laboratory specimen.

**Figure 17: Comparison of laboratory reports reported to the NDDoH, 2016**



The number of laboratory reports received via ELR increased by 10% from the 24,265 records received in 2015. ELR timeliness appears to have stayed consistent, with 89% of reports being created in Maven in zero to three days, 92% 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 2015.

There were 112 laboratory reports in Maven in 2016 that had 100 or more days between the specimen collection date and the date the report was created in Maven and/or the initial laboratory result date and the date the report was created in Maven. A couple of explanations exist for these late created reports. One is that 17 cases of *E. coli* were sent via ELR from the DLS. The DLS can serotype *E. coli* O157:H7. If the specimen does not type out as O157:H7, then the specimen are forwarded to the CDC for serotyping. Results from CDC can take months to receive, thus bringing our span of time from collection date to laboratory create date to being 100 days or greater. Another explanation is that 56 laboratory reports were either merged with another case or were manually manipulated, thereby resulting a change of a create date in Maven. The final explanation is that one laboratory sending ELR data had a VPN change by their ELR vender that resulted in a lost connection from the laboratory and NDDoH for a couple of weeks. After the connection was restored, the laboratory resent data from the time during the lost connection. This resulted in 34 laboratory results being reported with laboratory report dates ranging from 2008 to 2013.

A comparison was made for the two laboratories that implemented ELR in 2016 to analyze the timeliness of laboratory reporting prior to ELR implementation to after. Laboratory report specimen collection date, result date, and case create date in Maven were compared in the same span of time in the year before ELR implementation and the year after implementation. Laboratory A did not submit any laboratory reports in 2015, so 2014 lab reports were used for timeliness comparison. NDDoH received 16 laboratory reports from Laboratory A in 2014, compared to 19 reports received in 2016 following the implementation of ELR. The median number of days from result date of laboratory report to when a case was created in Maven improved by 67% and from collection date of laboratory specimen to when a case was created in Maven by 67% with the implementation of ELR.

NDDoH received one laboratory report from Laboratory B from July 2015 to December 2015, compared to 91 laboratory reports received during the same time period in 2016 following the implementation of ELR. Prior to ELR implementation, the majority of laboratory reports from Laboratory B were influenza. From January 2015 to July 2015, the NDDoH received nine influenza reports. Following implementation of ELR, Laboratory B reports included other reportable conditions besides influenza, including chlamydia, gonorrhea, campylobacter, MRSA and VRE. Timeliness of reporting appeared to be the same prior to ELR implementation to after. However, even though overall timeliness did not improve with the implementation of ELR, the total number of laboratory reports from Laboratory B did improve, from 10 in all of 2015 compared to 91 reports from July through December of 2016. Laboratory B either increased their laboratory testing capabilities or were not reporting all of the mandatory reportable conditions identified prior to the implementation of ELR.



Comparison of Laboratory A and B data that were reported prior to implementation of ELR with 2016 data after ELR implementation showed an improvement in both the numbers of reports and the timeliness from specimen collection and report date to creation in Maven.

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 and determine more accurate risk factors or exposures, along with any public health action that is needed. Additionally, fewer data entry errors are made with ELR than non-ELR reporting methods.

# Syndromic Surveillance

**Jill Baber, Syndromic Surveillance Epidemiologist**

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In 2016, the NDDoH transitioned to a new syndromic surveillance system, ESSENCE, to view syndromic reason-for-visit data submitted by hospitals and clinics throughout North Dakota. ESSENCE is a biosurveillance program designed by the John's Hopkins Public Health Laboratory, originally for use by the United States Department of Defense after the 9/11 terrorist attacks. A web-based version of the program is available for free to the NDDoH through the CDC National Syndromic Surveillance Platform (NSSP). Up until this point, the NDDoH used the NSSP's previous web-based syndromic surveillance system, BioSense 2.0, which was sunsetted at the end of 2016 after ESSENCE was installed into the platform.

ESSENCE will allow the NDDoH to have greater control over syndrome creation, with enhanced visualization capabilities. It will also allow submitting providers to view their own data on the web-based ESSENCE platform. The NDDoH is excited to move forward with this new syndromic surveillance system.

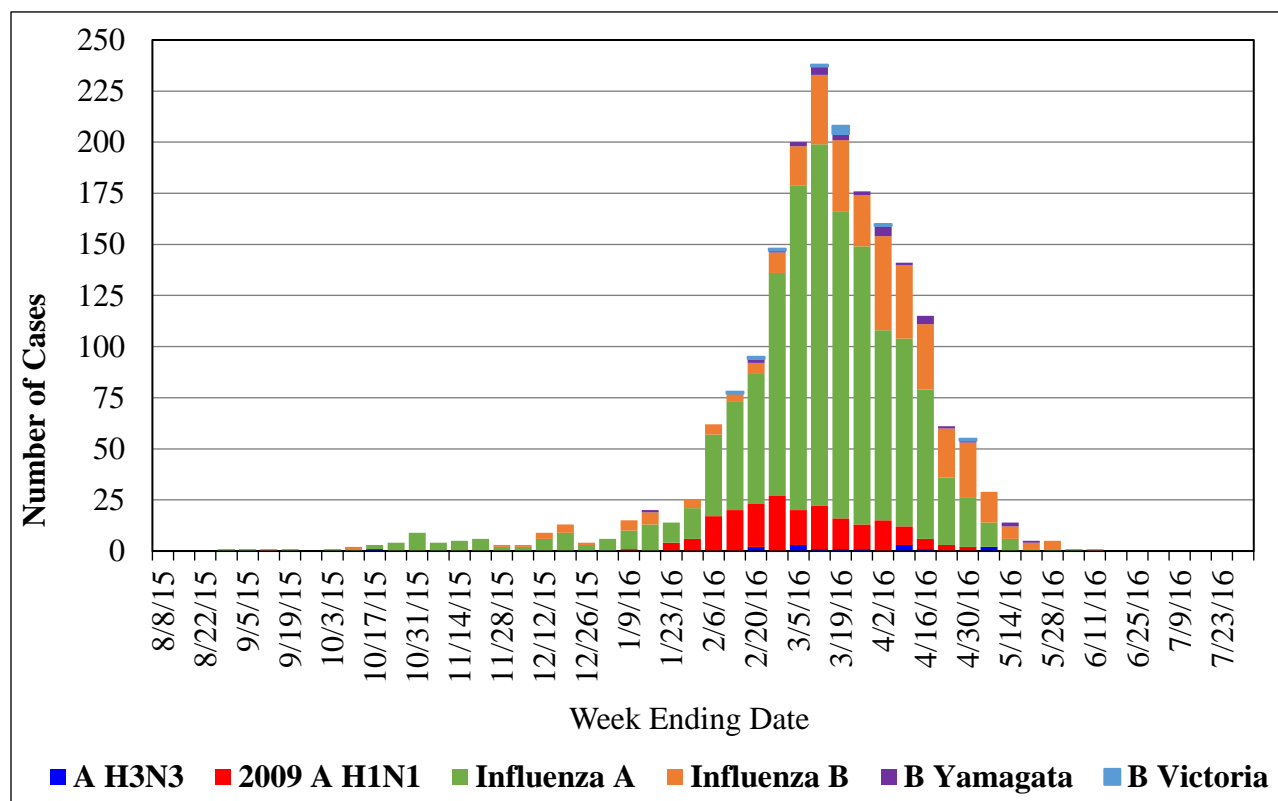
# Respiratory Diseases

Jill Baber, Influenza Surveillance Epidemiologist

## 2015-2016 Influenza Season

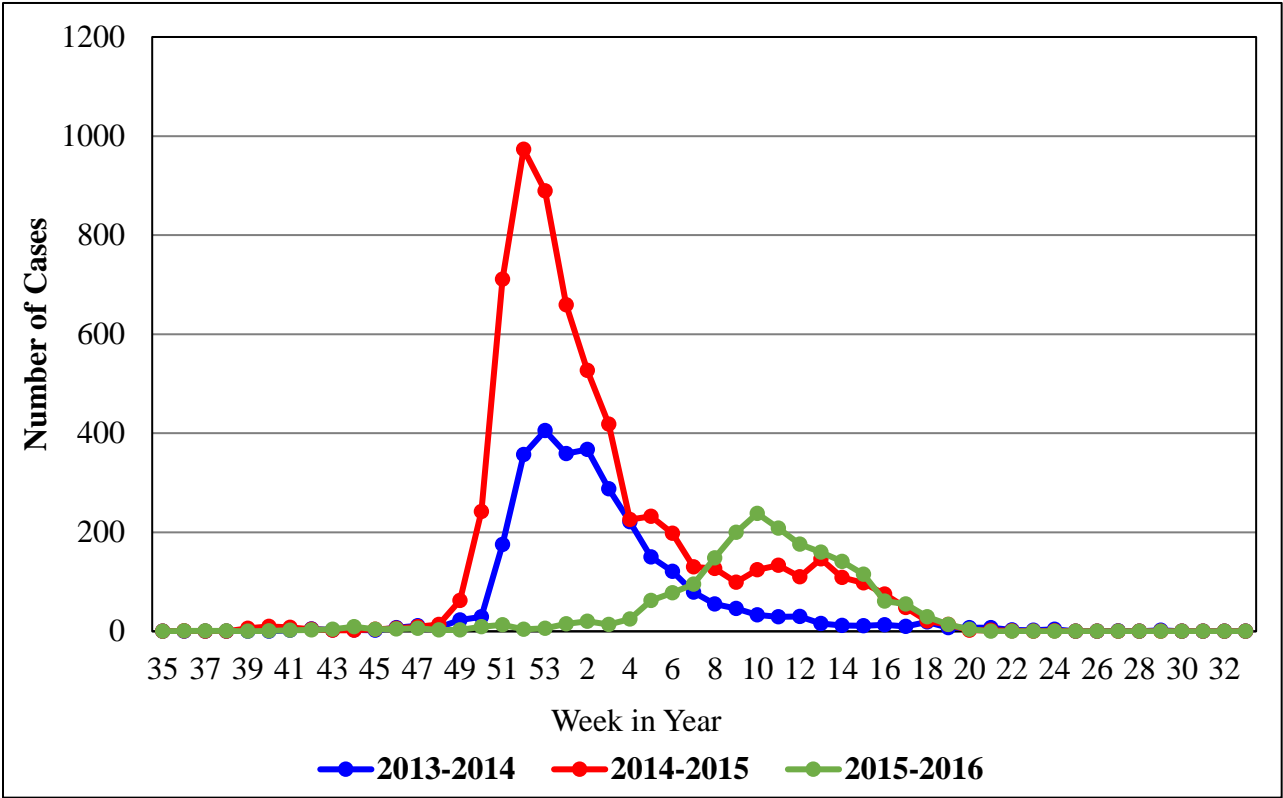
Influenza surveillance activities for the 2015-2016 season officially began August 1, 2015. The NDDoH requires all laboratory-identified cases of influenza, including positive rapid antigen tests, be individually reported to the NDDoH year-round. Summer 2015 activity was low. Early in the season, some cases and one outbreak were reported during September and October, possibly indicating another early season. However, cases dropped off, and seasonal activity did not start until January 2016. With only 1,942 reported, laboratory-confirmed cases, the season was the mildest in the last five years. It was also a later-than-average season, and an influenza A 2009 H1N1-predominant season. North Dakota's influenza activity was similar to national trends, but a side-by-side comparison is not possible because influenza is not a nationally notifiable disease. Pediatric deaths caused by influenza are nationally notifiable, and the NDDoH reported its first pediatric death since the 2010-2011 season, in a child with underlying medical conditions. This was one of five influenza-related deaths identified via physician report and vital records data for 2015-2016.

Figure 18: North Dakota 2015-2016 reported case count for seasonal influenza



With a peak week ending 03/12/2016, 2015-2016 was a later season than average. It certainly felt late, given that the previous three seasons peaked early, in the last week of December or the first week of January. The previous season, 2014-2015, was an unusually severe season, with 6,443 laboratory confirmed cases and 50 identified deaths, making 2015-2016 seem especially mild by comparison. More information on influenza in North Dakota can be found at [www.ndflu.gov](http://www.ndflu.gov).

**Figure 19: Influenza cases by week, North Dakota 2013-2016 seasons**



# 2016 Human Metapneumovirus Outbreak

**Jill Baber, Syndromic Surveillance Epidemiologist**

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A small cluster of unusually severe human metapneumovirus (hMPV) infections in children was reported to the NDDoH in May 2016. HMPV typically causes mild to moderate respiratory disease, and severe cases in children and adults have been known to happen rarely. Severe hMPV infection is most often seen in infants and the immunocompromised elderly. Most often, children with severe disease are co-infected with another respiratory virus—most commonly Respiratory Syncytial Virus (RSV). The six initial cases reported in the cluster were identified in hospitalized children, and four of the six cases were Native American. Cases in the cluster were older than expected; the median age of cases was 2.5 years, with a range of 4 months to 9 years. Although five of the six initial cases had some sort of underlying condition, only one co-infection was identified (rhinoviruses) among the initial cases. Two cases in the initial cluster died.

Because of the slightly unusual aspects of this initial cluster, the NDDoH initiated an investigation with the assistance of an Epi-Aid from CDC. The investigation aimed to identify additional cases of unusually severe hMPV in both children and adults; characterize the outbreak; and document the unusual presentation for other public health and medical professionals.

All hospitalized patients with a positive test for human metapneumovirus from January 2016 through June 2016 at one of the state's six largest hospitals were identified. Eleven additional pediatric patients and 27 adult patients were included. Charts for these individuals were reviewed for symptomology, co-infections, co-morbidities, underlying conditions, and clinical course. No special associations among individuals with hMPV were found. The investigation did not ultimately indicate anything unusual. However, it provided valuable insight into the possible clinical course for hMPV. Results of the outbreak were published by the CDC in the Morbidity and Mortality Weekly report, and can be found at:

[www.cdc.gov/mmwr/volumes/66/wr/mm6618a7.htm](http://www.cdc.gov/mmwr/volumes/66/wr/mm6618a7.htm).

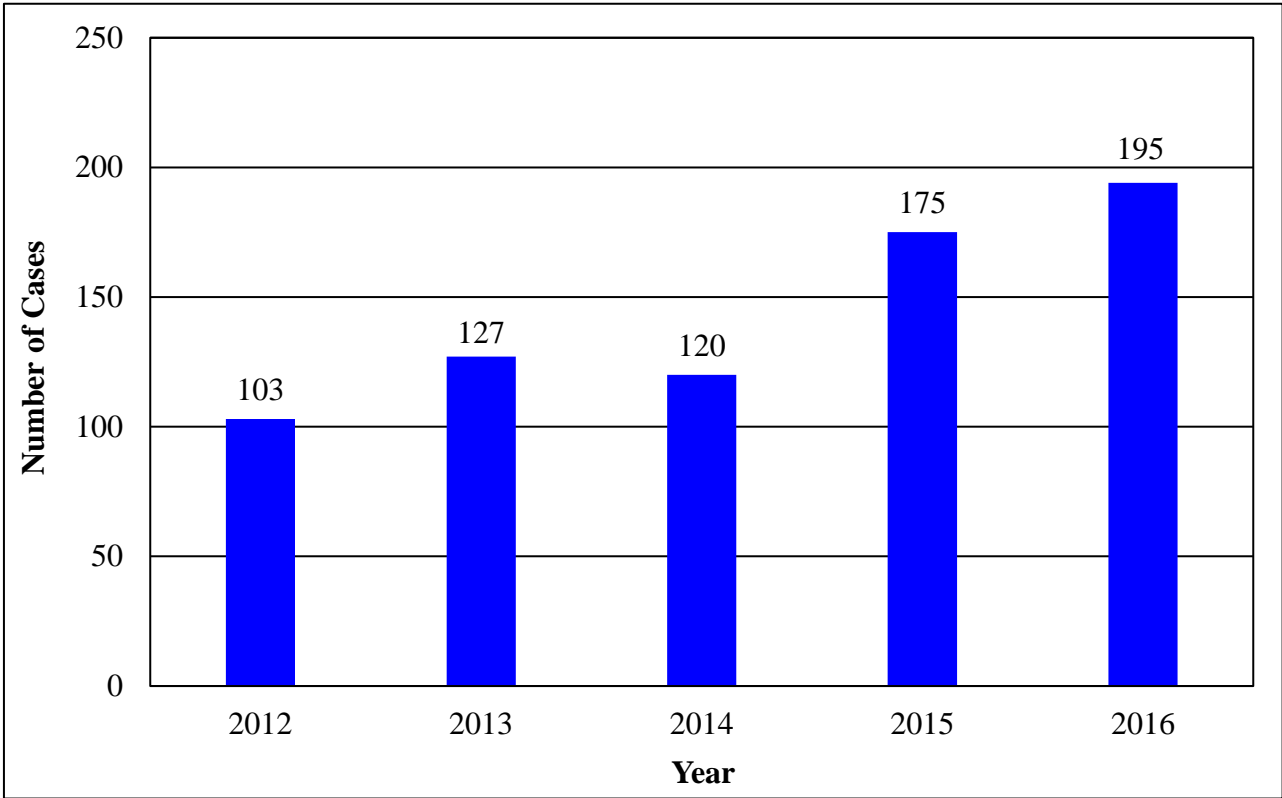
# Enteric Diseases

Laura Cronquist, Epidemiologist

## Campylobacteriosis

In 2016, 195 cases of campylobacteriosis were reported to the NDDoH, an 11% increase from the 175 cases reported in 2015 (Figure 20). Statewide, campylobacteriosis incidence rate was 25.7 cases per 100,000 people in 2016. Thirty-eight counties reported cases, with Logan (154.6 cases per 100,000 people), Hettinger (152.1 cases per 100,000 people), and McIntosh (150.6 cases per 100,000 people) having the highest incidence of campylobacteriosis.

Figure 20: North Dakota Campylobacteriosis Case Counts by Year, 2012-2016

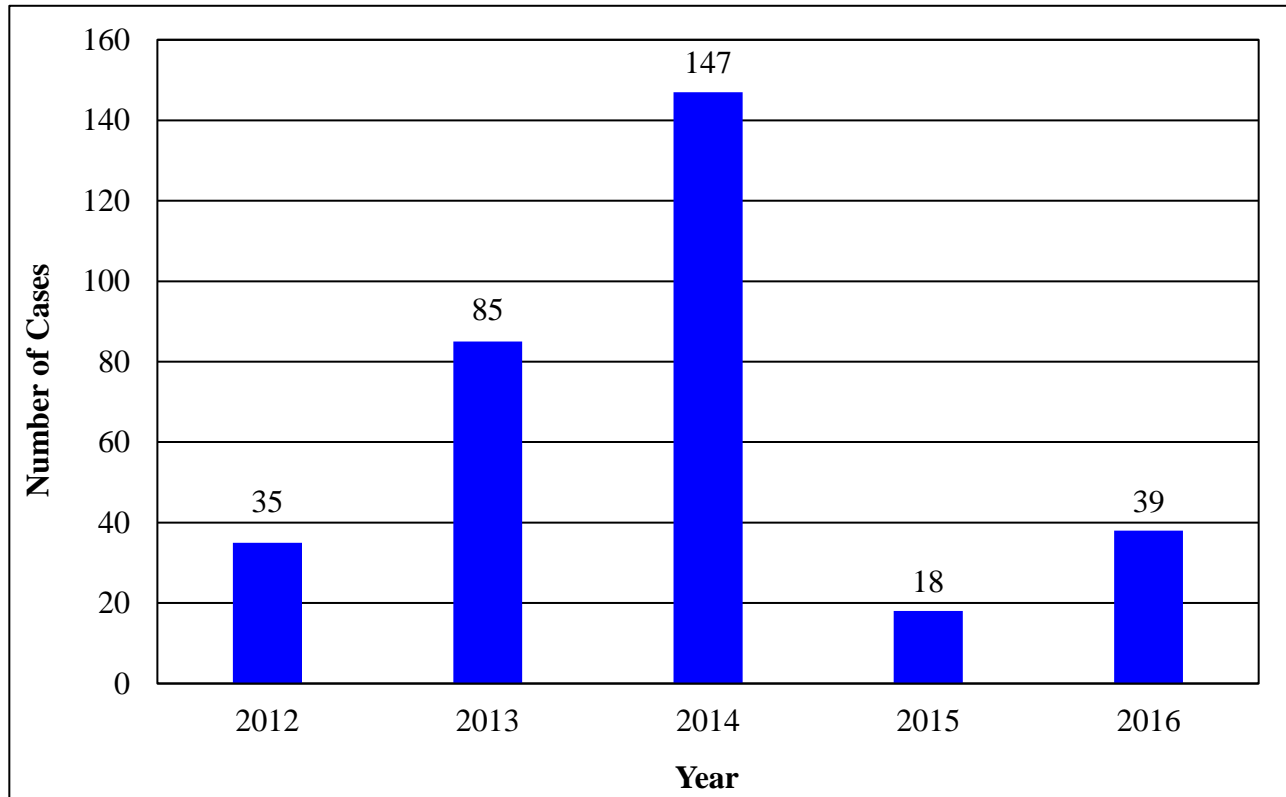


The median age of cases of campylobacteriosis was 32 years. Persons less than ten years of age had the highest age-specific incidence rate (33.0 cases per 100,000 people). One-hundred sixteen (59%) of the reported cases were male. Thirty-two (16%) cases were hospitalized.

## Cryptosporidiosis

In 2016, 39 cases of cryptosporidiosis were reported to the NDDoH, a 117% increase from the 18 cases reported in 2015 (Figure 21). Statewide cryptosporidiosis incidence was 5.1 cases per 100,000 people in 2016. Thirteen counties reported cases, with Stark (32.1 cases per 100,000 people), Bowman (30.9 cases per 100,000 people) and Emmons (29.9 cases per 100,000 people) having the highest incidence of cryptosporidiosis.

**Figure 21: North Dakota Cryptosporidiosis Case Counts by Year, 2012-2016**

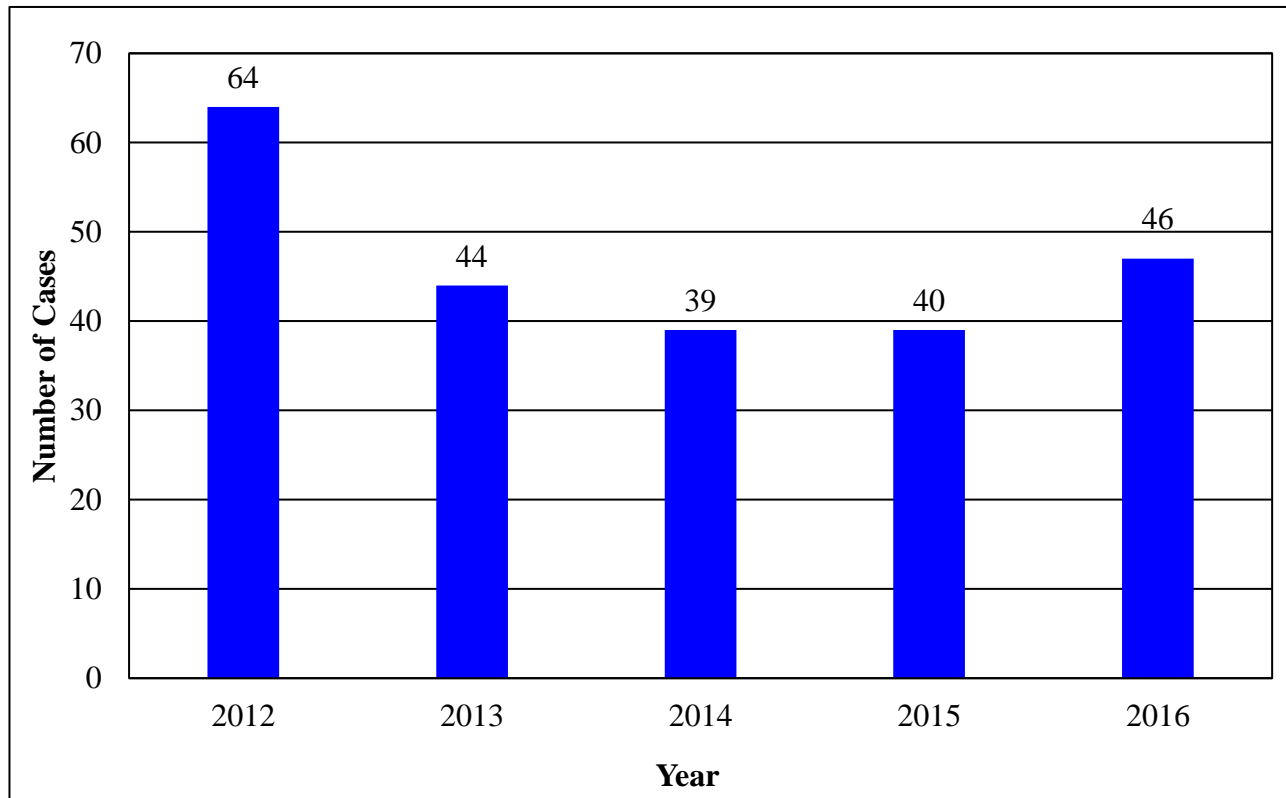


The median age of cryptosporidiosis cases was 24 years. Persons less than ten years of age had the highest age-specific incidence rate (9.7 cases per 100,000 people). Twenty-one (54%) of the reported cases were female. Two (5%) cases were hospitalized.

## Giardiasis

In 2016, 46 cases of giardiasis were reported to the NDDoH, which was a 15% increase from the 40 cases reported in 2015 (Figure 22). Statewide giardiasis incidence was 6.1 cases per 100,000 people in 2016. Fourteen counties reported cases, with Emmons (89.7 cases per 100,000 people), Logan (51.5 cases per 100,000 people) and LaMoure (48.6 cases per 100,000 people) having the highest incidence of giardiasis.

**Figure 22: North Dakota Giardiasis Case Counts by Year, 2012-2016**



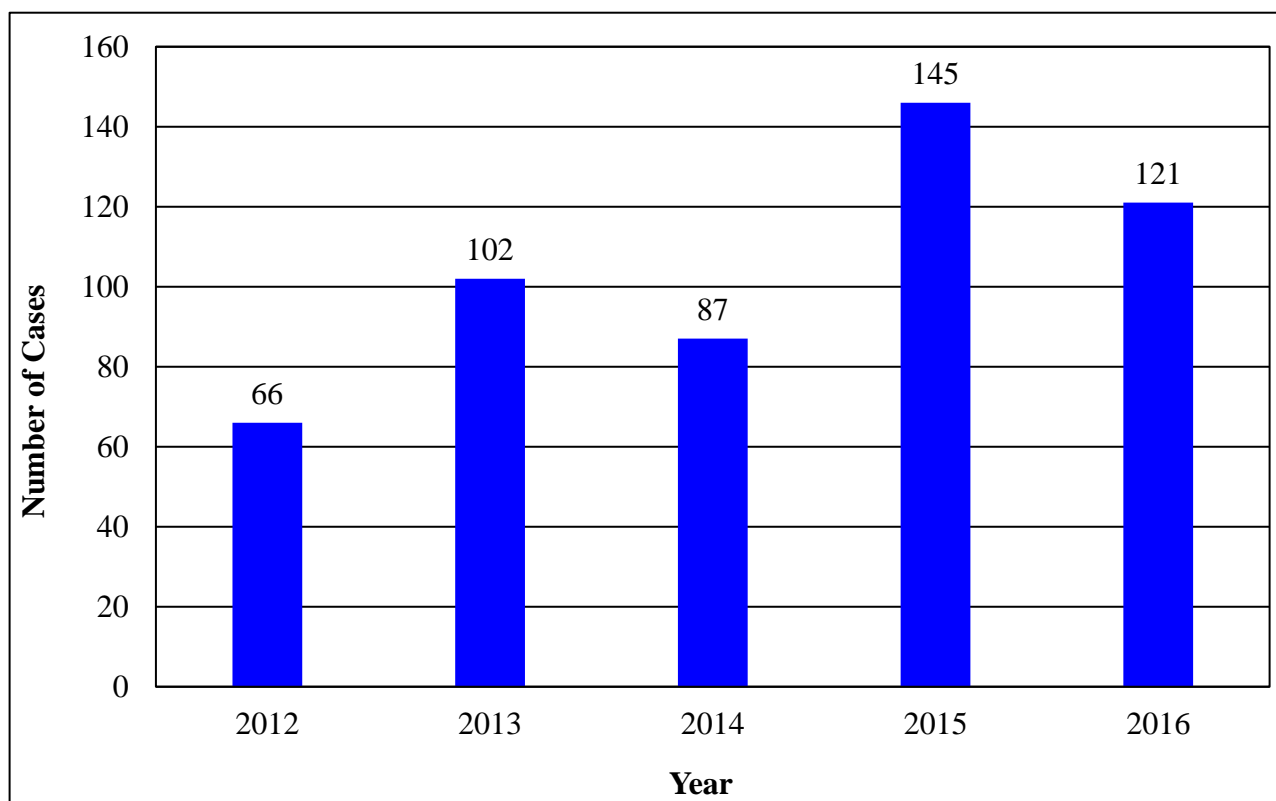
The median age of cases of giardiasis was 32 years. Persons aged 30-39 years had the highest age-specific incidence rate (10.1 cases per 100,000 people). Twenty-seven (59%) cases were female. Six (13%) cases were hospitalized.



## Salmonellosis

In 2016, 121 cases of salmonellosis were reported to the NDDoH, a 17% decrease from 145 cases reported in 2015 (Figure 23). Statewide salmonellosis incidence was 15.9 cases per 100,000 people in 2016. Thirty counties reported cases, with McHenry (134.2 cases per 100,000 people), Billings (107.1 cases per 100,000 people), and McLean (71.9 cases per 100,000 people) having the highest incidence of salmonellosis.

**Figure 23: North Dakota Salmonellosis Case Counts by Year, 2012-2016**



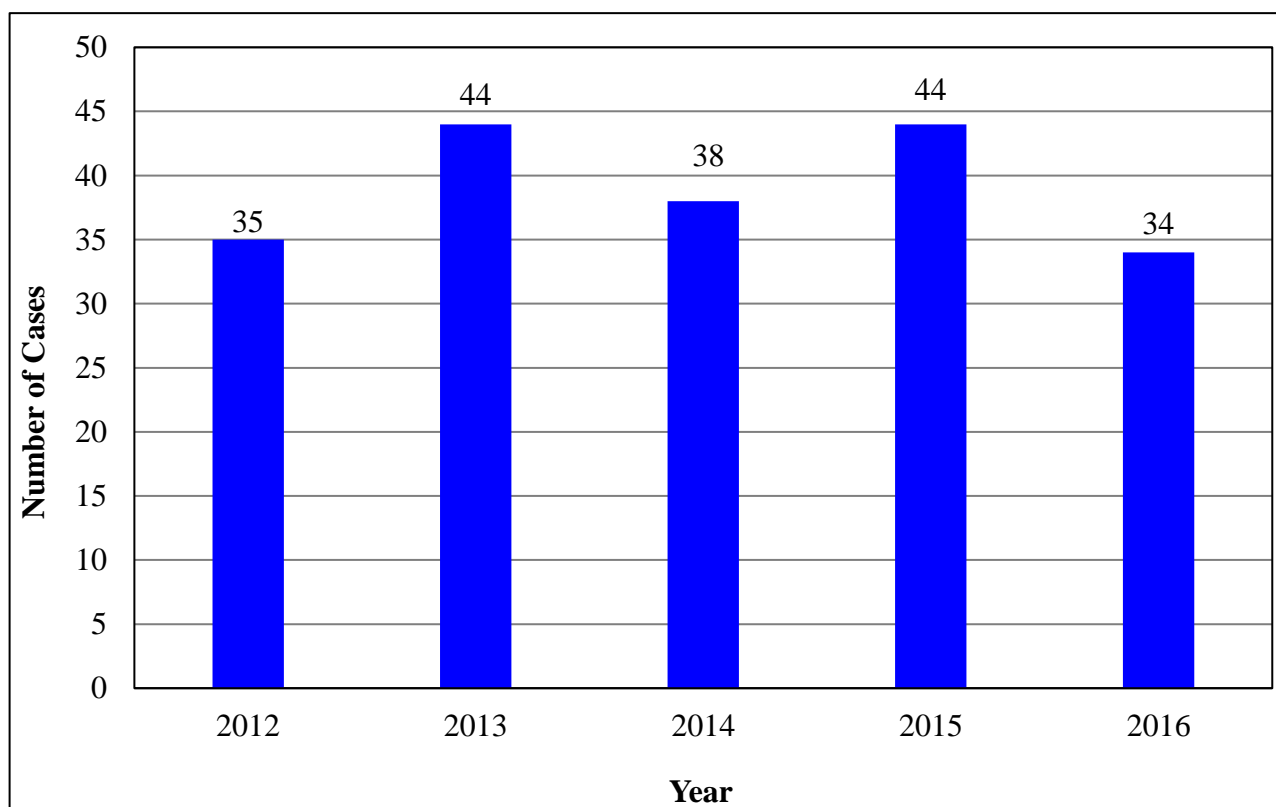
The median age of salmonellosis cases was 36 years. Persons less than five years of age had the highest age-specific incidence rate (30.6 cases per 100,000 people). Seventy-five (62%) cases were female. Twenty-six (21%) cases were hospitalized.

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

In 2016, 34 cases of STEC were reported to the NDDoH, a 23% decrease from the 44 cases reported in 2015 (Figure 24). Of the 34 cases in 2016, six were *E. coli* O157. In 2015, 15 of the 44 cases were *E. coli* O157. Statewide STEC incidence was 4.5 cases per 100,000 people in 2016. Fifteen counties reported cases, with Steele (51.0 cases per 100,000 people), Foster (30.3 cases per 100,000 people), and Emmons (29.9 cases per 100,000 people) having the highest incidence of STEC.

The median age of cases of STEC was 25.5 years. Persons aged 5-9 years had the highest age-specific incidence rate (13.8 cases per 100,000 people). Eighteen (53%) cases were male and nine (20%) cases were hospitalized.

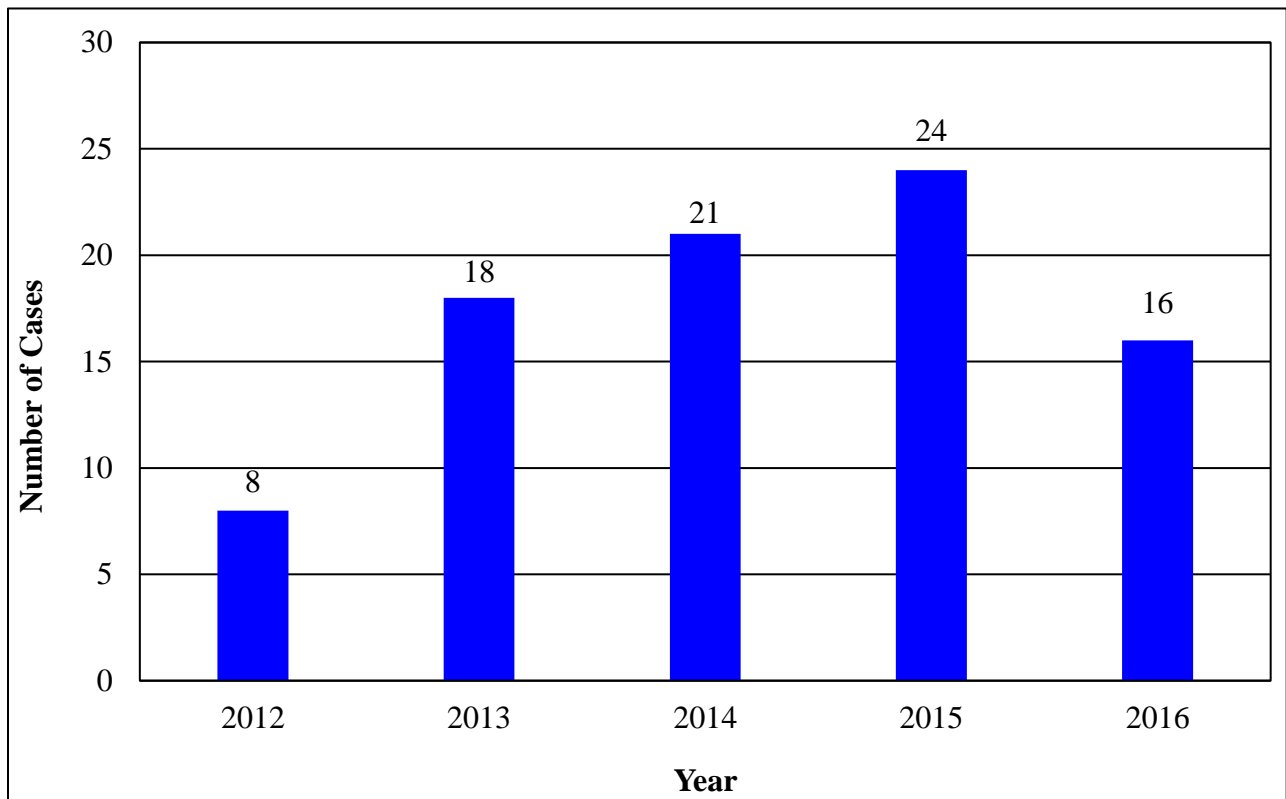
**Figure 24: North Dakota STEC Case Counts by Year, 2012-2016**



## Shigellosis

In 2016, 16 cases of shigellosis were reported to the NDDoH, a 33% decrease from the 24 cases reported in 2015 (Figure 25). Statewide shigellosis incidence was 2.1 cases per 100,000 people in 2016. Three counties reported cases, with Ramsey (8.7 cases per 100,000 people) having the highest incidence of shigellosis followed by Cass (8.0 cases per 100,000 people) and Stutsman (4.7 cases per 100,000).

**Figure 25: North Dakota Shigellosis Case Counts by Year, 2012-2016**



The median age of cases of shigellosis was 38 years. Persons aged 5-9 years had the highest age-specific incidence rate (4.0 cases per 100,000 people). Twelve (75%) were female. Two (12%) cases were hospitalized.

For more information about enteric infections and foodborne gastrointestinal illness, visit [www.ndhealth.gov/disease/GI](http://www.ndhealth.gov/disease/GI).

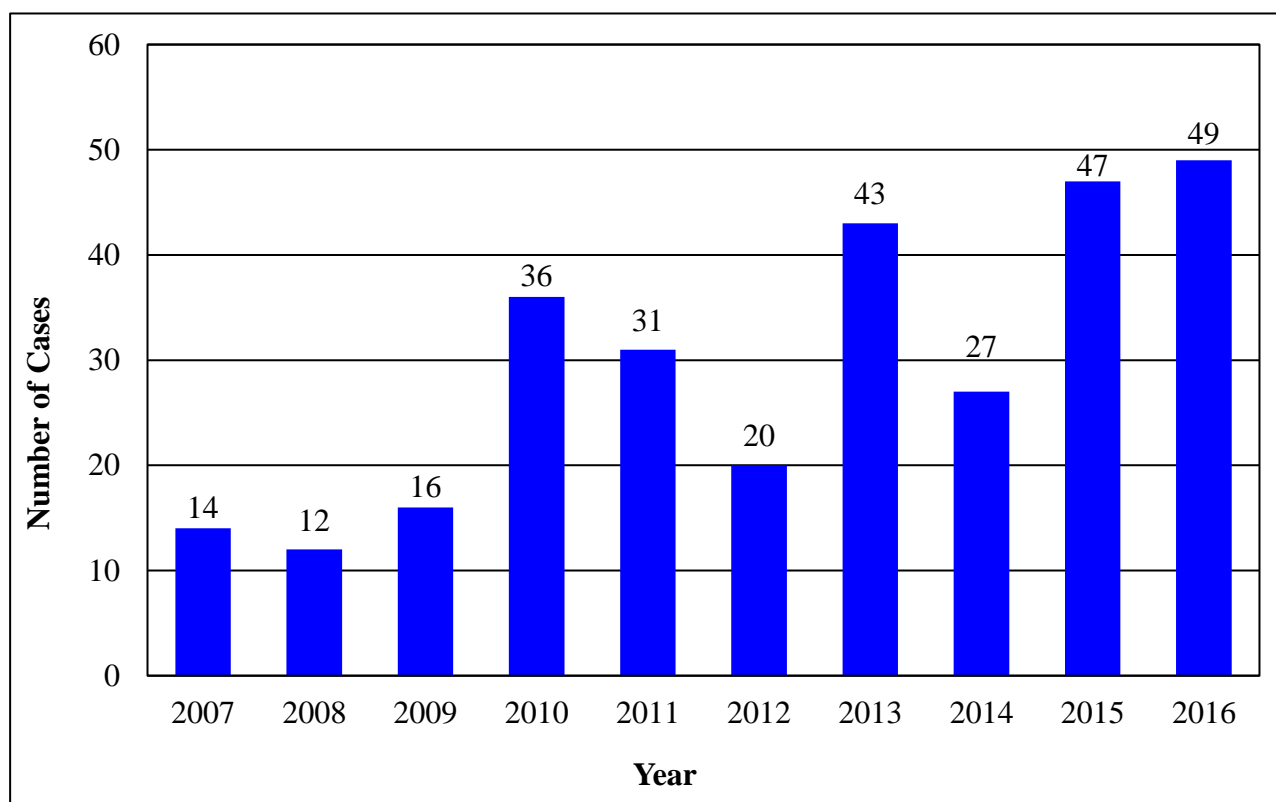
# Zoonotic Diseases

Laura Cronquist, Epidemiologist

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

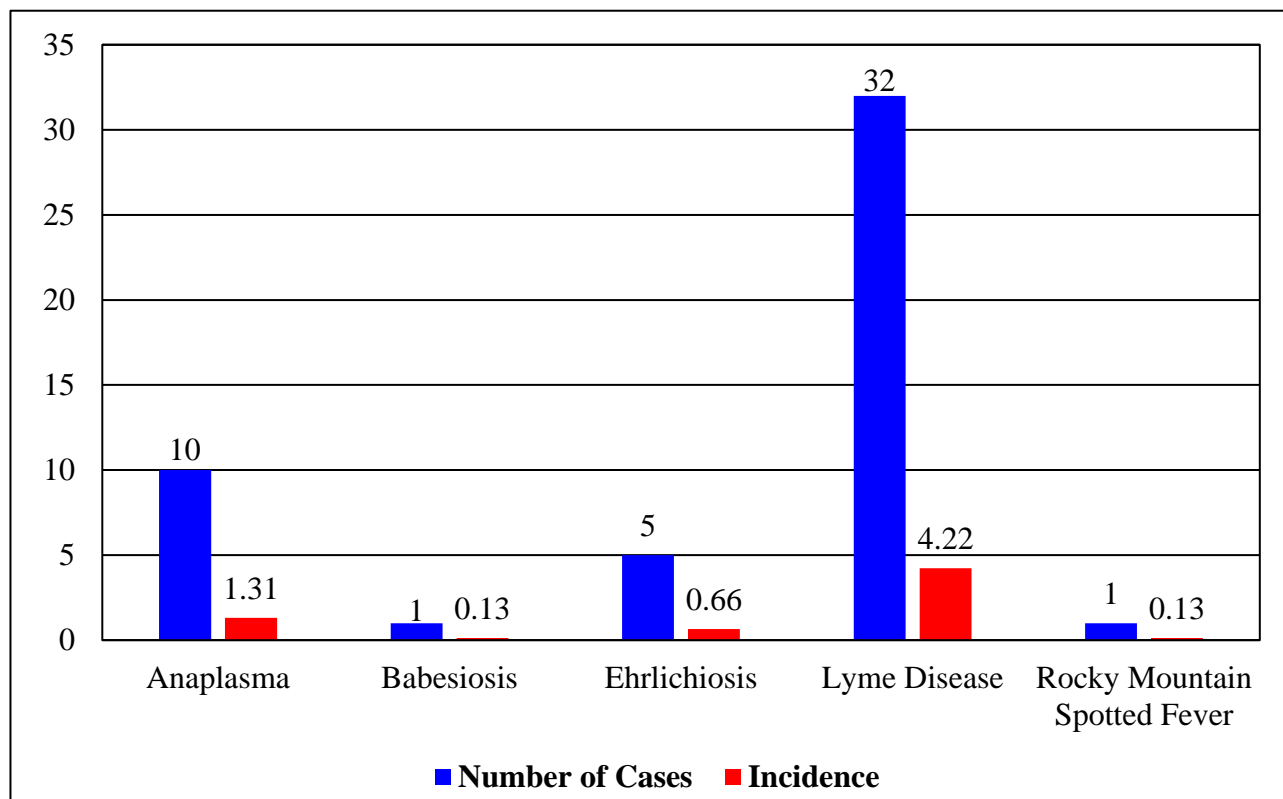
In 2016, 49 cases of tickborne diseases were reported to the NDDoH, a 4% increase from the 47 cases reported in 2015 (Figure 26). Statewide, tick-borne disease incidence was 6.5 cases per 100,000 people in 2016. Eleven counties reported cases, with McIntosh (75.3 cases per 100,000 people), Ransom (18.5 cases per 100,000 people), and Grand Forks (15.5 cases per 100,000 people), having the highest incidence of tickborne diseases.

**Figure 26: North Dakota Tickborne Diseases Case Counts by Year, 2007-2016**



The median age of cases of tick-borne disease was 44 years. Persons aged 55 and older had the highest age-specific incidence rate (10.4 cases per 100,000 people). Thirty-three (67%) cases were male, and nine cases (18%) were hospitalized. Of the 49 reported cases of tick-borne diseases in 2016, the majority of cases (65%) were Lyme disease (Figure 27).

**Figure 27: North Dakota Tickborne Diseases Case Counts and Incidences, 2016**

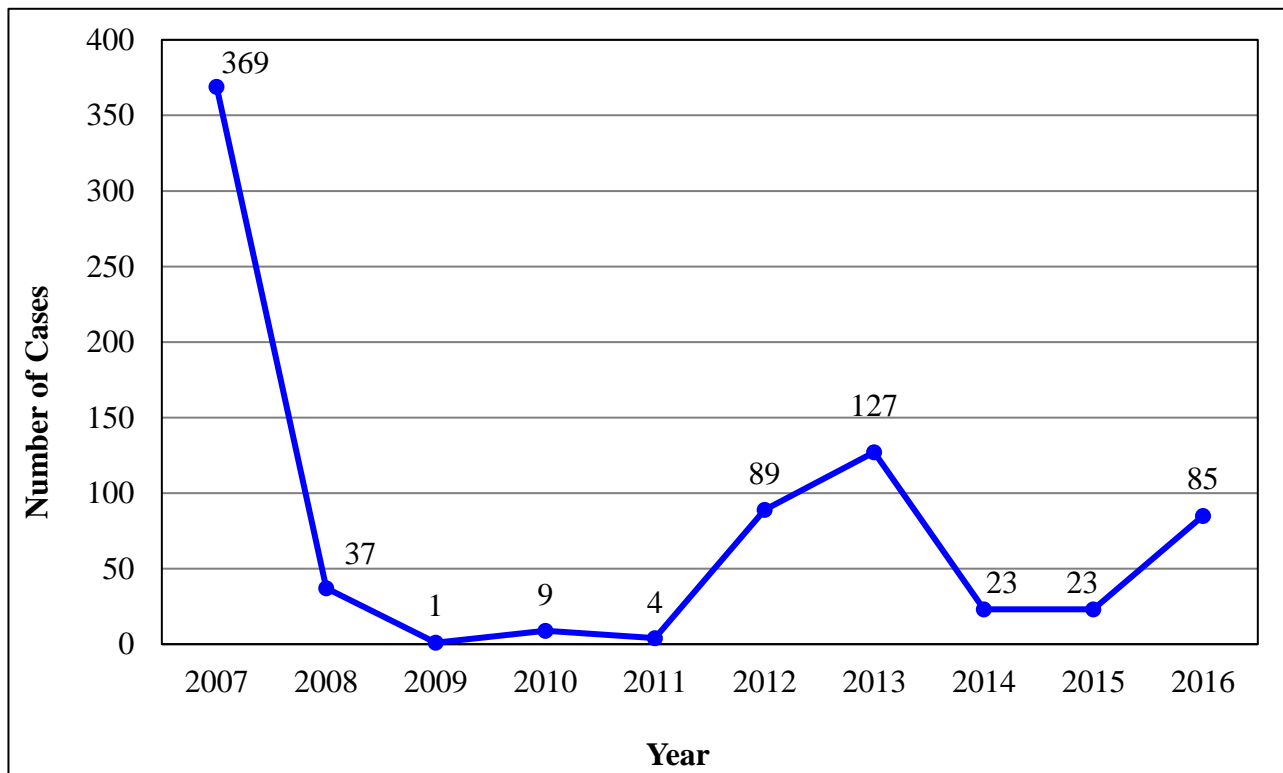


## West Nile Virus (WNV)

In 2016, 85 cases of WNV infection were reported to the NDDoH, a 270% increase from the 23 cases reported in 2015 (Figure 28). Statewide, WNV incidence was 11.2 cases per 100,000 people in 2016. Twenty-eight counties reported cases, with McIntosh (113.0 cases per 100,000 people), Wells (97.6 cases per 100,000 people) and Sheridan (75.6 cases per 100,000 people) having the highest incidence of WNV.

The median age of WNV cases was 53 years. Persons aged 55 and older had the highest age-specific incidence rate (20.8 cases per 100,000 people). Fifty-seven (67%) of the reported cases were male, and 28 (33%) cases were hospitalized. There were 22 cases of neuroinvasive disease, and 63 cases of non-neuroinvasive disease. Two cases were fatal.

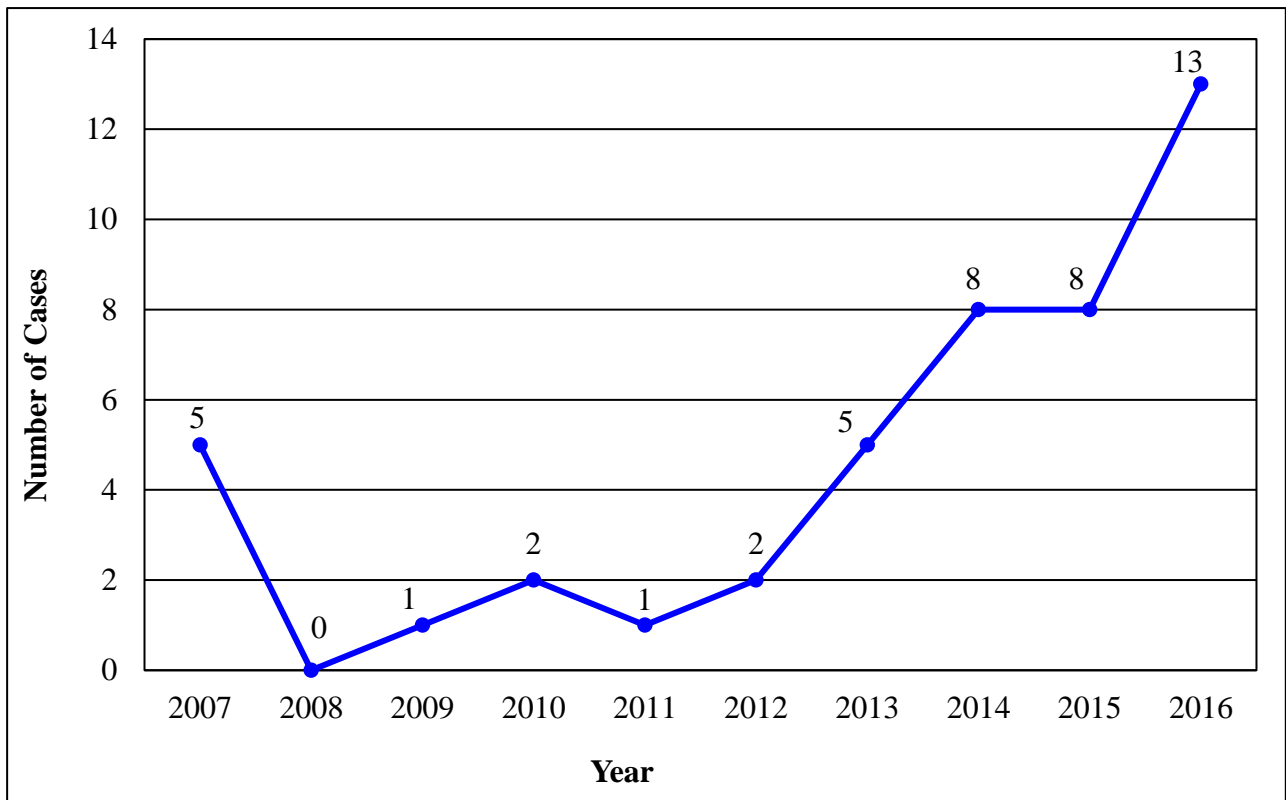
**Figure 28: North Dakota West Nile Virus Case Counts by Year, 2007-2016**



### Other Arboviral Diseases (Chikungunya, Dengue, Malaria, Zika)

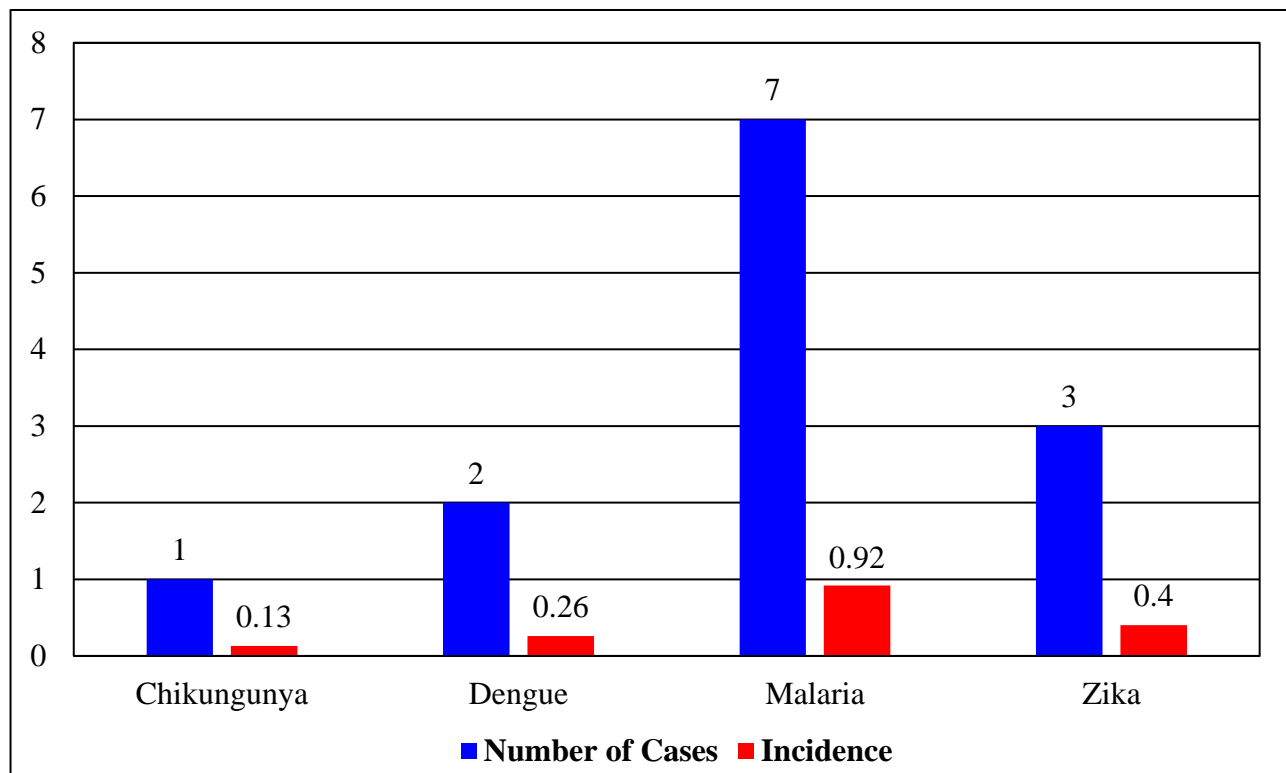
In 2016, 13 cases of other arboviral diseases were reported to the NDDoH, a 63% increase from the eight cases reported in 2015 (Figure 29).

**Figure 29: North Dakota Other Arboviral Diseases Case Counts by Year, 2007-2016**



Statewide, the incidence of other arboviral diseases was 1.71 cases per 100,000 people in 2016. Ten counties reported cases, with Sargent (51.4 cases per 100,000 people), Adams (43.4 cases per 100,000 people), and Bottineau (15.2 cases per 100,000 people) having the highest incidence of other arboviral diseases.

**Figure 30: North Dakota Other Arboviral Diseases Case Counts and Incidences, 2016**



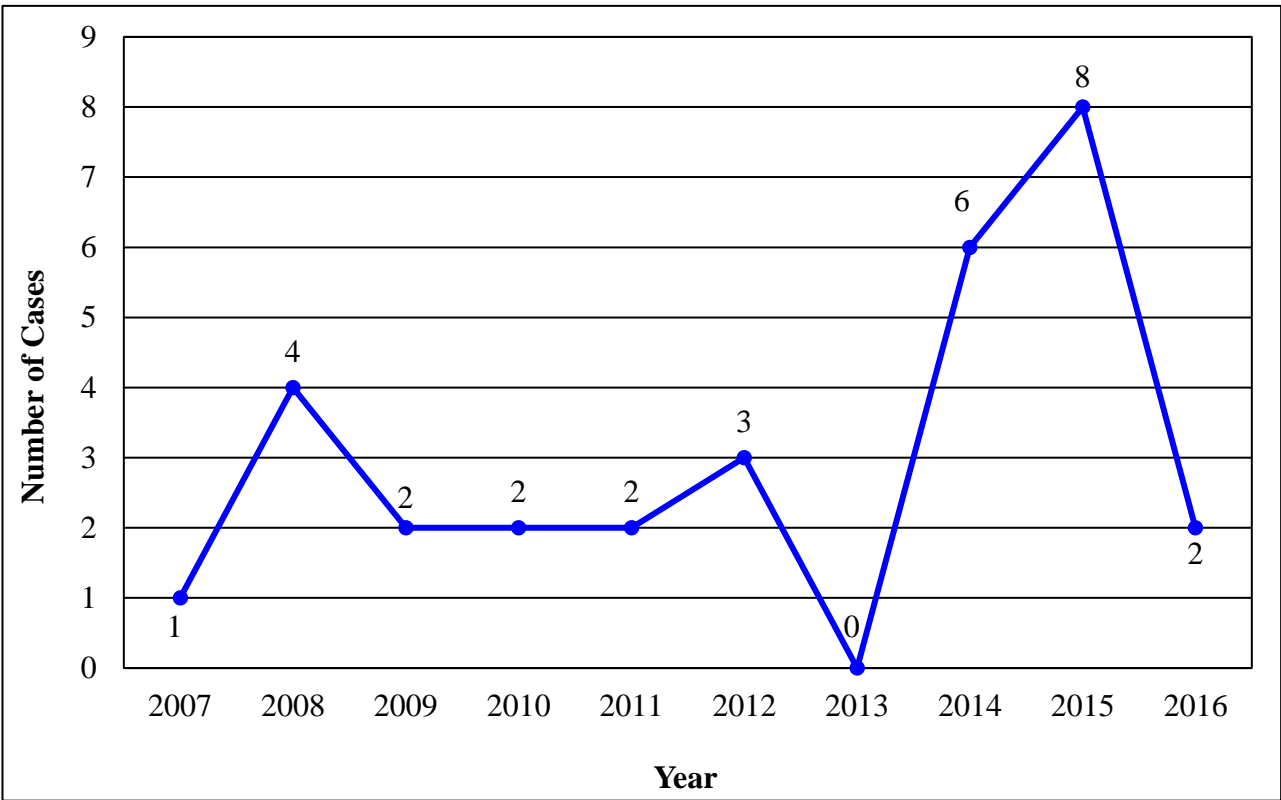
The median age of other arboviral disease cases was 36 years. Persons aged 35-39 had the highest age-specific incidence rate (6.8 cases per 100,000 people). Eight (62%) of the reported cases were male, and three cases (23%) were hospitalized. There were three Zika virus disease cases reported in 2016.



**Other Zoonotic Diseases (Brucellosis, Hantavirus, Tularemia)**

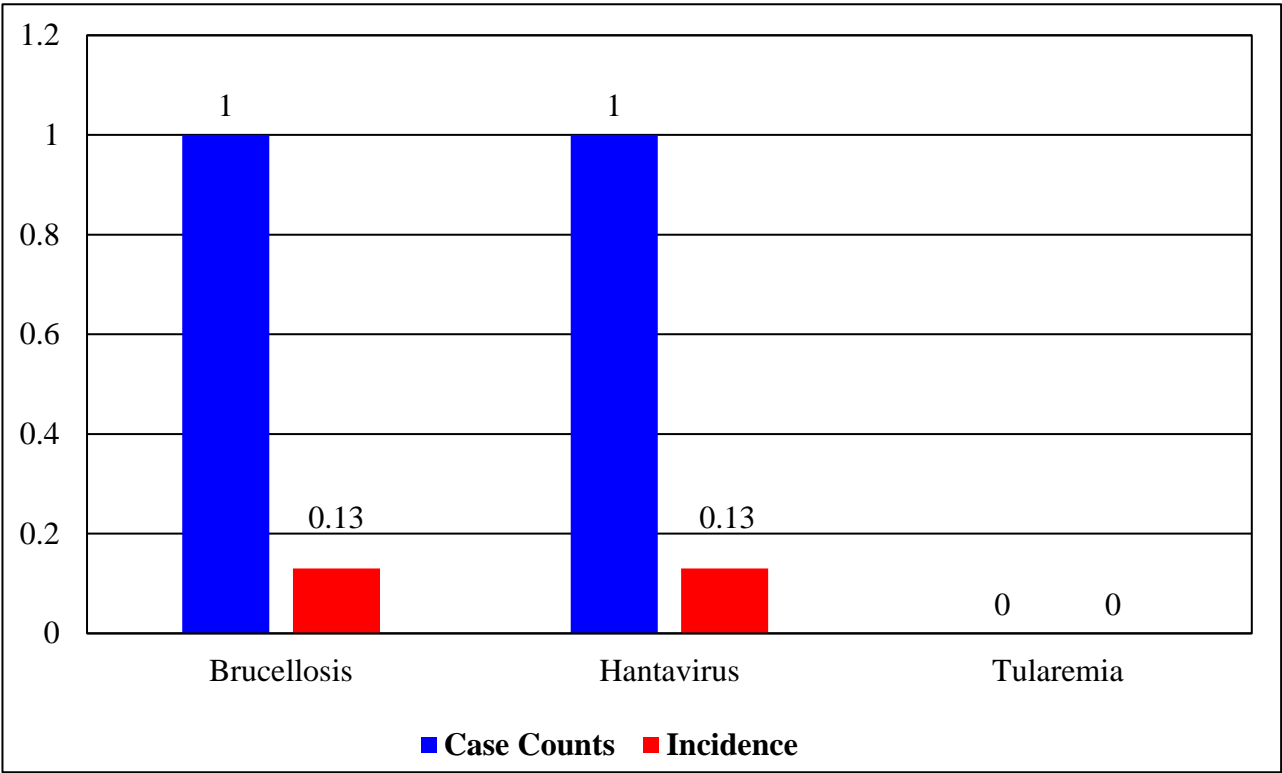
In 2016, two cases of other zoonotic diseases were reported to the NDDoH, a 75% decrease from the eight cases reported in 2015 (Figure 31).

**Figure 31: North Dakota Other Zoonotic Diseases Case Counts by Year, 2007-2016**



Statewide, other zoonotic disease incidence was 0.26 cases per 100,000 people in 2016. The median age of cases of other zoonotic diseases was 17.5 years. Two (100%) cases were female, and two cases (100%) were hospitalized.

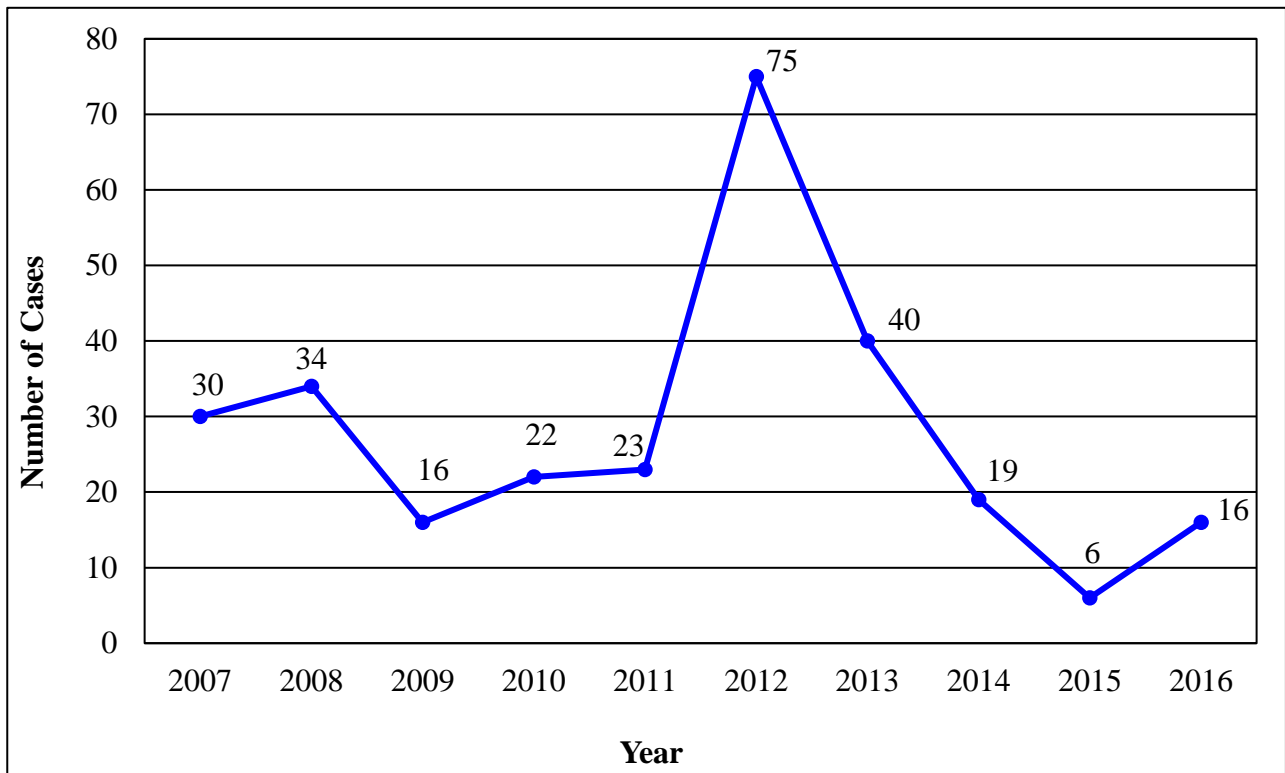
**Figure 32: North Dakota Other Zoonotic Disease Case Counts and Incidences, 2016**



## Animal Rabies

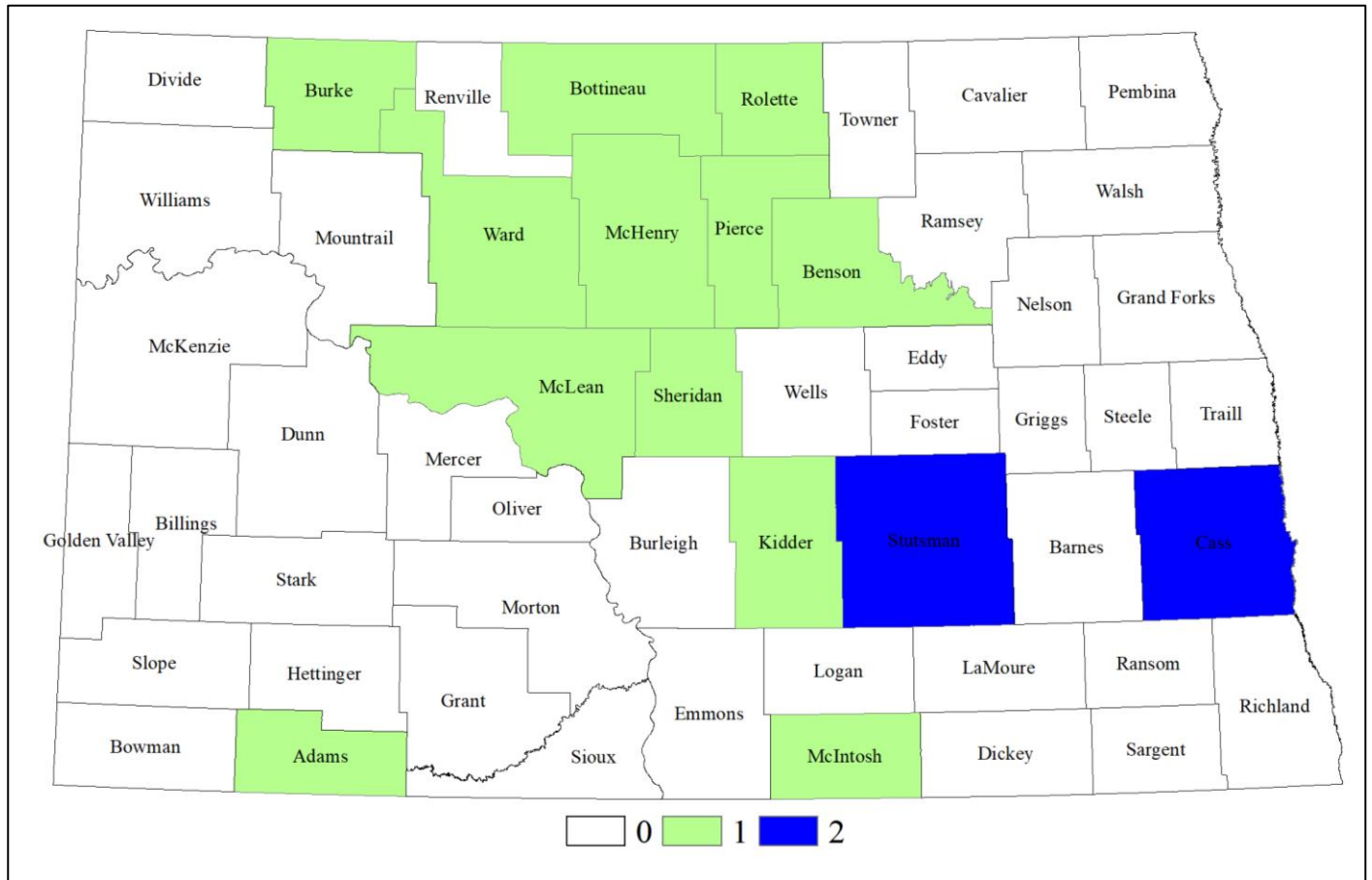
In 2016, 522 animals were tested for rabies. Sixteen animals were positive, a 167% increase from the six animals that tested positive in 2015 (Figure 33).

**Figure 33: Cases of Animal Rabies in North Dakota by Year, 2007-2016**



Animals from 14 counties tested positive for rabies. There were no human cases of rabies in 2016. Most of the reported animal cases were skunks (7), while other animals that tested positive included cattle (5), a horse, a cat, a dog, and a goat.

**Map 1: Counties with Cases of Animal Rabies in North Dakota, 2016**



# The NDDoH Responds to Zika Virus

**Michelle Feist, ELC Program Manager**

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Prior to 2015, Zika virus outbreaks were known to have occurred in Africa, Southeast Asia, and the Pacific Islands. Since then, Zika virus outbreaks have occurred in many countries. The CDC issued the first travel notice for Zika in Brazil June 2015. On January 22, 2016, the CDC activated its Emergency Operations Center (EOC) in response to the outbreaks occurring in Central and South America. The NDDoH partially activated the Department Operations Center (DOC) in May 2016 to coordinate the NDDoH response to Zika virus. The Joint Information Center (JIC) was also activated. The Division of Disease Control was the lead agency for the Zika response, with the NDDoH public information officers leading the communication and outreach efforts.

The response to Zika virus came with many challenges. Zika virus infection during pregnancy can cause damage to the brain, microcephaly, brain abnormalities, eye defects, hearing loss, and limb defects. Transmission of Zika virus was found to not only be transmitted by mosquitoes, but also from mother to her fetus, and through sex. New characteristics of the virus such as transmission, persistence in body fluids, and localized outbreaks were being discovered which caused the recommendations for Zika virus testing to continuously evolve. Zika virus was first detected in the continental United States in July 2016, which increased concern about further spread in the United States.

The *Aedes aegypti* and *Aedes albopictus* mosquitoes, which are the known vectors for Zika, have not been found in North Dakota. In 2016, there were three Zika cases and one asymptomatic infection identified in North Dakota. All four individuals reported recent travel to an area with active Zika virus transmission prior to becoming ill. The NDDoH continues to recommend that pregnant women should not travel to areas with active Zika virus transmission. Pregnant women with a sex partner who has traveled to or lives in an area with active Zika virus transmission should use condoms or other barrier methods, or abstain from sex for the duration of the pregnancy.

More information about Zika virus can be found on the NDDoH Zika website at [www.ndhealth.gov/disease/zika/](http://www.ndhealth.gov/disease/zika/).

# Carbapenem-resistant Enterbacteriaceae

Faye Salzer, Healthcare Associated Infection Coordinator

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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 *Escherichia coli* (*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 possess 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.

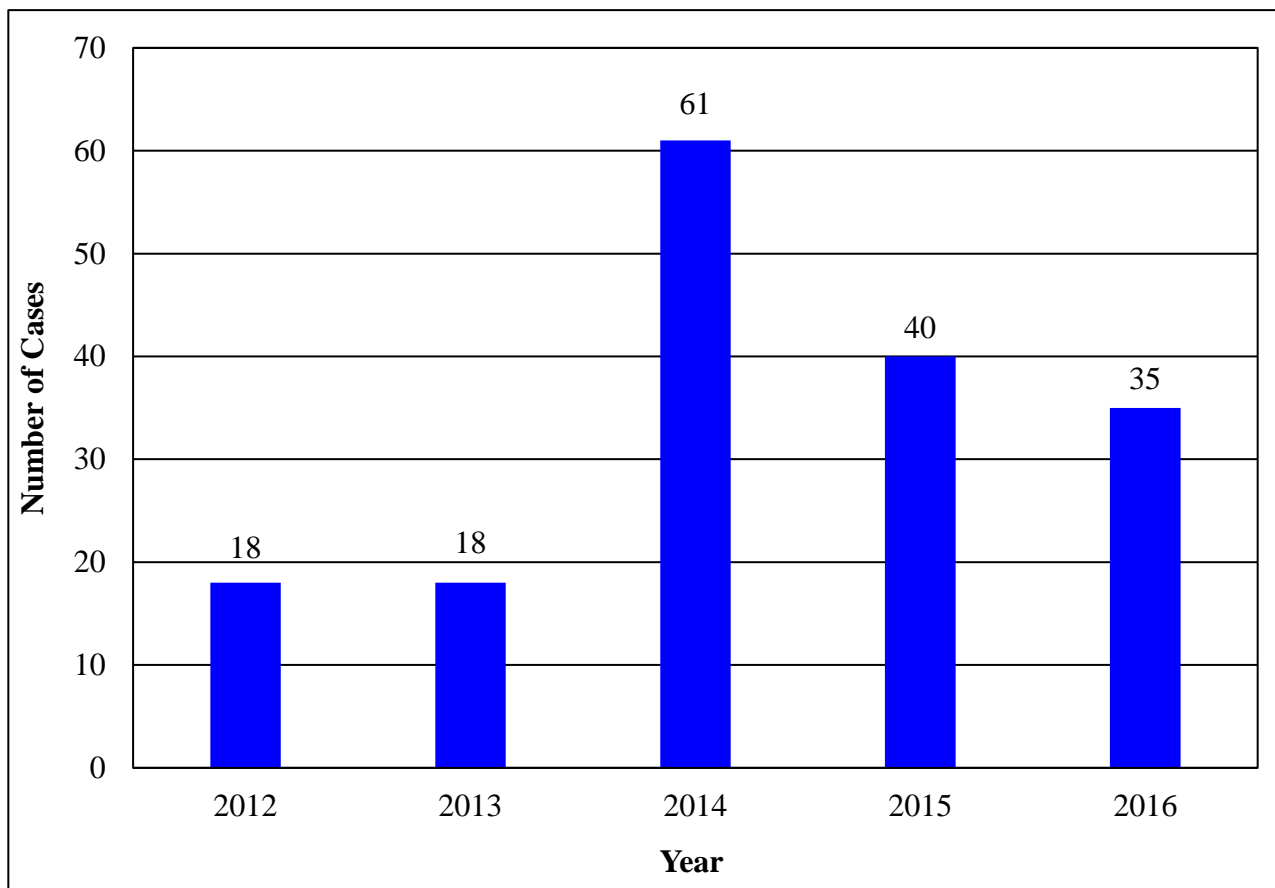
In 2016, 35 cases of CRE were reported to the NDDoH, a 14.6 percent decrease from the 41 cases reported in 2015. Statewide in North Dakota, CRE incidence was 4.6 cases per 100,000 people in 2016. Sixteen counties reported cases in 2016 compared to 17 counties in 2015. The counties with the highest incidence of CRE cases are McHenry (33.5 cases per 100,000 people), Oliver (54.1 cases per 100,000 people), Sheridan (153.61 cases per 100,000 people), and Sioux (45.5 cases per 100,000 people). The median age of cases of CRE was 67 years. Persons age 60 and older had the highest age-specific incidence rate (15.2 cases per 100,000 people). Eighteen (51%) of the reported cases were male.

Healthy people usually do not get CRE infections. In healthcare 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.

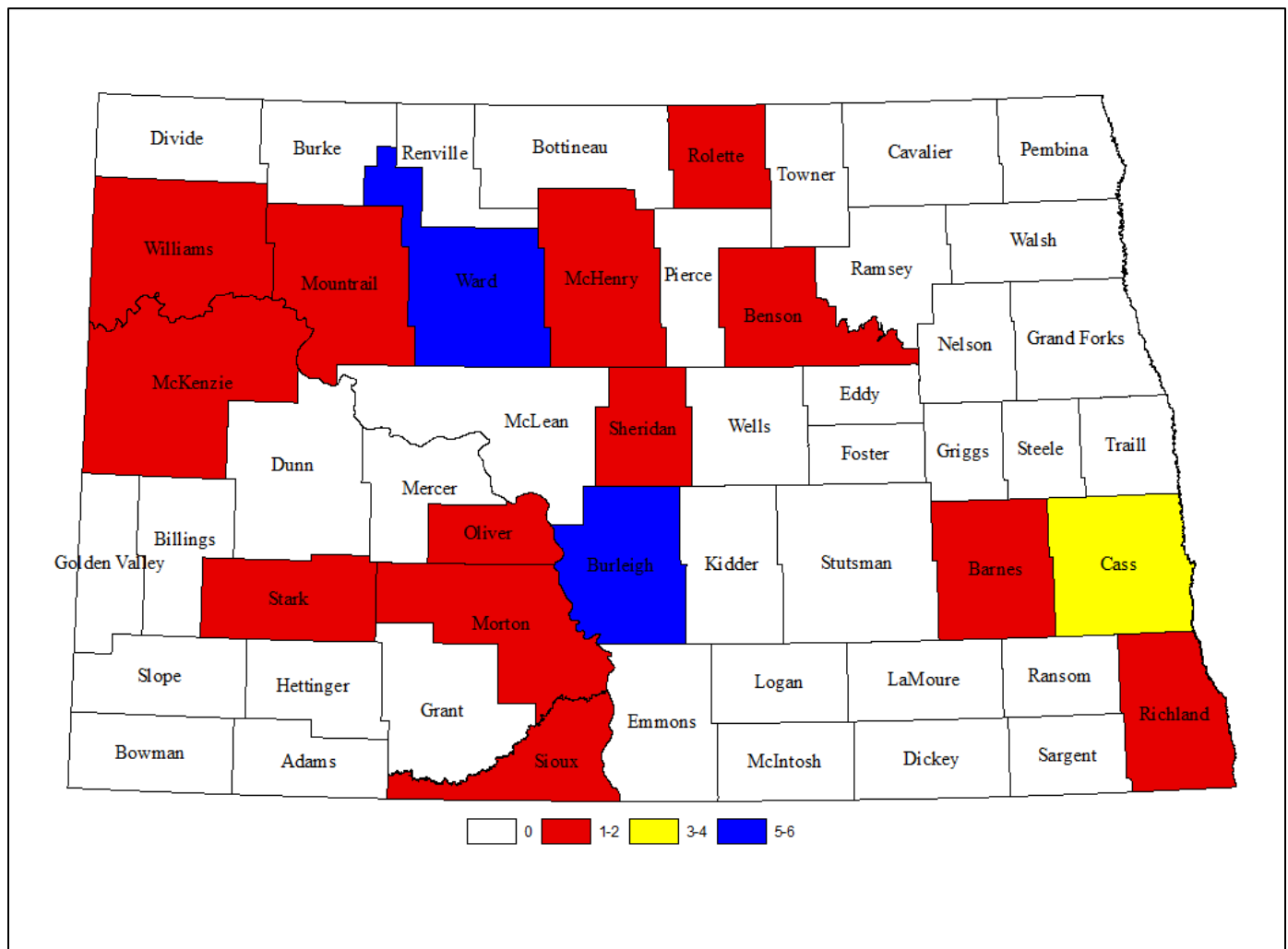
Clinicians, Infection preventionists and all healthcare workers, as well as environmental cleaning personnel, play a critical role in slowing the spread of CRE. Transmission can be prevented by

- 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.

**Figure 34: North Dakota CRE Case Counts by Year, 2012-2016**



### Map 2: Counties with Cases of CRE in North Dakota, 2016





# HIV/STD/TB/

## Viral Hepatitis Programs

The NDDoH HIV program is divided in 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 that 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 healthcare 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 incident cases each year of human immunodeficiency virus (HIV/AIDS) in the United States. In 2016, the incident case rate was 6.6 cases per 100,000 people.

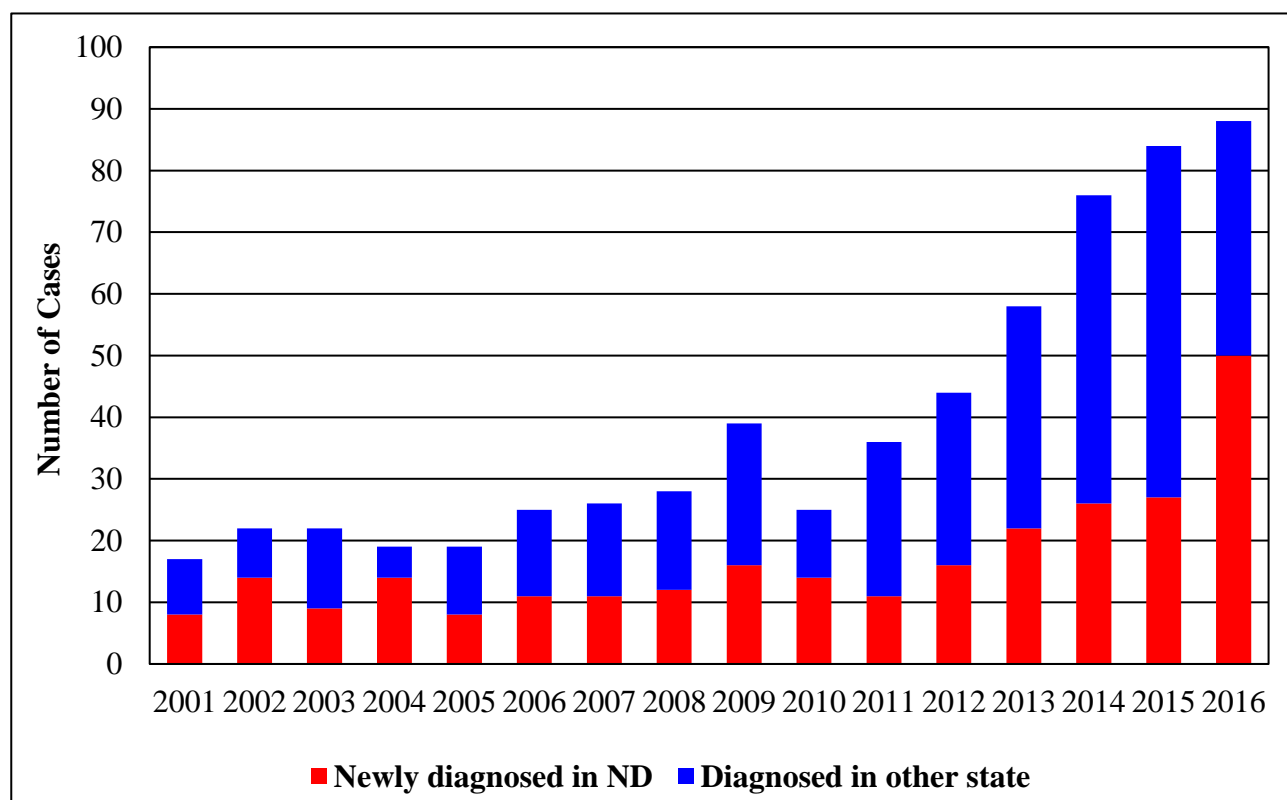
In 2016, 88 HIV/AIDS cases were reported to the NDDoH. This count includes cases being diagnosed for the first time in the state, and cases previously diagnosed elsewhere who moved to North Dakota during the year.

In 2016, 50 North Dakota residents were diagnosed with HIV/AIDS and reported to the NDDoH. Fifteen of those newly diagnosed HIV cases were advanced enough to meet the case definition for AIDS at the time of diagnosis. Sixty-four percent of HIV/AIDS cases reported in 2016 were male.

## Cumulative (2001-2016) HIV/AIDS Cases

HIV and AIDS have been reportable conditions in North Dakota since 1984. The cumulative reported infections as of December 31, 2016, stands at 891 HIV/AIDS cases.

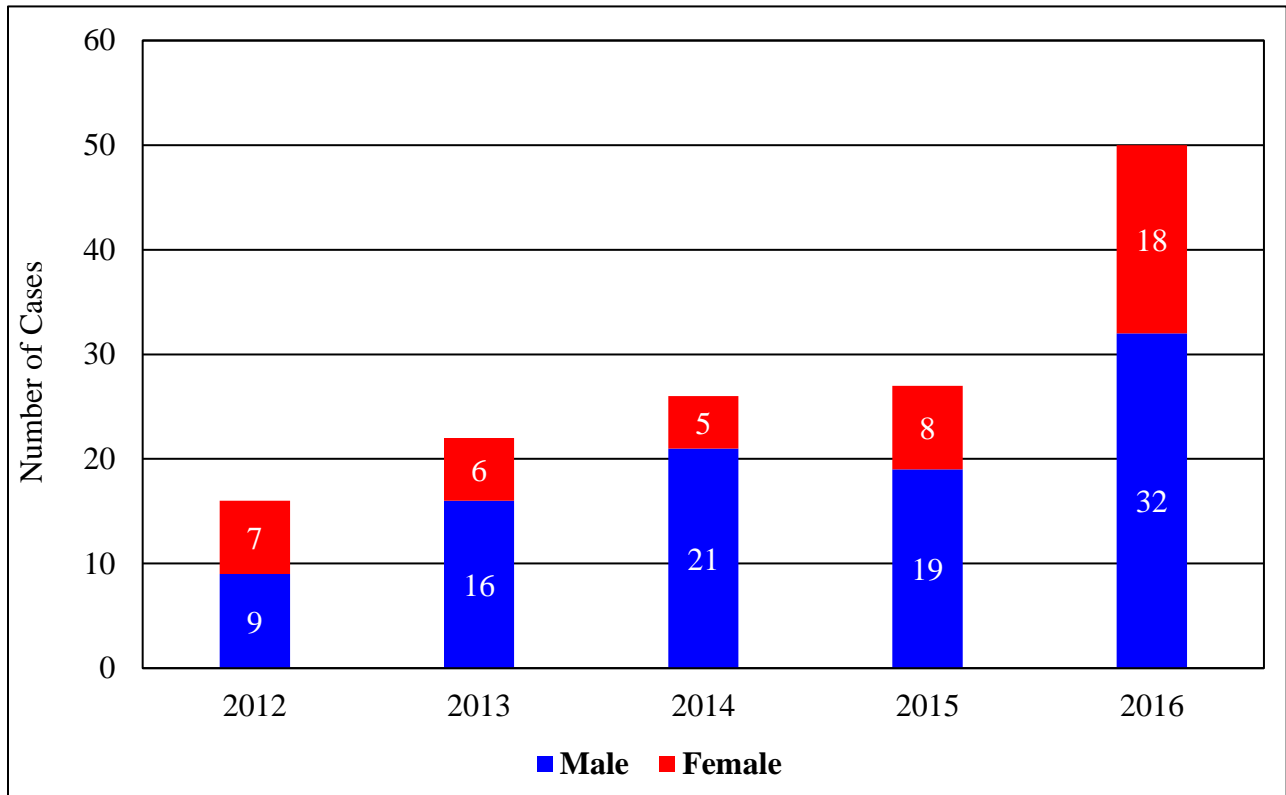
**Figure 35: HIV/AIDS diagnosed in North Dakota and HIV/AIDS previously diagnosed in other states by year, 2001-2016**



### HIV/AIDS Incidence: 2012-2016

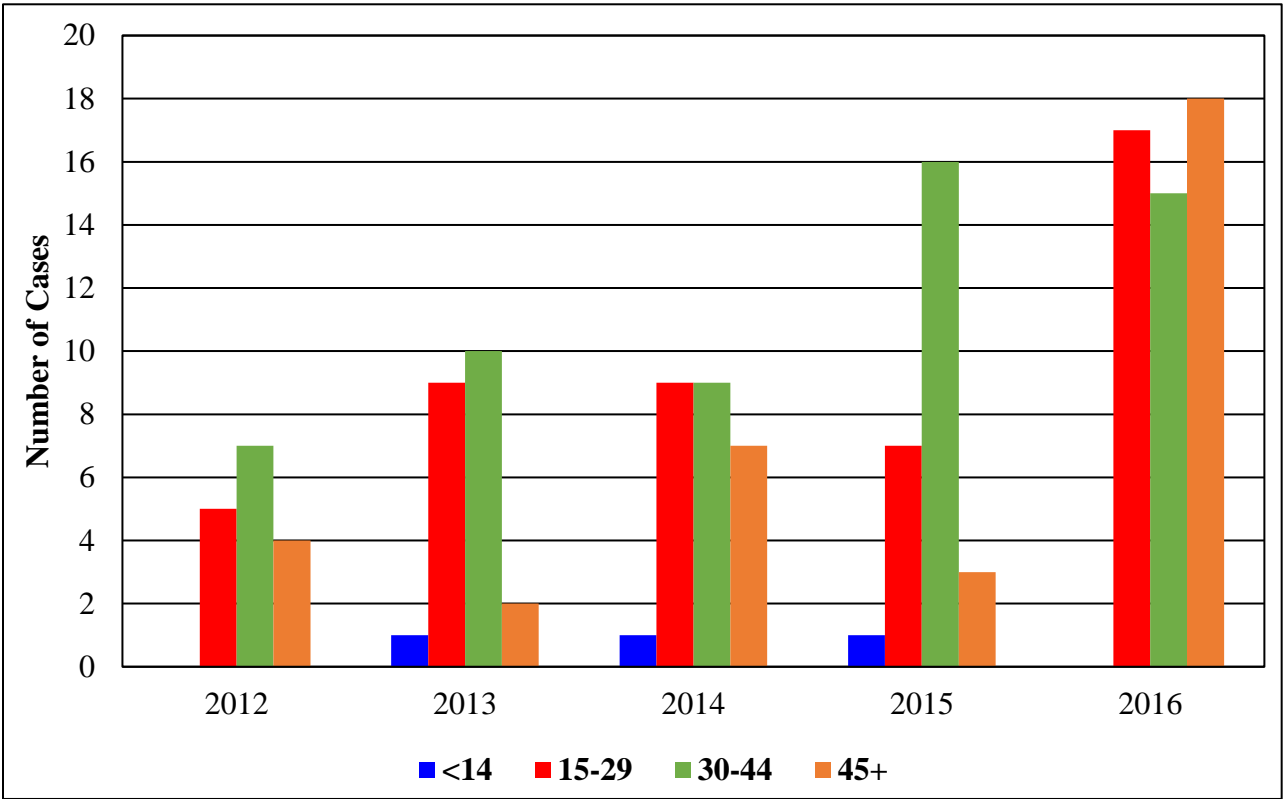
HIV/AIDS incidence refers to cases that were newly diagnosed in North Dakota within a given time frame. AIDS cases reported in this section met the criteria for AIDS at first diagnosis. From 2012 to 2016, 141 HIV/AIDS cases were diagnosed in North Dakota. Thirty-two percent met the criteria for AIDS at time of diagnosis, while the remaining 68% were diagnosed as an HIV infection. Sixty-nine percent were male and 31% were female.

**Figure 36: HIV/Aids Incident Cases by Gender, 2012-2016**



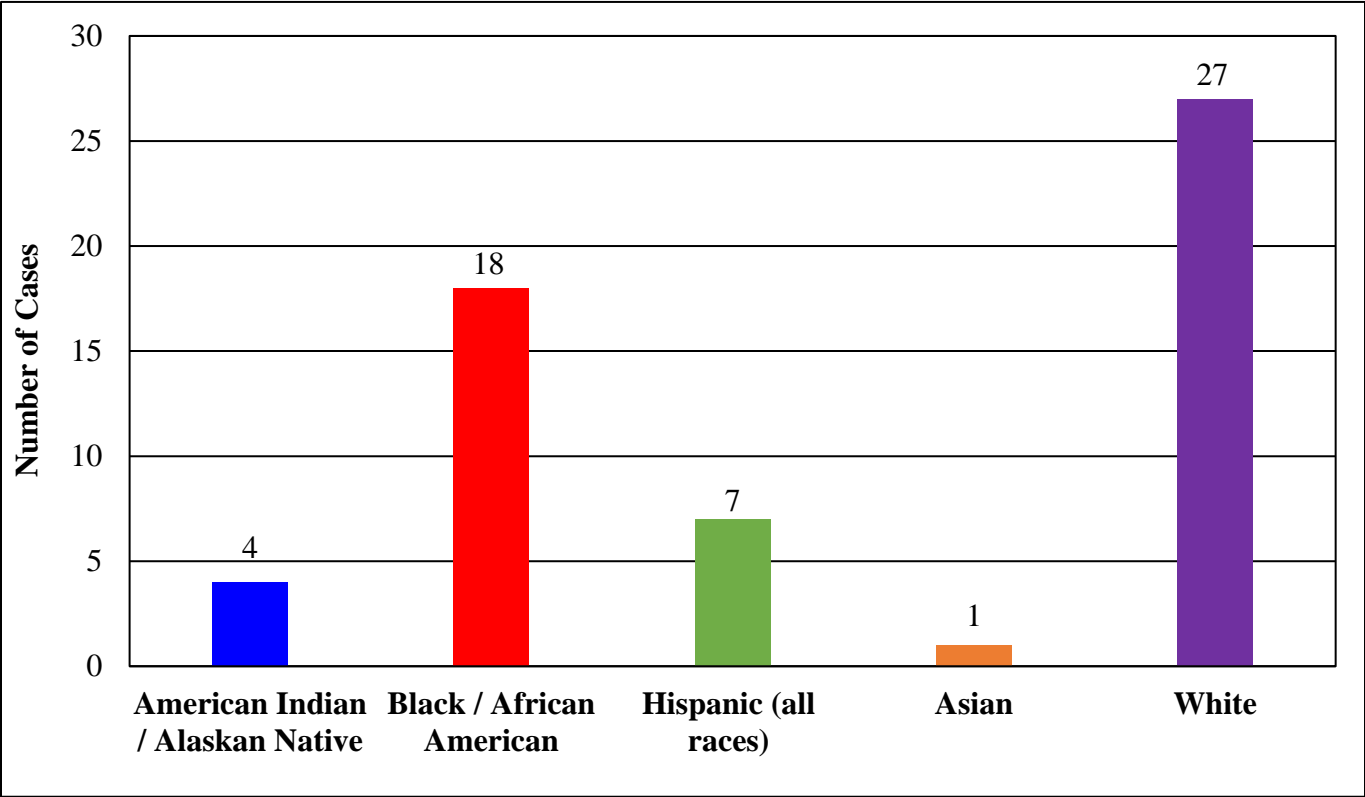
The age groups of HIV/AIDS cases diagnosed for the first time in North Dakota between 2012 and 2016 are shown in Figure 37. Forty percent of new HIV/AIDS diagnoses in North Dakota are in individuals ages 20 to 34. The minimum age was 16 years and the maximum age was 66 years.

**Figure 37: Incidence Age of HIV/AIDS cases diagnosed in N.D. 2012 – 2016**

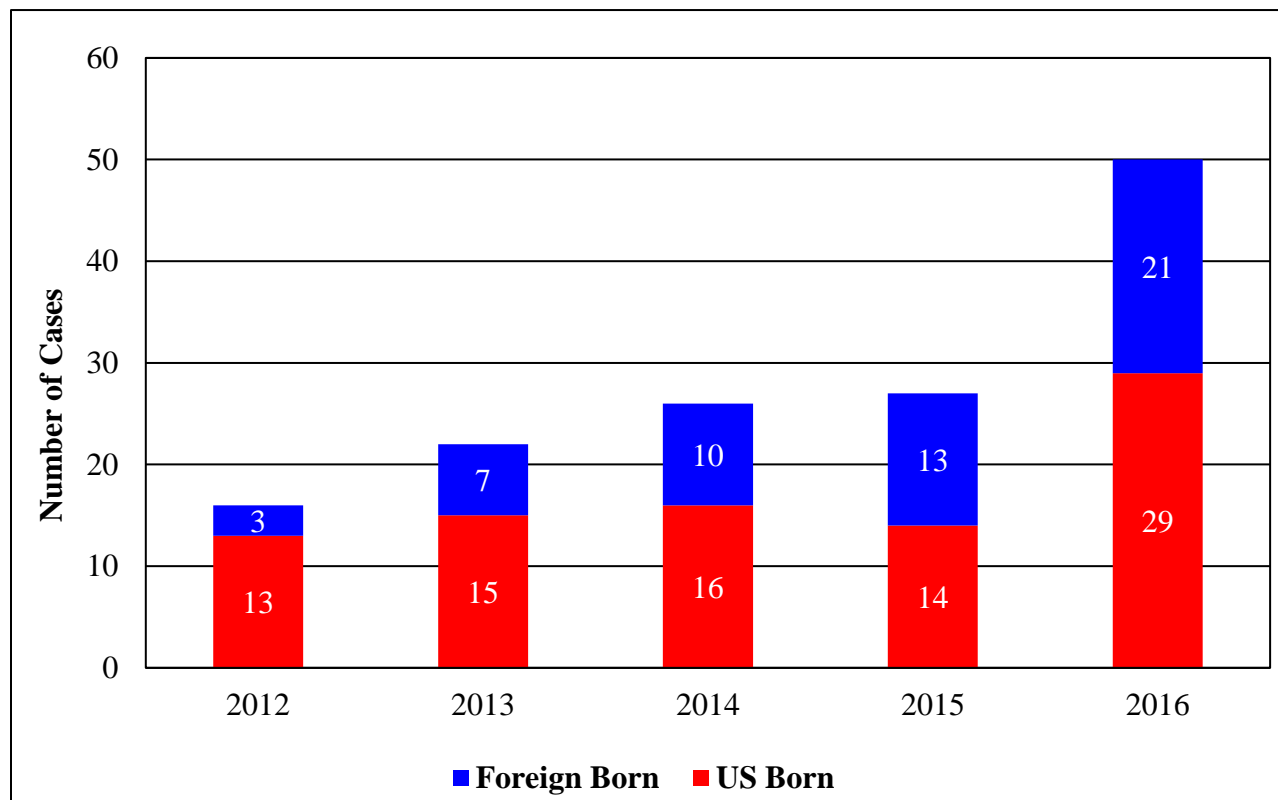


Racial and ethnic minorities disproportionately continue to be affected by HIV in the United States and North Dakota. Black/African Americans represent approximately 2.5% of the United States population, but accounted for an estimated 36% of new HIV infections in 2016. Black/African American North Dakotans are 28 times more likely to have HIV than white North Dakotans.

**Figure 38: Race/Ethnicity for HIV/AIDS cases diagnosed in 2016**

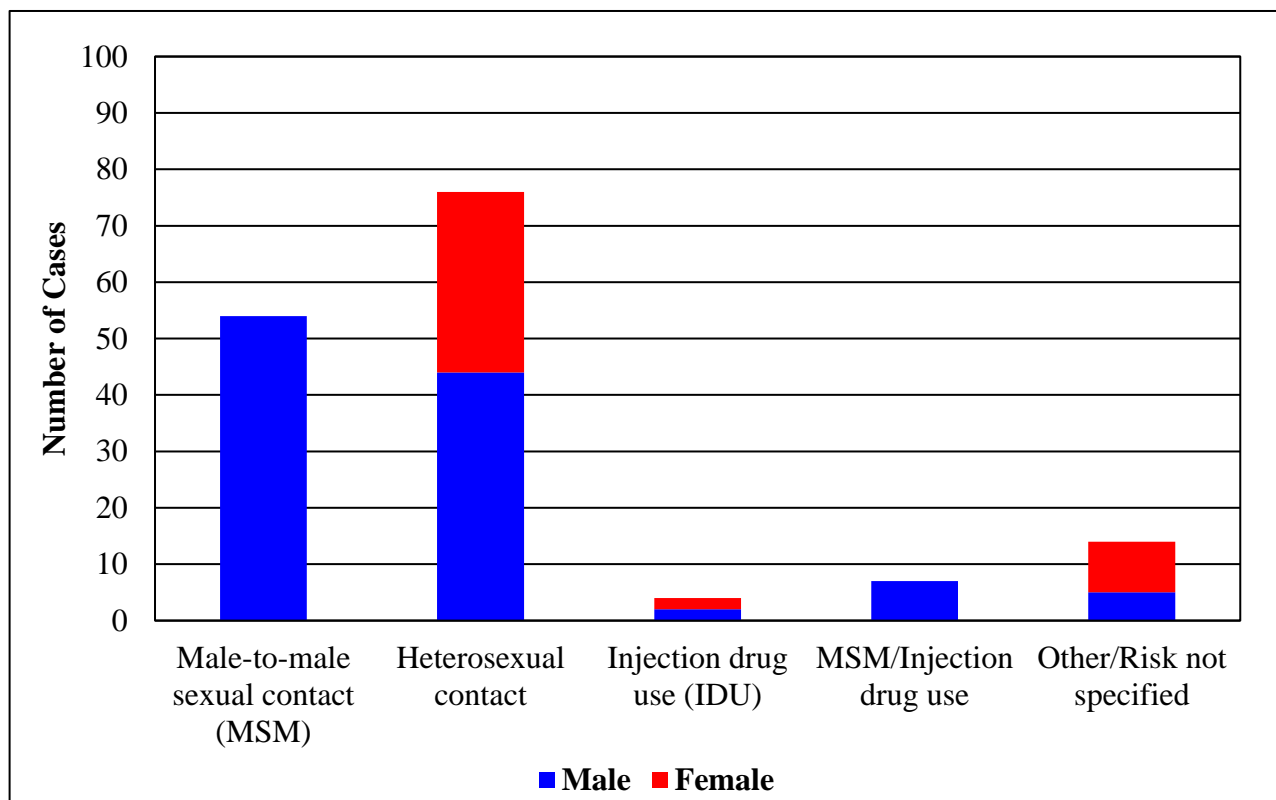


**Figure 39: Newly reported HIV/AIDS cases in North Dakota by country of birth, 2012-2016**

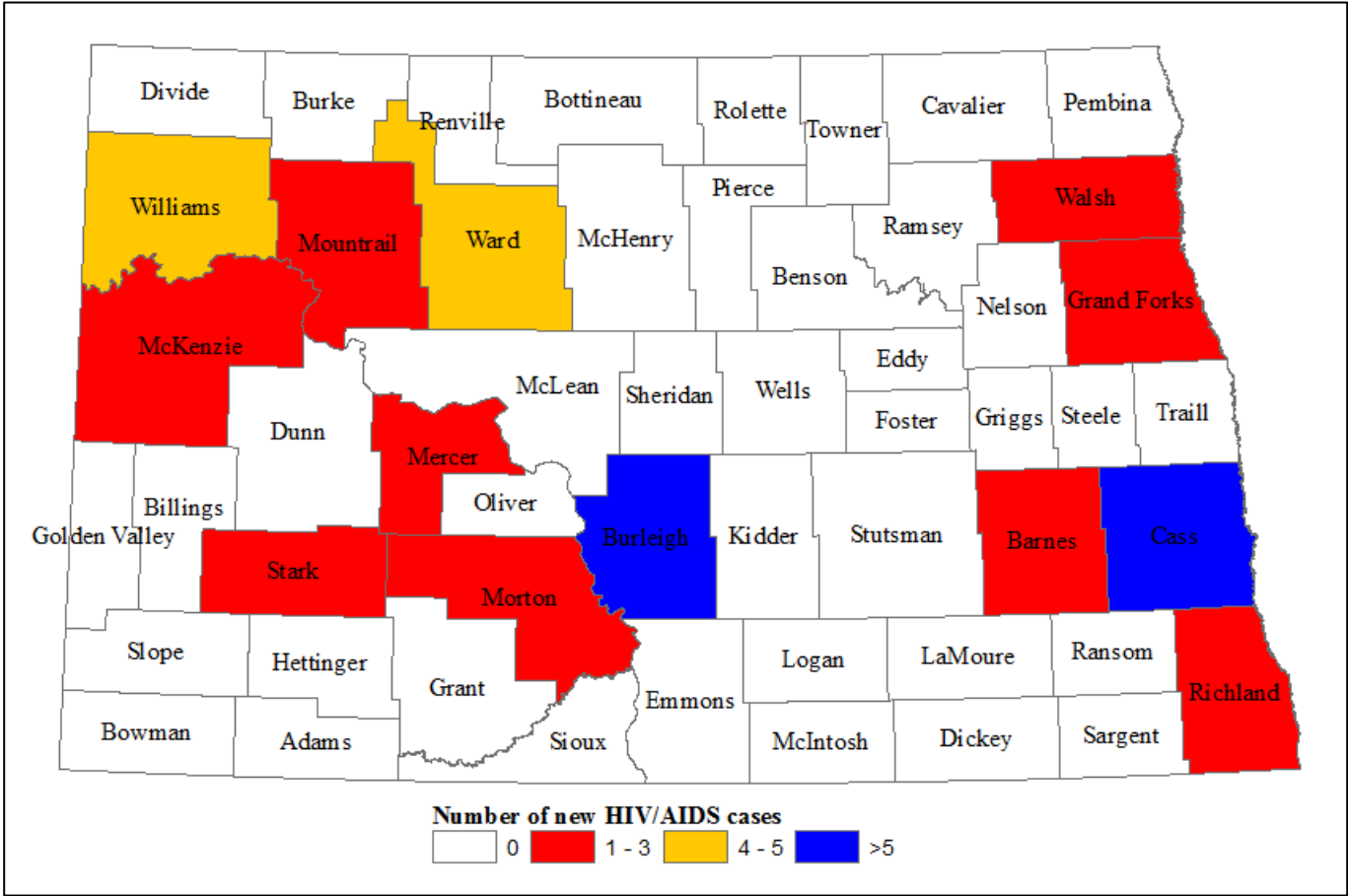


Male-to-male sexual contact continued to be the most frequently self-reported risk factor among males. Fifty-six percent of male cases diagnosed between 2012 and 2016 reported male-to-male sexual contact. In females, heterosexual contact was the most frequent risk factor. In 2016, there was report of injection drug use as a risk factor in males and females which had not been seen in the previous five years. Risk factors of HIV/AIDS cases diagnosed in North Dakota for 2011-2015 separated by gender are shown below (Figure 40).

**Figure 40: Risk factors of HIV/AIDS cases diagnosed in ND by Gender, 2012-2016**

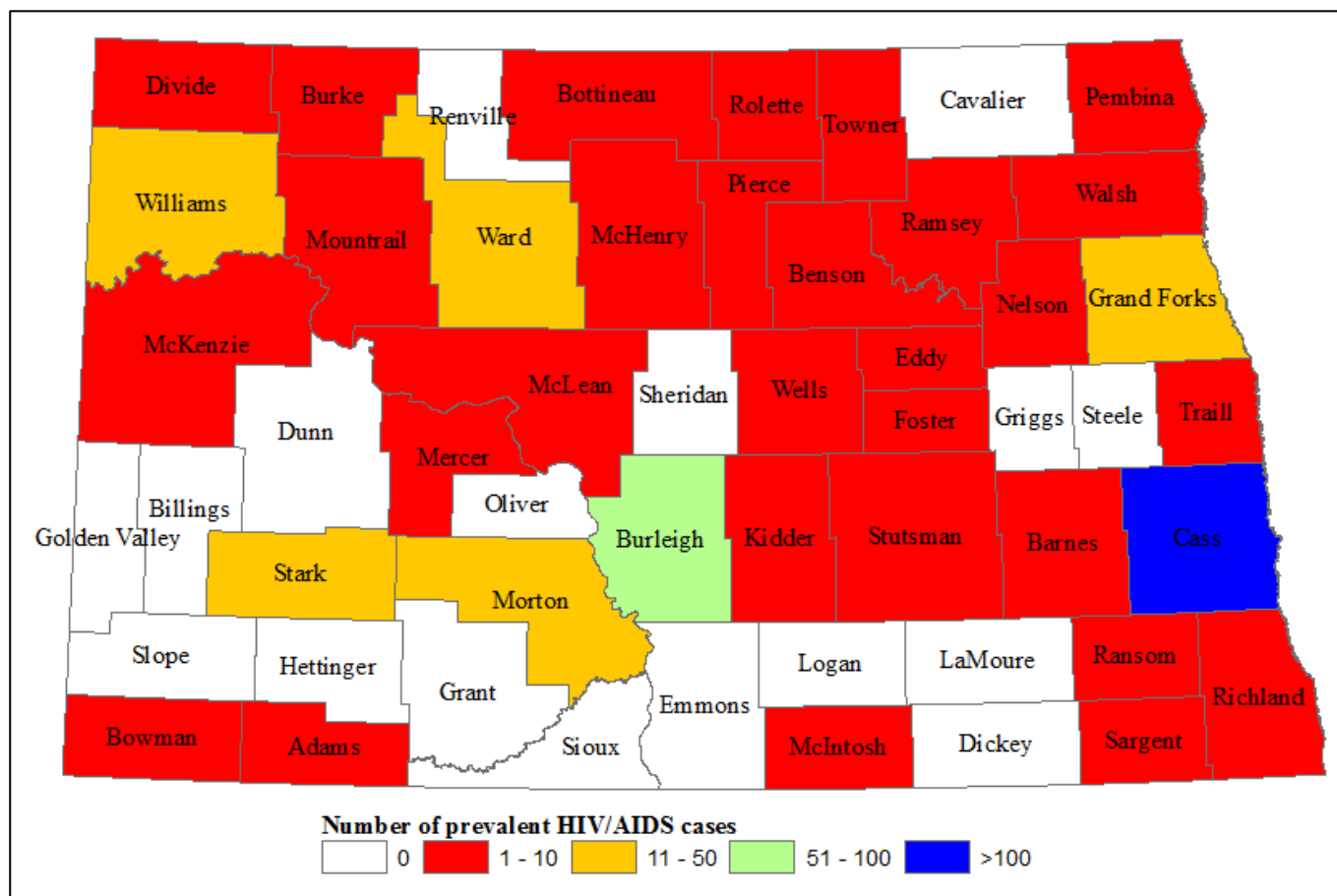


**Map 3: Geographic location of newly identified HIV/AIDS cases diagnosed in 2016**





**Map 4: Geographic location of HIV/AIDS cases currently living in North Dakota, 2016**



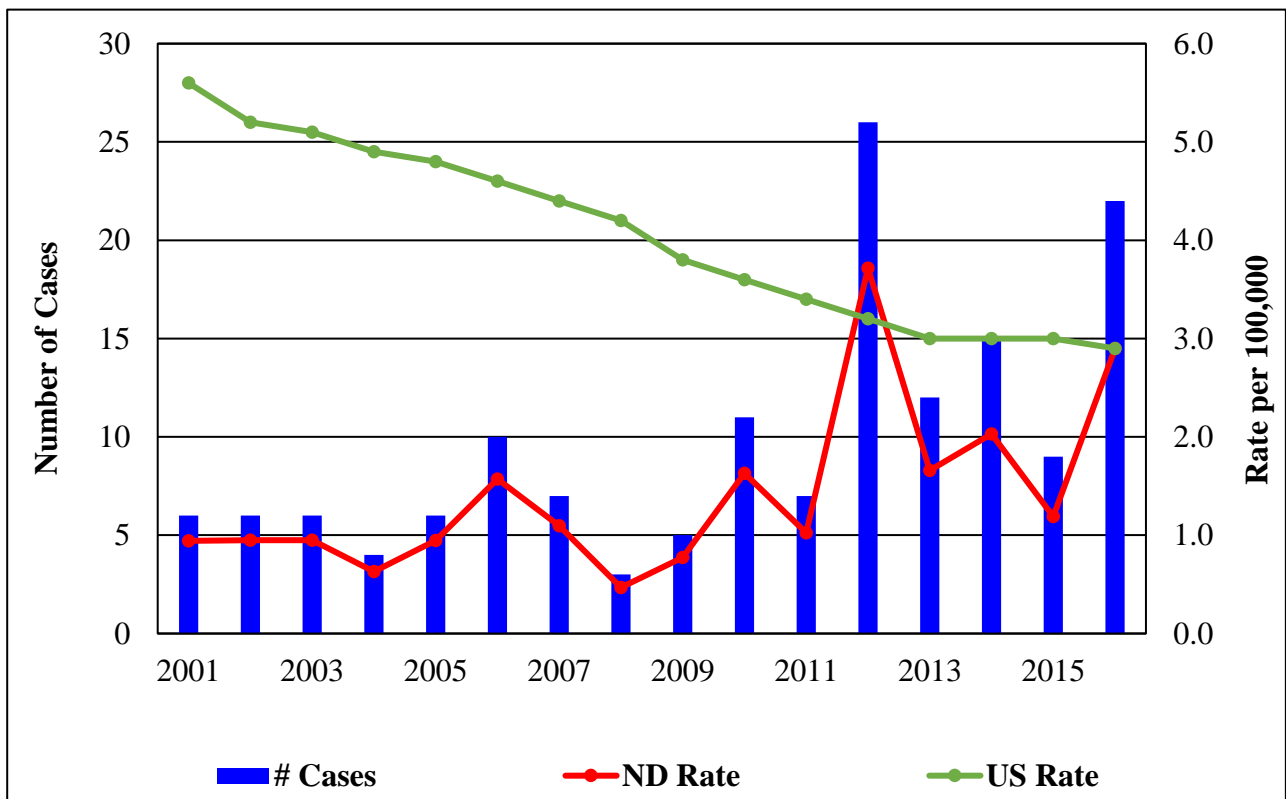
# Tuberculosis

Dee Pritschet, TB Coordinator

## Tuberculosis (TB)

22 cases of active tuberculosis (TB) were reported to the NDDoH in 2016, an increase of 141% from 2015 (9 cases). In the United States, 9,287 cases of active TB were reported for a case rate of 2.9 cases per 100,000. This represents a slight decrease compared to 2015 (-3.4%). North Dakota is one of 12 states to report an incidence rate higher than the national average (2.93).

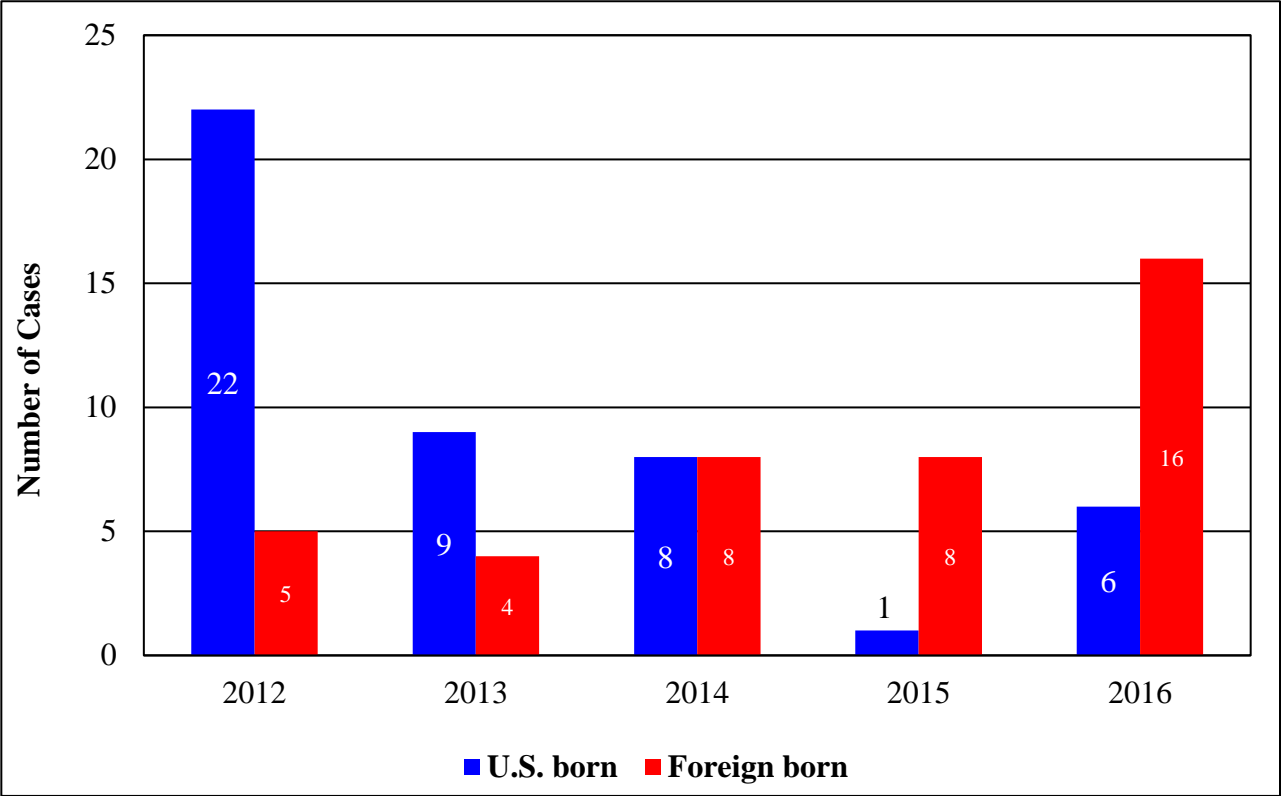
**Figure 41: North Dakota Cases: U.S. and ND Tuberculosis Disease Rates, 2001–2016**



Active TB in North Dakota is diagnosed at a younger age than the United States average. Seventy-three percent of cases are between the ages of 0 to 44, compared to the United States average of 45%, and 27% of North Dakota cases are between the ages of 45 and greater than 65, compared to the United States at 55%.

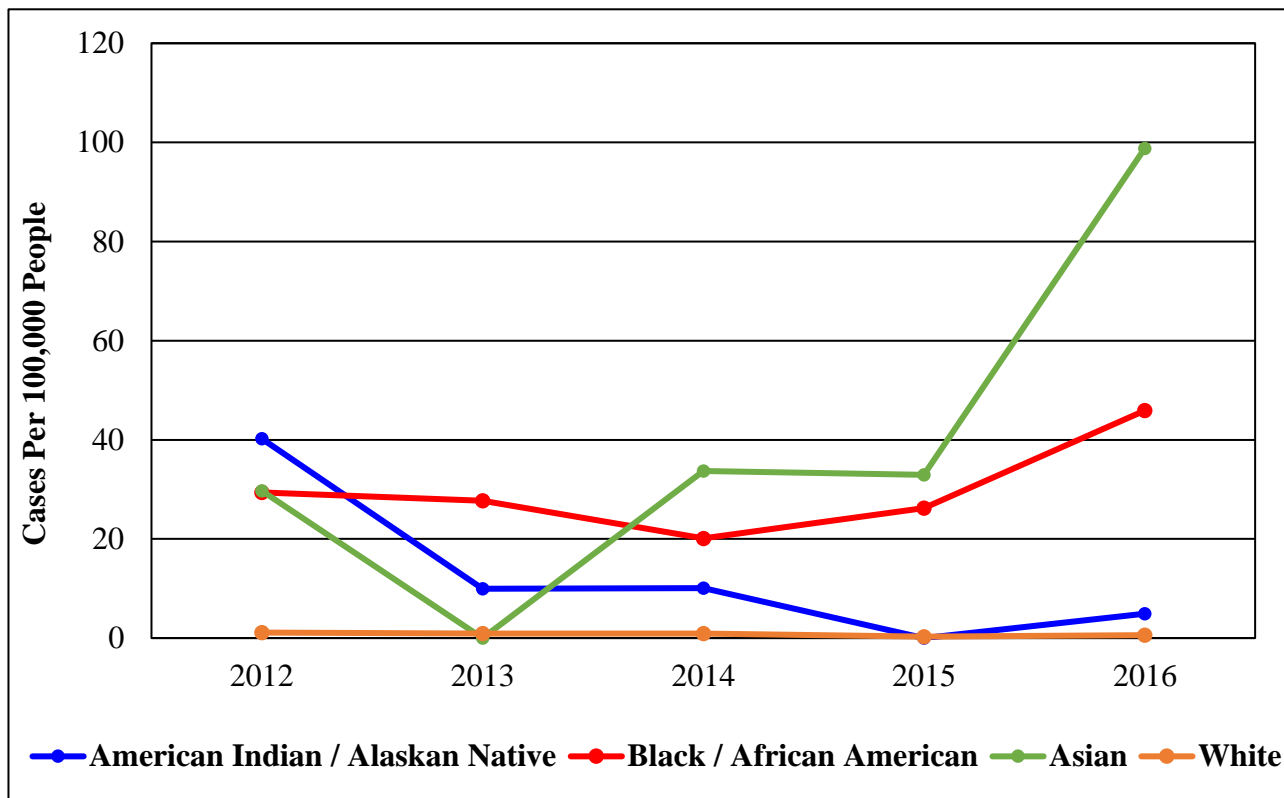
Although incidence of TB in North Dakota is low, cases that are reported demonstrate a racial disparity. The majority of TB cases in North Dakota are from a racial or ethnic minority. Of the 22 cases reported in 2016, U.S.-born persons accounted for six (27%) cases, and 16 cases (73%) cases occurred among foreign-born persons.

**Figure 42: Number of active TB cases reported in North Dakota by country of birth, 2012-2016**

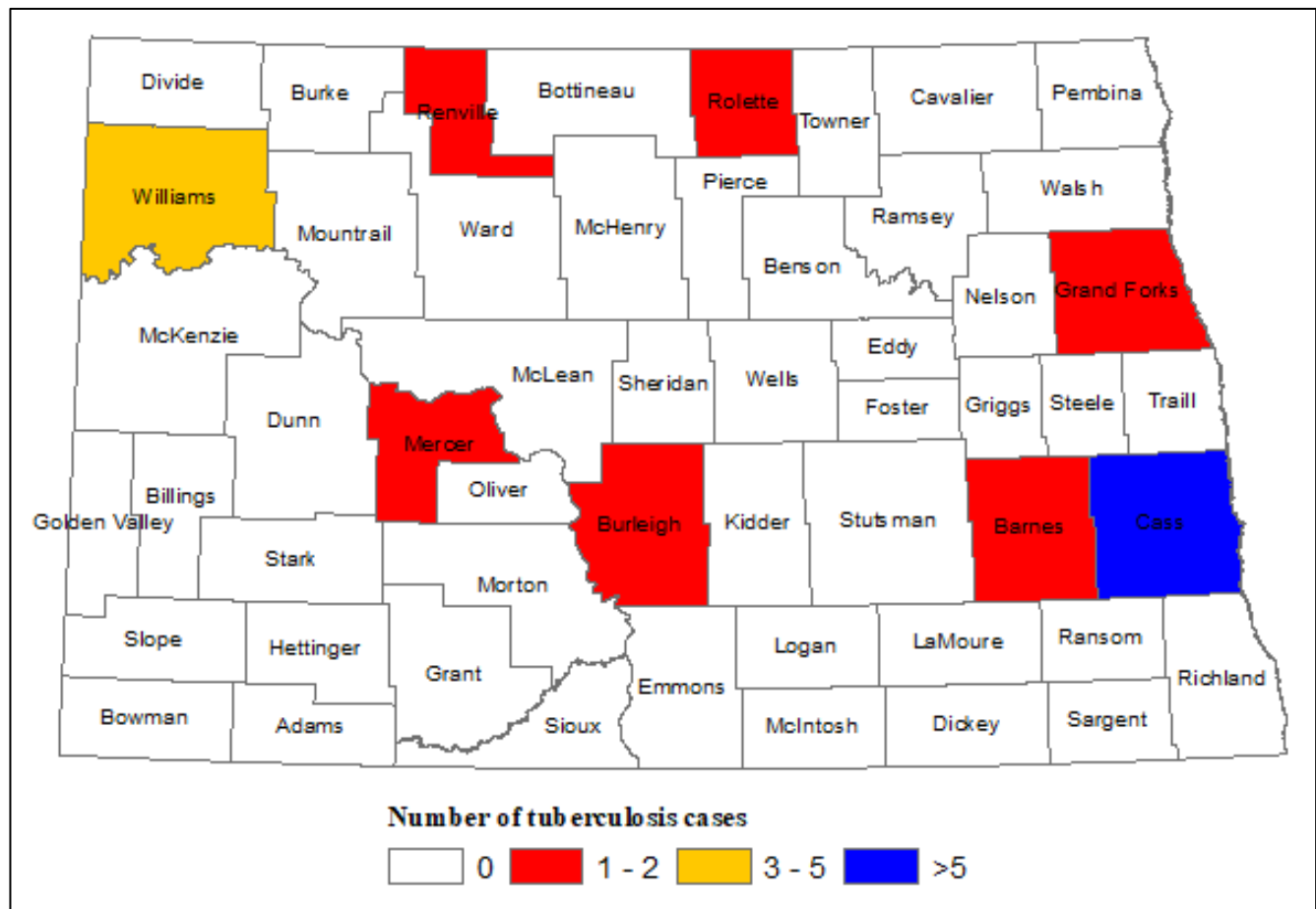


Among foreign-born persons, the highest TB incidence was among Asian populations (98.8 cases per 100,000), followed by Black, then American Indian/Alaskan Native.

**Figure 43: Tuberculosis Cases by Race/Ethnicity, North Dakota, 2012-2016**



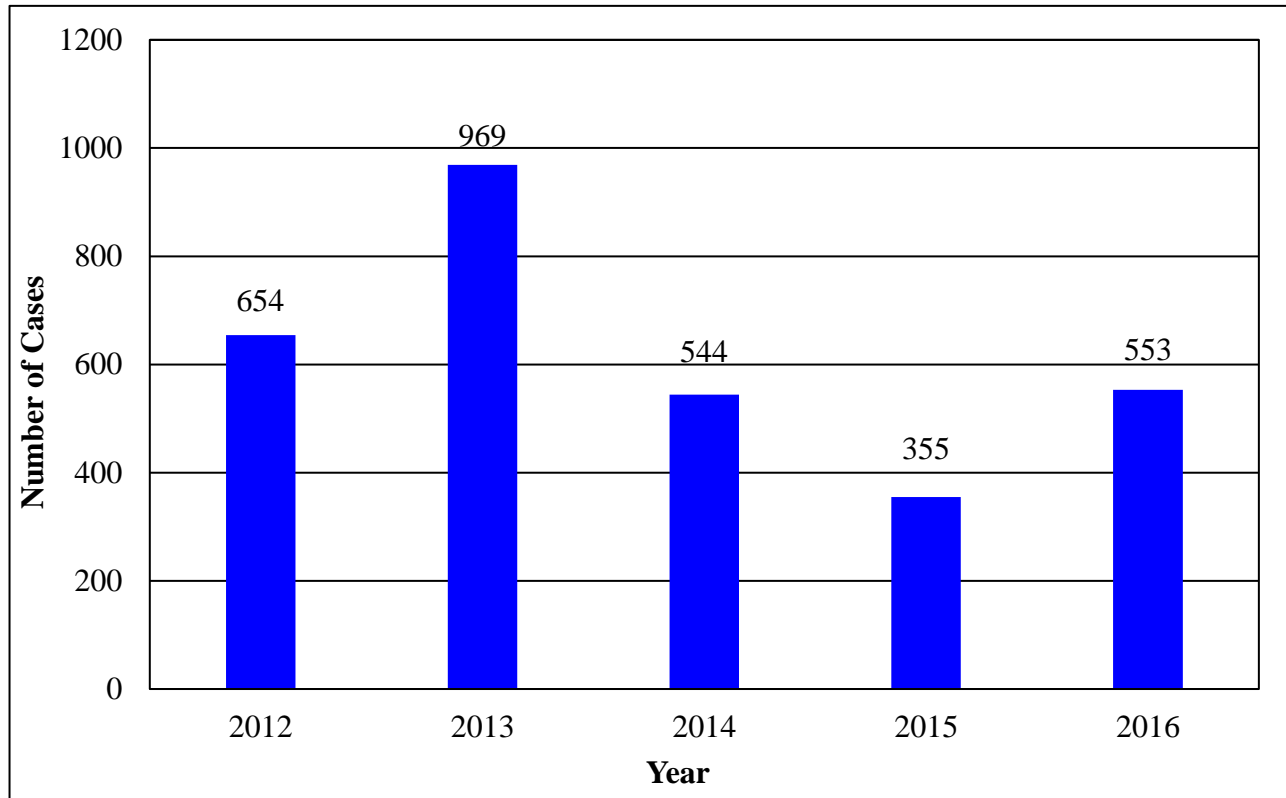
**Map 5: North Dakota Tuberculosis Cases by County, 2016**



### Latent Tuberculosis Infection (LTBI)

An estimated one-third of the global population is currently infected with TB, most of these being LTBI. Individuals with LTBI are not infectious, and do not have symptoms of TB disease. The number of latent tuberculosis infections reported in North Dakota over the past five years is shown in Figure 44.

**Figure 44: Reported Cases of LTBI North Dakota, 2012-2016**



The North Dakota TB elimination goal is to reduce the number of active tuberculosis cases; this can only be achieved by identifying and treating persons with TB infection (LTBI). In 2016, 553 cases of TB infection were reported to the NDDoH. The TB program partners with local public health units and correctional facilities to provide TB medication, ensuring appropriate treatment to treat TB infection.

# Hansen's Disease

Dee Pritschet, TB Coordinator

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One case of Hansen's disease (also known as leprosy) was reported to the NDDoH in 2016. A skin biopsy was performed and the specimen was submitted for culture and pathology; Fite's acid fast stain was performed to confirm the presence of leprae bacilli.

Hansen's disease is an infection caused by a bacterium, *Mycobacterium leprae*. These bacteria grow very slowly, and it may take infected individuals up to 20 years to develop signs of the disease.

In 2015, 178 cases of Hansen's disease (HD) were reported in the United States, the most recent year for which data is available. HD cases were reported from 31 states and Puerto Rico in 2015. Of the 178 cases, 101 (57 percent) were foreign-born. The largest proportion of cases (43) identified as Asian or South Pacific Islander. Males comprised 66 percent (117) of the new cases.

The National Hansen's Disease Program provides the antibiotics required to treat the infection. The recommended treatment regimen for HD is three antibiotics; dapsone, rifampin and clofazimine for one to two years, depending upon the severity of the disease.

# Sexually Transmitted Diseases

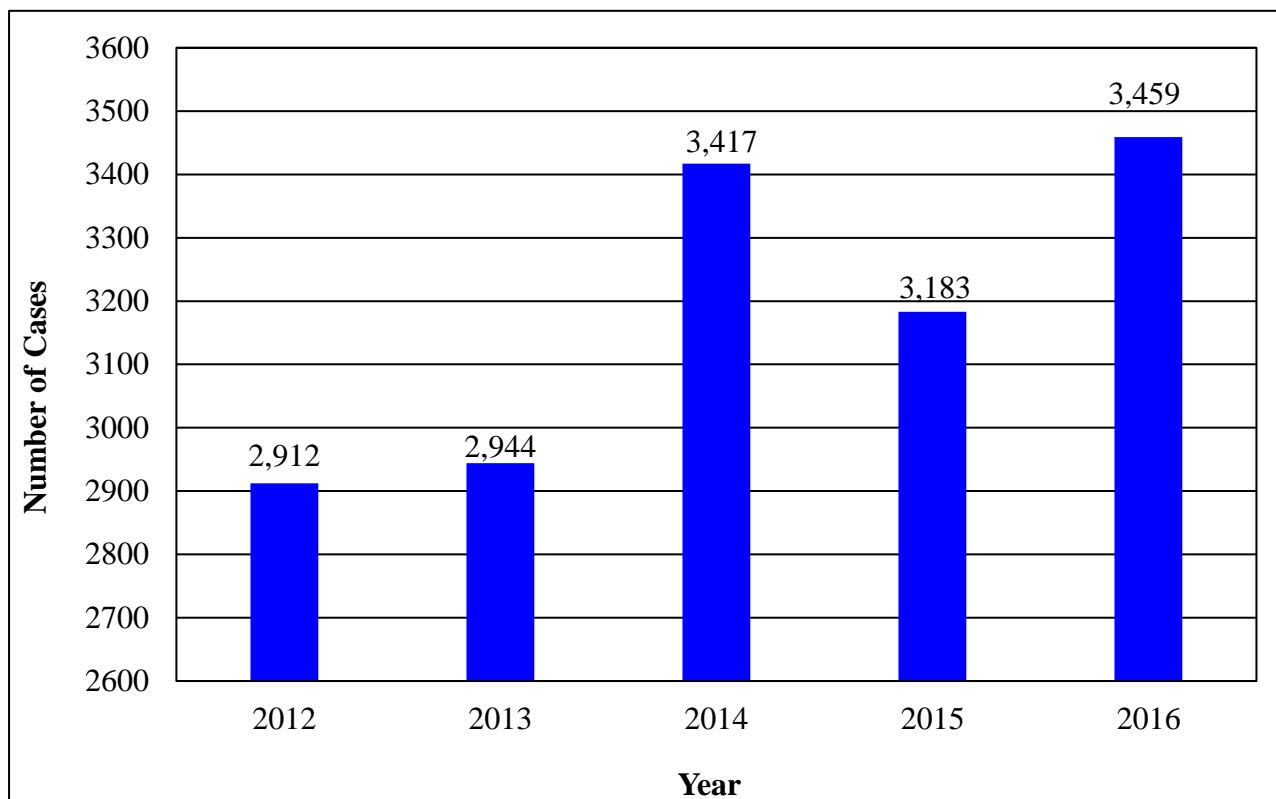
Shari Renton, STD Surveillance Coordinator

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## Chlamydia

In 2016, 3,463 cases of chlamydia were reported to the NDDoH, a rate of 457.5 cases per 100,000 persons. There was a 9% increase in the number of chlamydia cases from 2015 to 2016, despite a drop in cases from 2014 to 2015 (Figure 45).

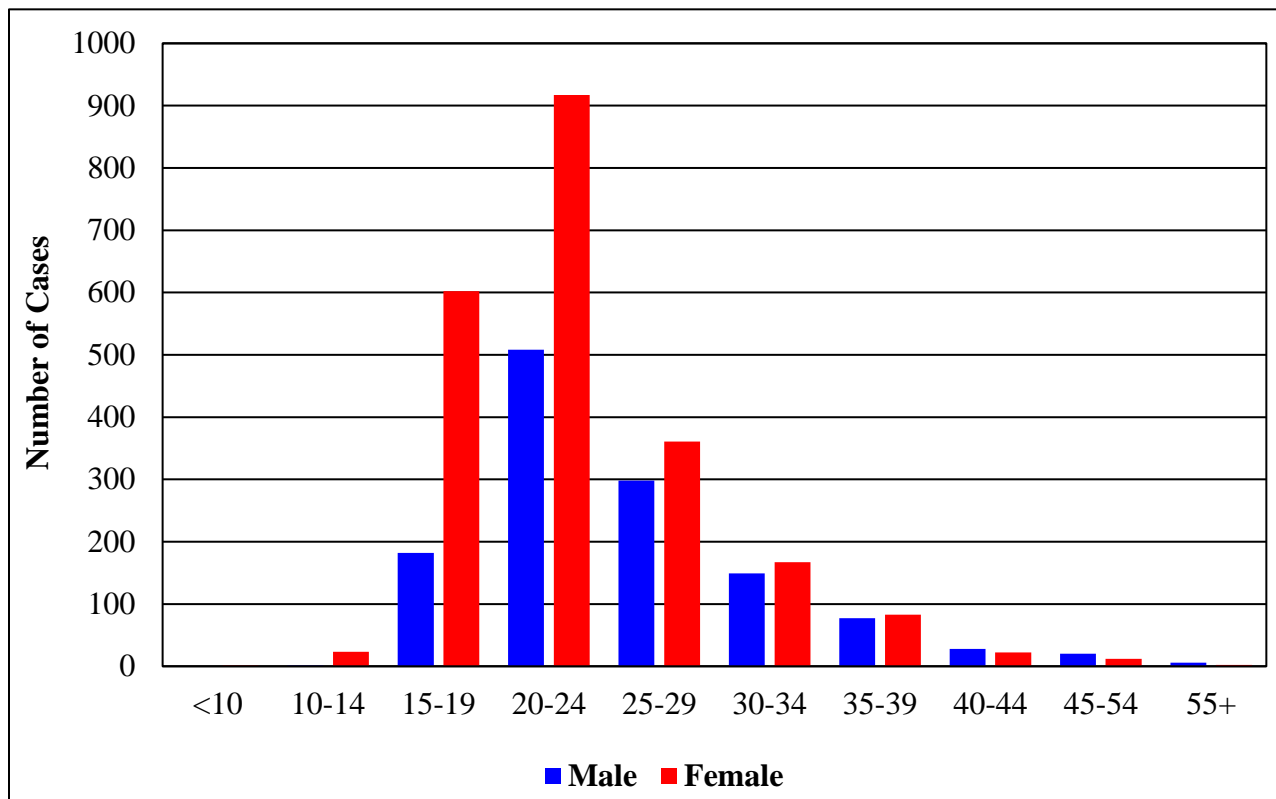
**Figure 45: Chlamydia Cases by Year, North Dakota, 2012-2016**



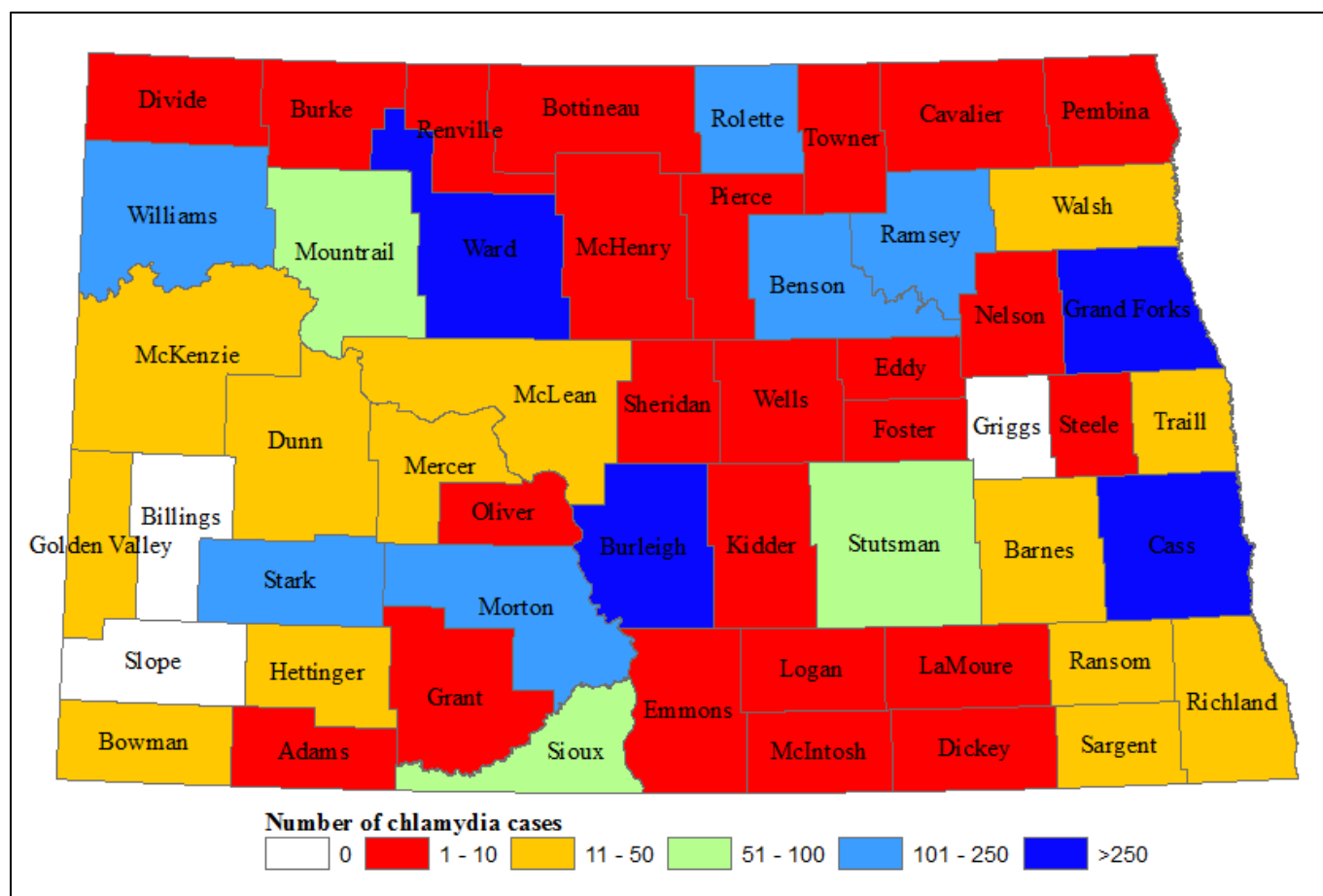


Of the cases reported in 2016, 2,191 (63%) were reported in females. Individuals ages 20-24 represented 41% of cases, and had twice as many cases as reported for ages 15-19 and 25-29 (Figure 46).

**Figure 46: Chlamydia Cases by Age Group and Gender, North Dakota, 2016**



**Map 6: North Dakota Chlamydia Cases by County, 2016**



In 2016, 50 of 53 counties had residents diagnosed with chlamydia. Slope County has not had a case of chlamydia since 2011. Overall incidence of chlamydia clusters near population centers. Ten counties in North Dakota had chlamydia rates higher than the overall North Dakota rate of 420.5 cases per 100,000 persons. Counties reporting the highest chlamydia rates in North Dakota are Sioux (2,082 per 100,000 people), Benson (1,910 per 100,000 people), and Rolette (1,058 per 100,000 people).

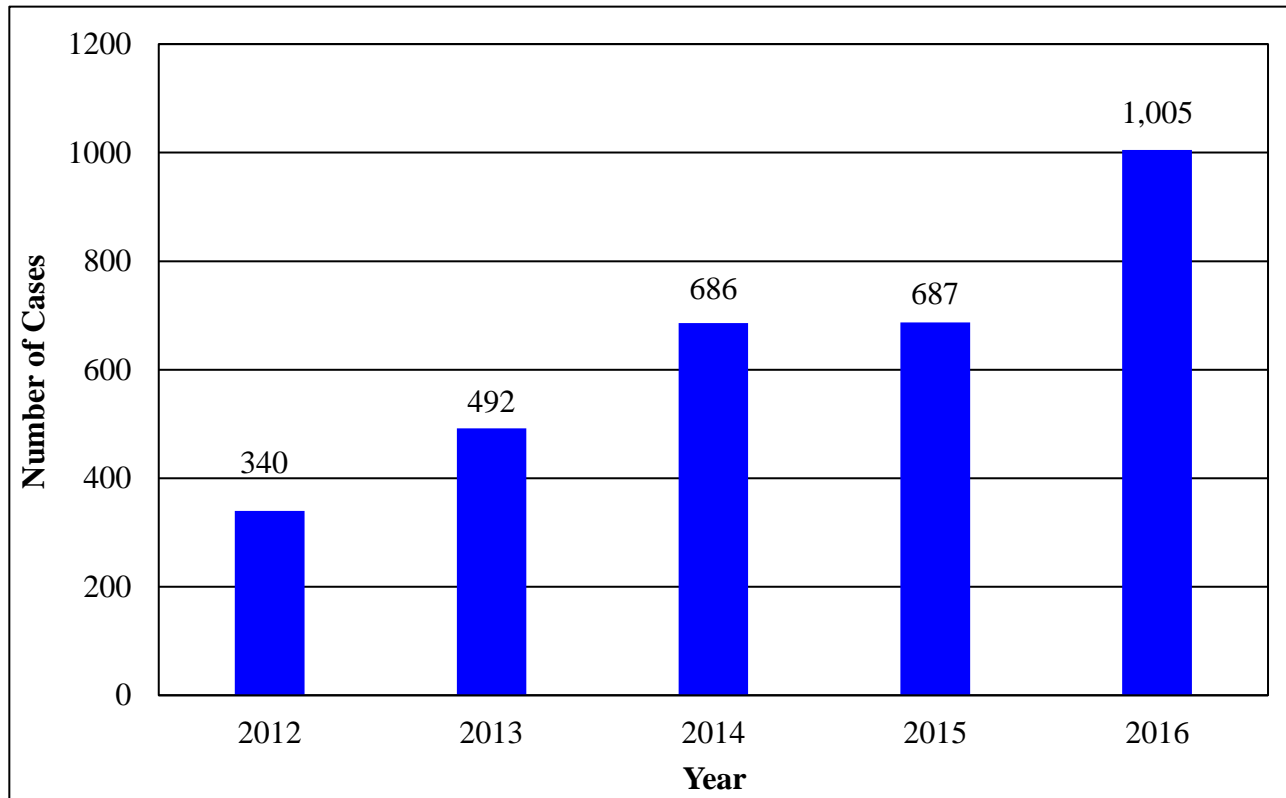
**Table 1: Epi Facts of North Dakota Chlamydia Cases, 2016**

<b>How many people are being treated?</b>	113 (3.3%) chlamydia cases were not treated, and 14 cases did not adhere to treatment guidelines.
<b>How many cases were interviewed?</b>	34% of chlamydia cases were reported as being interviewed. <i>Note: The NDDoH only interviews pregnant women, those diagnosed with PID, and cases under 14 years of age. Interview reports are submitted from private providers on the remainder of patients.</i>
<b>How many partners were tested and treated?</b>	2,355 partners were reported to interviewers However, 60% of cases reported no sexual partners. Of reported partners, 417 were named for follow-up and partner services.
<b>What are the risk factors for getting chlamydia?</b>	10% reported sex while high or intoxicated, 10% reported having more than one sex partner in the previous 12 months, and 5% reported having anonymous sex partners.
<b>How many were also tested for HIV?</b>	31% of chlamydia cases were reported as being tested for HIV. All chlamydia cases are recommended to be tested for HIV at time of diagnosis.

## Gonorrhea

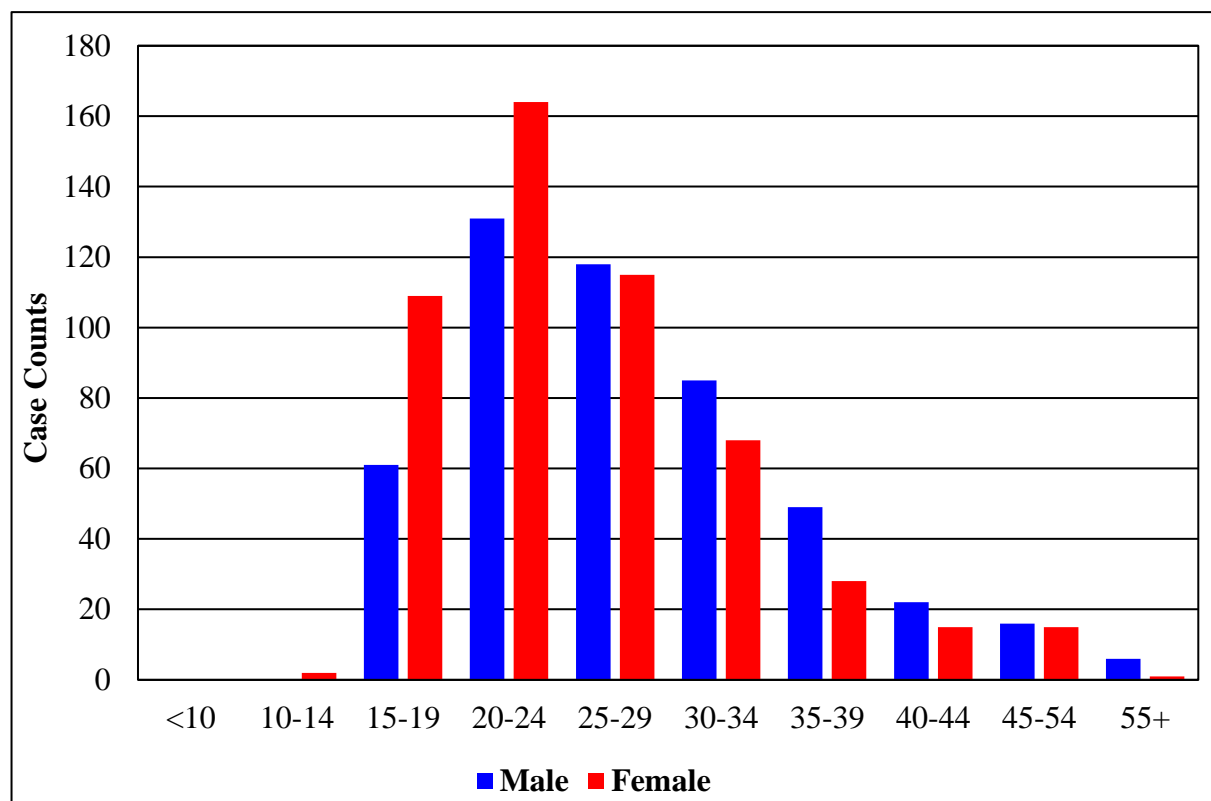
In 2014 and 2015, the gonorrhea rates remained steady after having increased an average of 40% each year prior. However, in 2016 there was an increase in the number of gonorrhea cases again. With a total of 1,005 cases, the number rose 46% from 2015. The case count reported in 2016 corresponds to a rate of 133 cases per 100,000 individuals. The rise in gonorrhea cases has been seen all across the United States, with rates at unprecedented highs.

**Figure 47: Gonorrhea Cases by Year, North Dakota, 2012-2016**



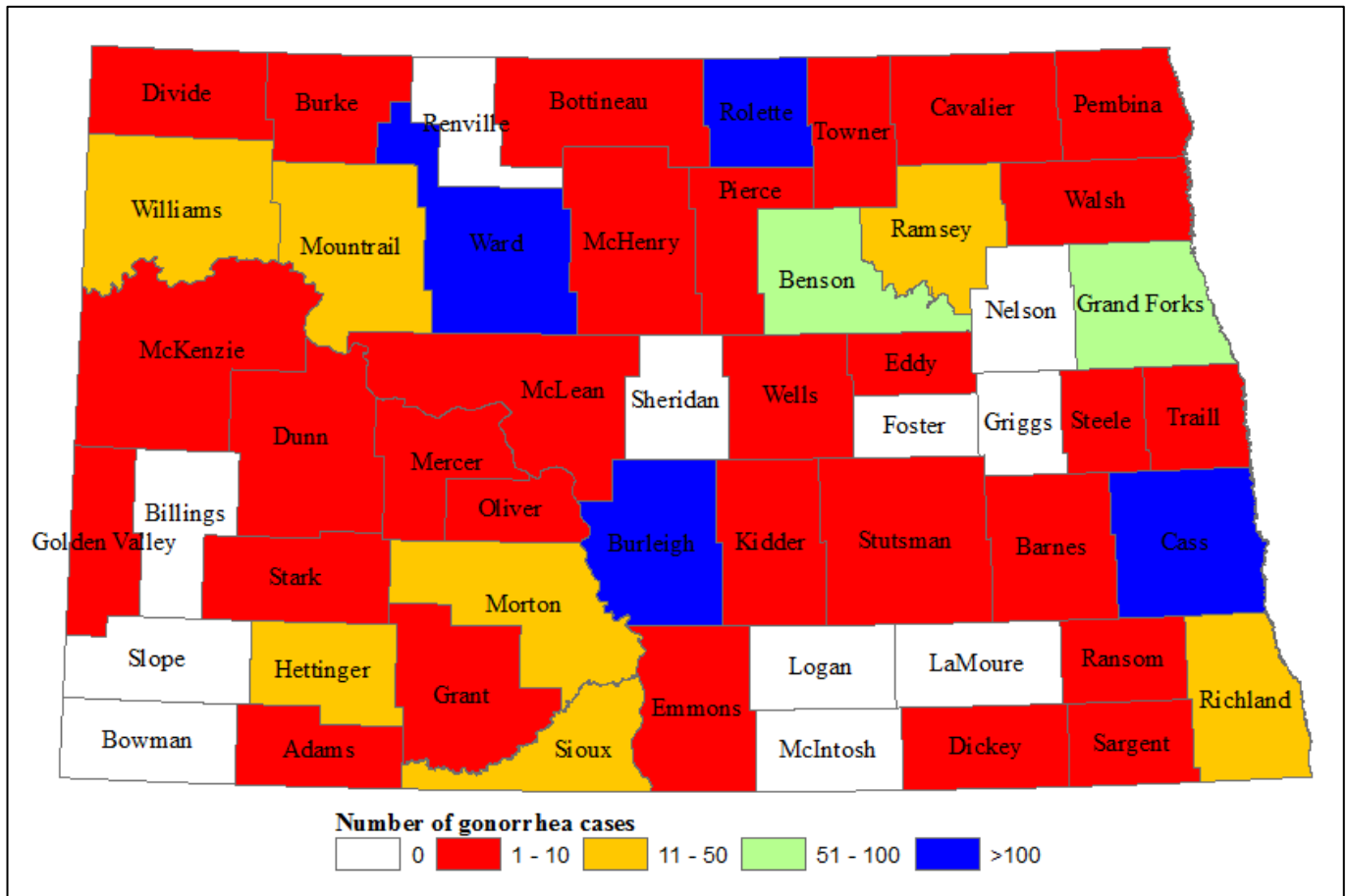
Of the cases reported in 2016, 517 (51%) were reported in females. The majority (53%) of gonorrhea cases were reported in people ages 20 to 29 (Figure 48). The average age of gonorrhea cases remained constant from 2015 to 2016 at 26.7 years. Male cases are on average older than female cases.

**Figure 48: Gonorrhea Cases by Age Group and Gender, North Dakota, 2016**



There were 420 cases of gonorrhea reported among American Indian/Alaskan Natives (1,034 cases per 100,000 individuals) followed by 404 cases in white individuals (60 cases per 100,000). Among Black/African Americans, 139 cases were reported (911 cases per 100,000).

**Map 7: North Dakota Gonorrhea Cases by County, 2016**



Counties reporting the highest gonorrhea rates in North Dakota are Benson (1,333 cases per 100,000), Rolette (976 cases per 100,000), and Sioux (572 cases per 100,000) counties. These rates are higher than the rate of 133 per 100,000 people for all of North Dakota. An additional seven counties have gonorrhea rates higher than the North Dakota rate.

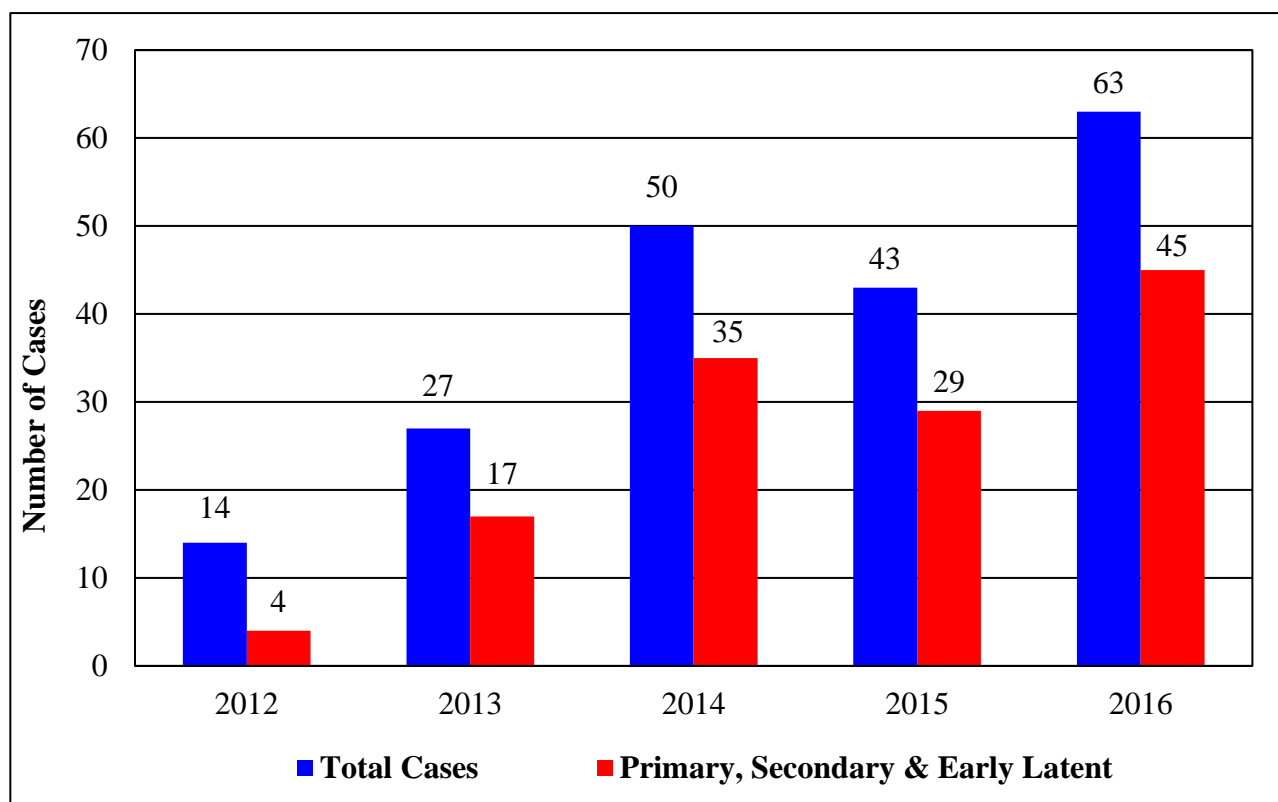
**Table 2: Epi Facts of North Dakota Gonorrhea Cases, 2016**

<b>Where are cases being diagnosed?</b>	50% of cases were diagnosed at a private clinic/hospital; 29% at tribal/IHS facilities, 15% at family planning/pregnancy clinics, and 6% at other facilities.
<b>How are cases being treated?</b>	130 (13%) cases were treated <u>inappropriately</u> . <i>Reminder: the appropriate treatment for gonorrhea is dual therapy of 1 gram azithromycin and 250mg IM ceftriaxone.</i>
<b>How many cases were interviewed?</b>	68% of cases were reported as being interviewed.
<b>How many partners were tested and treated?</b>	418 partners were reported to interviewers. Of those partners, 118 were referred for partner services, with nearly 50% being treated. The majority of those not treated were unable to be located for notification and treatment.
<b>What are the risk factors for gonorrhea?</b>	For cases with risk factor information, 44% reported never or not often condom use, 40% reported having more than one sex partner in the previous 12 months, 35% reported sex while high or intoxicated, and 16% reported having anonymous sex partners. Eighteen percent of individuals who reported their total number of partners for the past 12 months reported having five or more in that time period.
<b>How many were tested for HIV?</b>	Only 37% of cases were reported as being tested for HIV. All gonorrhea cases are recommended to be tested for HIV at time of diagnosis

## Syphilis

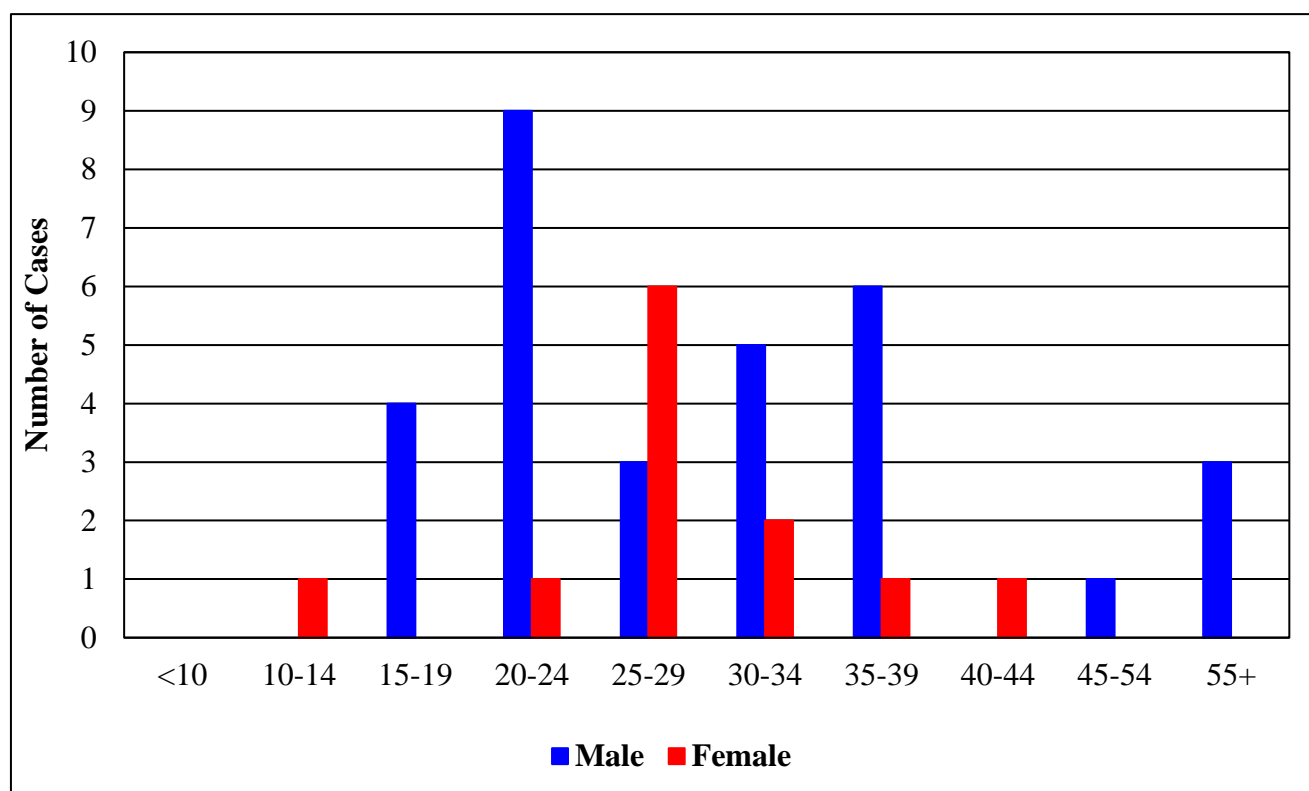
In 2016, there was a 50% increase in the number of syphilis cases reported in North Dakota, from 42 to 63 cases (Figure 49). The rate of syphilis infection in North Dakota for 2016 was 8.3 cases per 100,000 persons.

**Figure 49: Reported Syphilis Cases in North Dakota, 2012-2016**

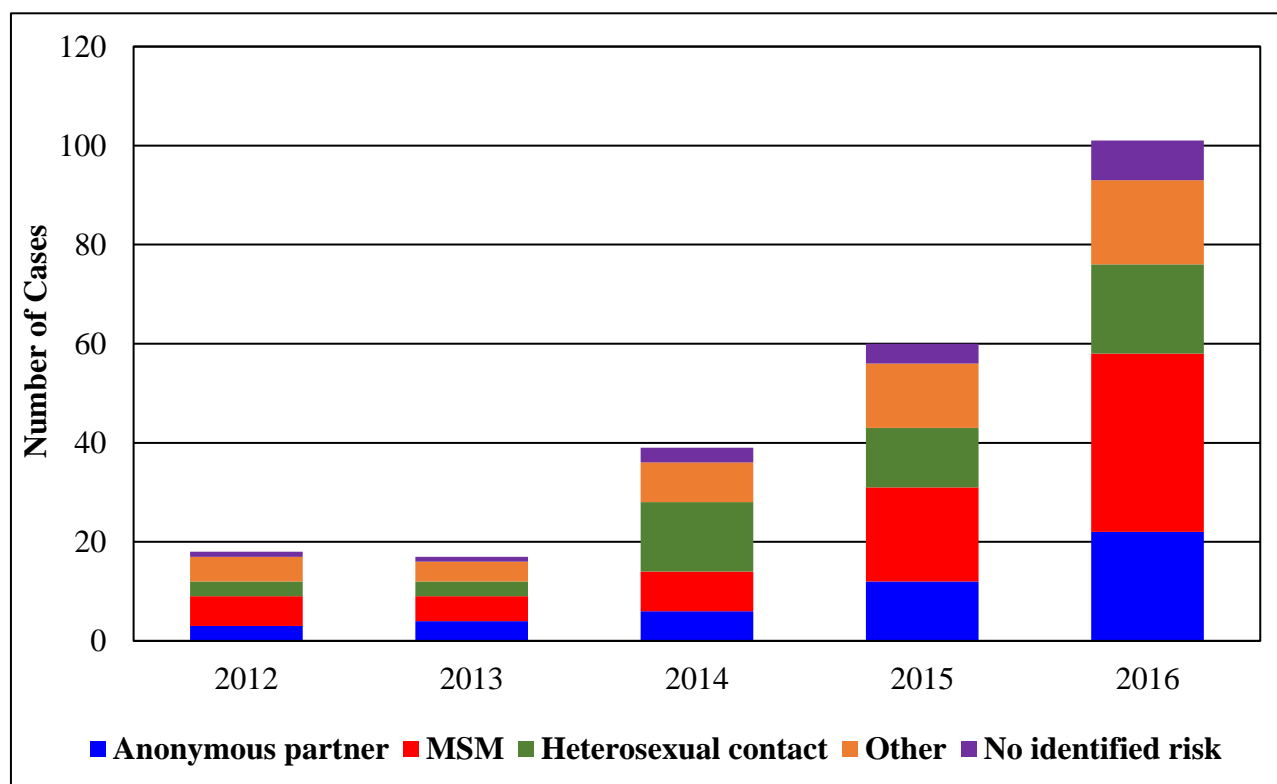


Of total cases reported in North Dakota, 84% were male. In 2016, the average age of cases increased over three years from 30.2 years to 33.4 years. In 2016, 39 syphilis cases were reported in white individuals, nine were reported in American Indian/Alaskan Natives, and nine were reported in Black/African Americans. The rates of syphilis among American Indian/Alaskan Natives has decreased since 2014.

**Figure 50: Reported Syphilis Cases in North Dakota by Age and Gender, 2016**



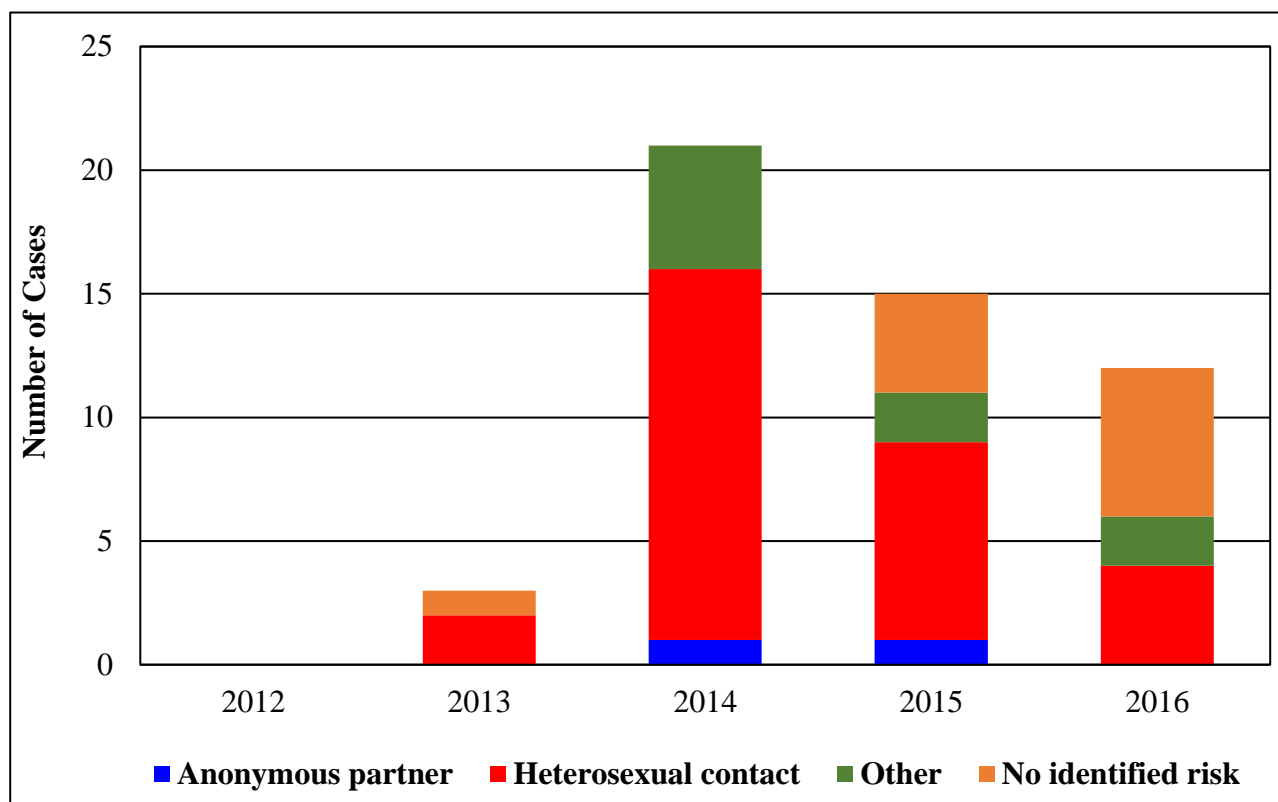
**Figure 51: Self-Reported Risk Factors of Male Syphilis Cases in North Dakota, 2012-2016**



Male to male sexual contact continues to be the most often self-reported risk factor for male syphilis cases in 2016.

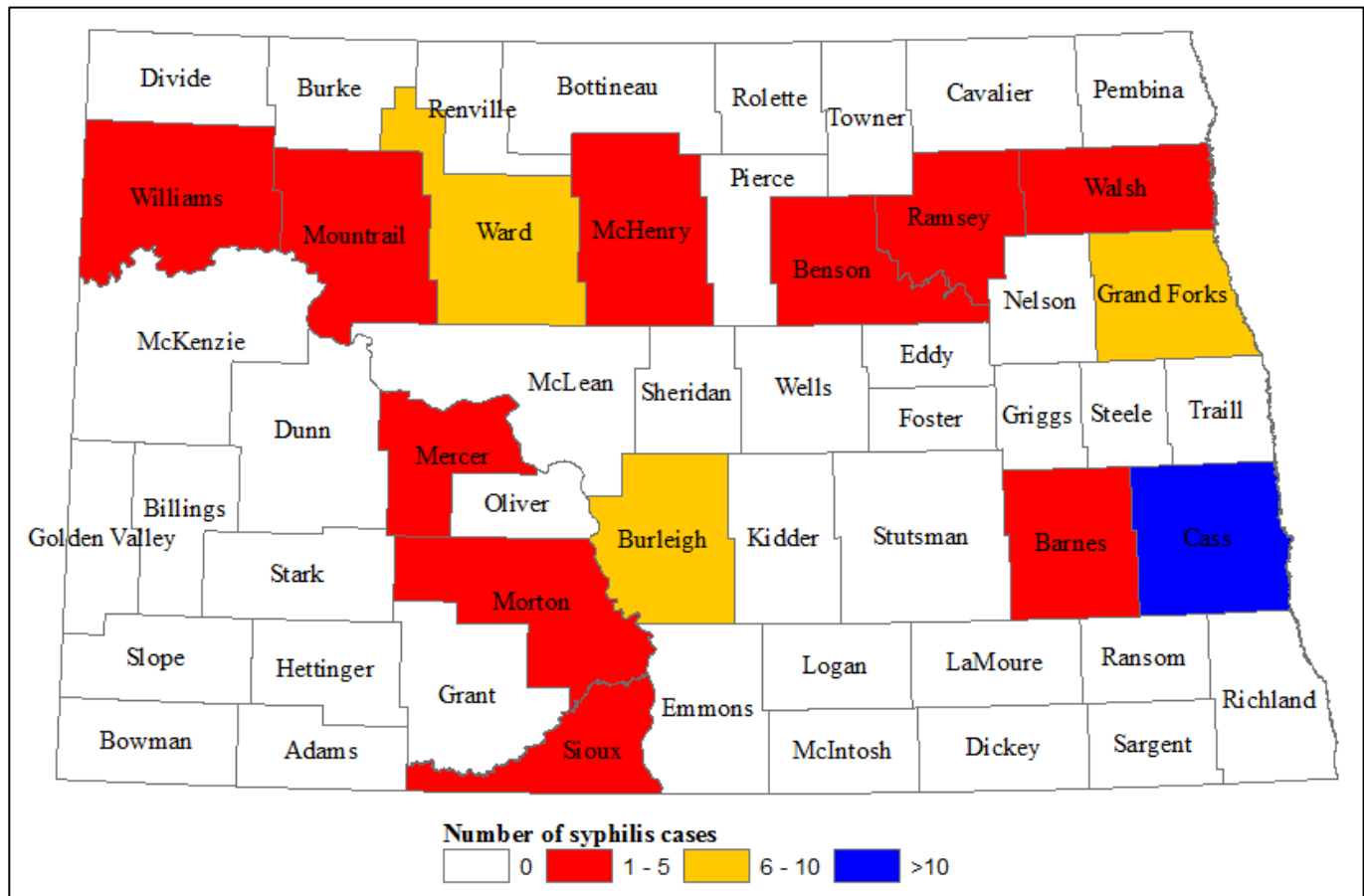


**Figure 52: Self-Reported Risk Factors of Female Syphilis Cases in North Dakota, 2012-2016**



Heterosexual contact has been the most common self-reported risk factor in female syphilis cases. No self-reported risk factor information was available in 2012.

**Map 8: North Dakota Syphilis Cases by County, 2016**



# Viral Hepatitis

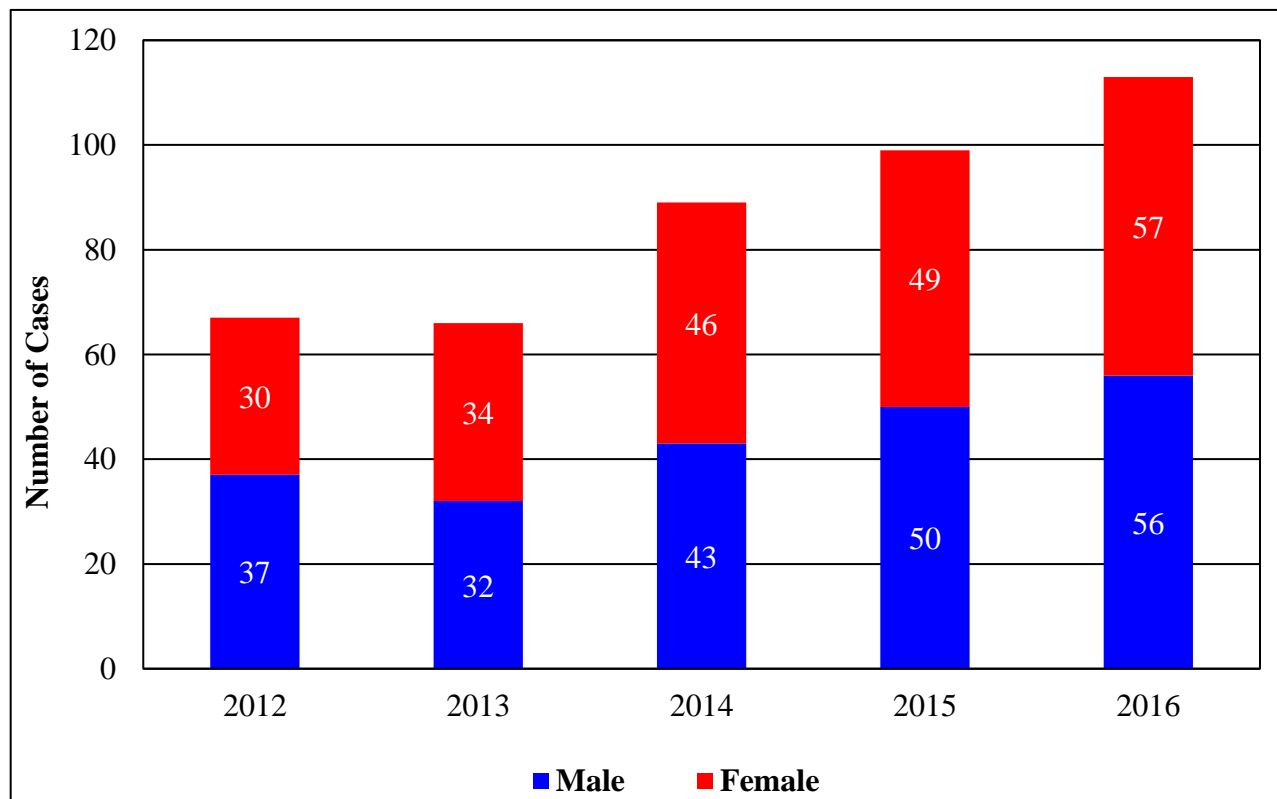
Shari Renton, Hepatitis Surveillance Coordinator

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 healthcare providers, organizing and hosting an HIV/hepatitis conference for healthcare providers, and contracting with local public health units (LPHUs) to provide the above mentioned viral hepatitis services. In 2016, NDDoH contracted with 21 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](http://www.ndhealth.gov/disease/hepatitis). Testing sites screened 1,471 individuals. Of those, 105 (7.1%) were positive in 2016.

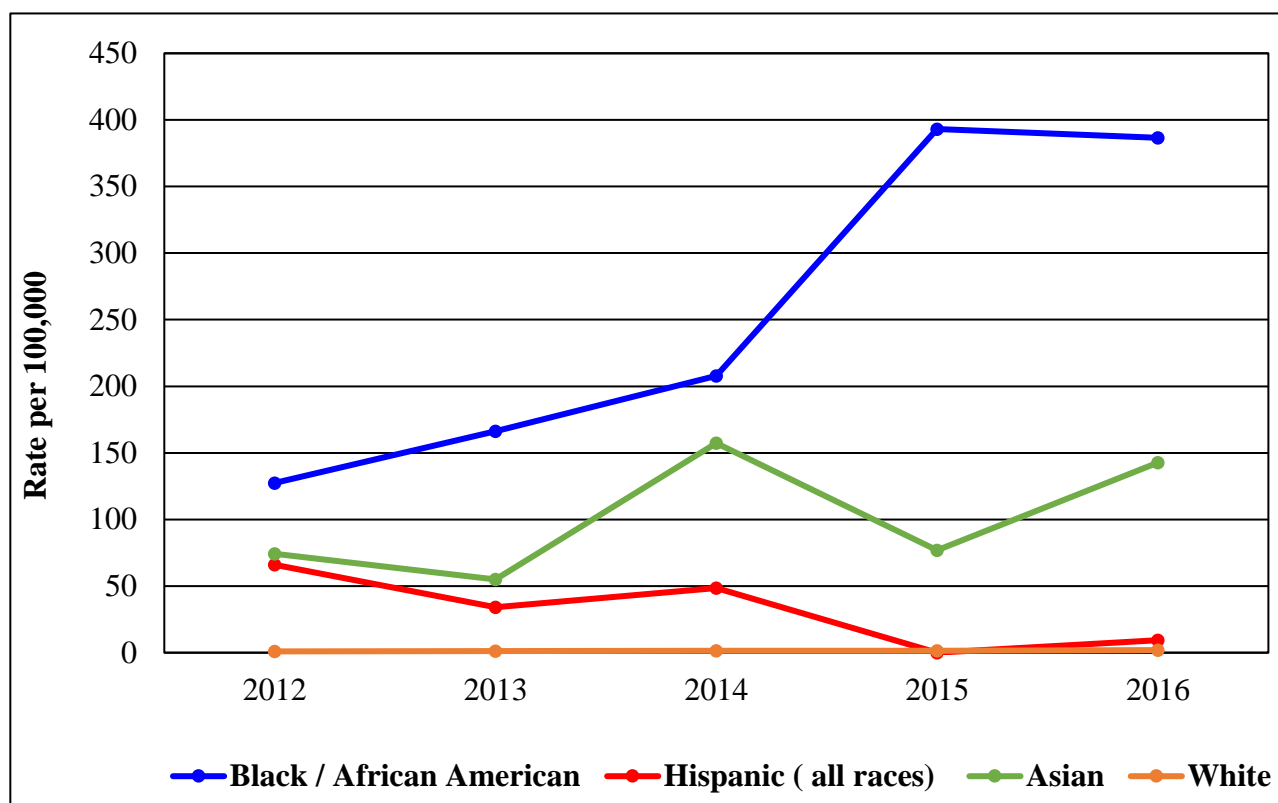
## Hepatitis B Virus

In 2016, 113 cases of chronic HBV infection were reported from 14 counties in North Dakota. This is a 14% increase from the 99 cases reported in 2015. Of the 113 HBV-positive cases reported to the NDDoH, 57 were female and 56 were male. The average age was 35.

**Figure 53: Reported Chronic HBV Cases by Year, North Dakota, 2012-2016**

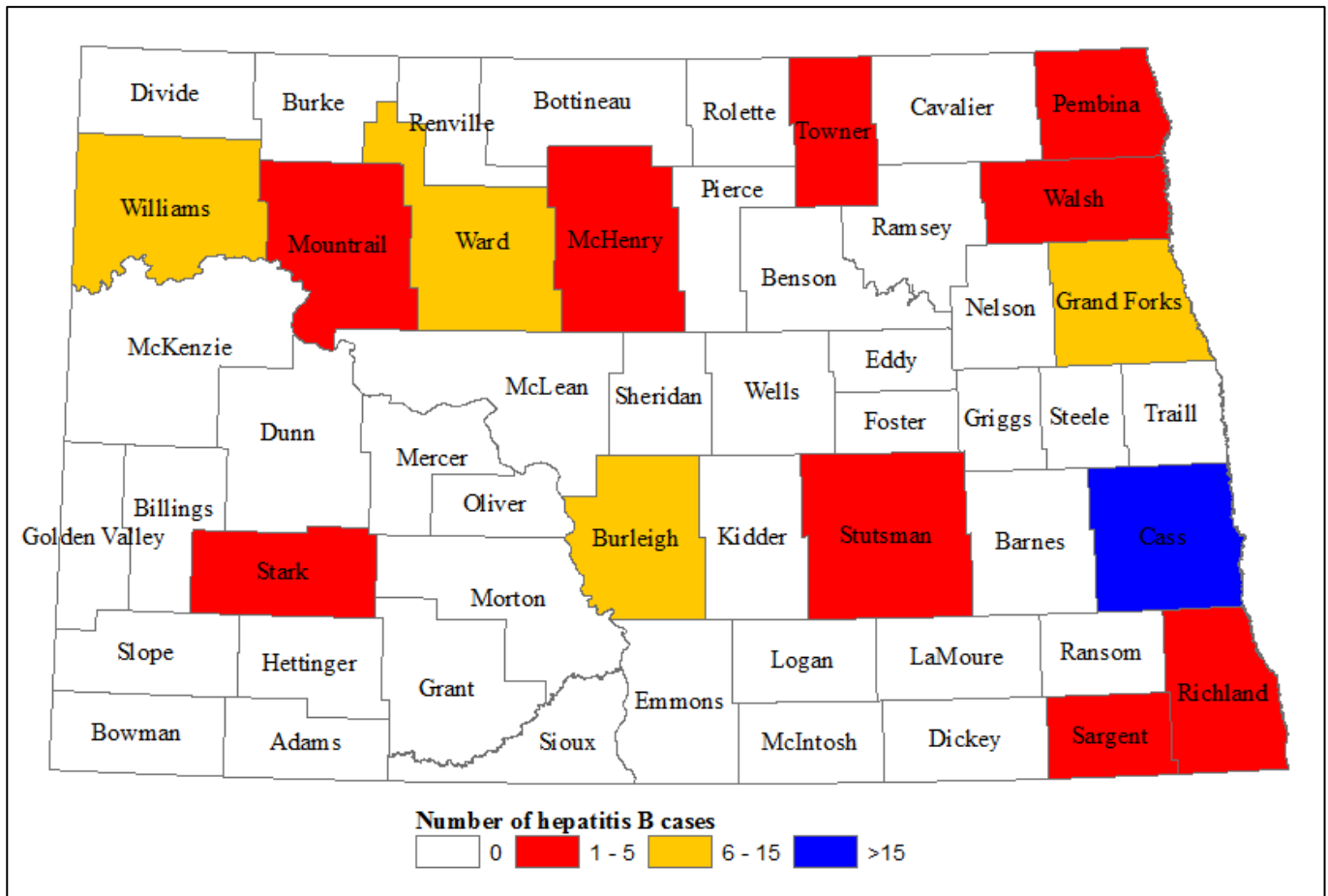


**Figure 54: Hepatitis B Rates by Race, North Dakota, 2012-2016**



Among those reporting race, 66% were Black/African American, 15% were white, and 15% were Asian. The majority of HBV cases occur in persons who are born in countries where HBV is endemic. Since vaccination programs were started in the United States, the number of HBV infections among American born individuals has been drastically reduced.

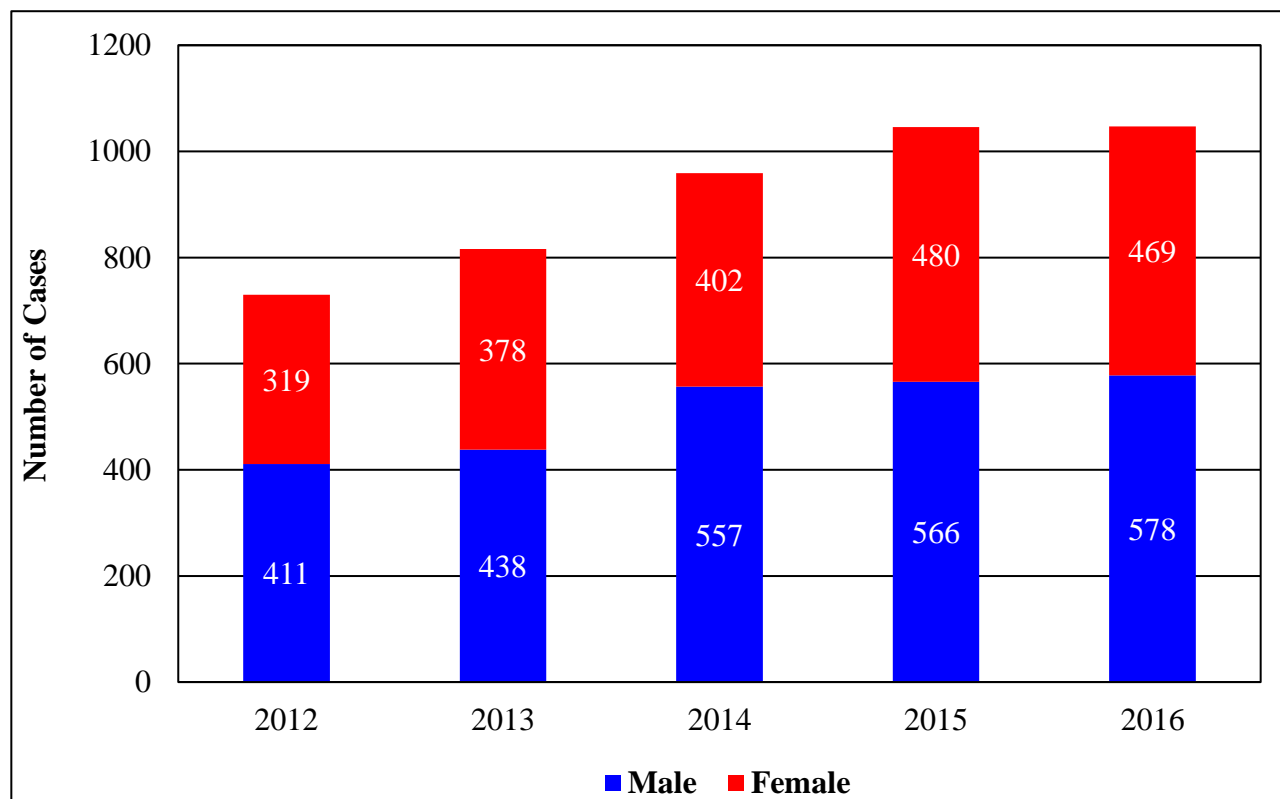
**Map 9: North Dakota Hepatitis B Cases by County, 2016**



## Hepatitis C Virus

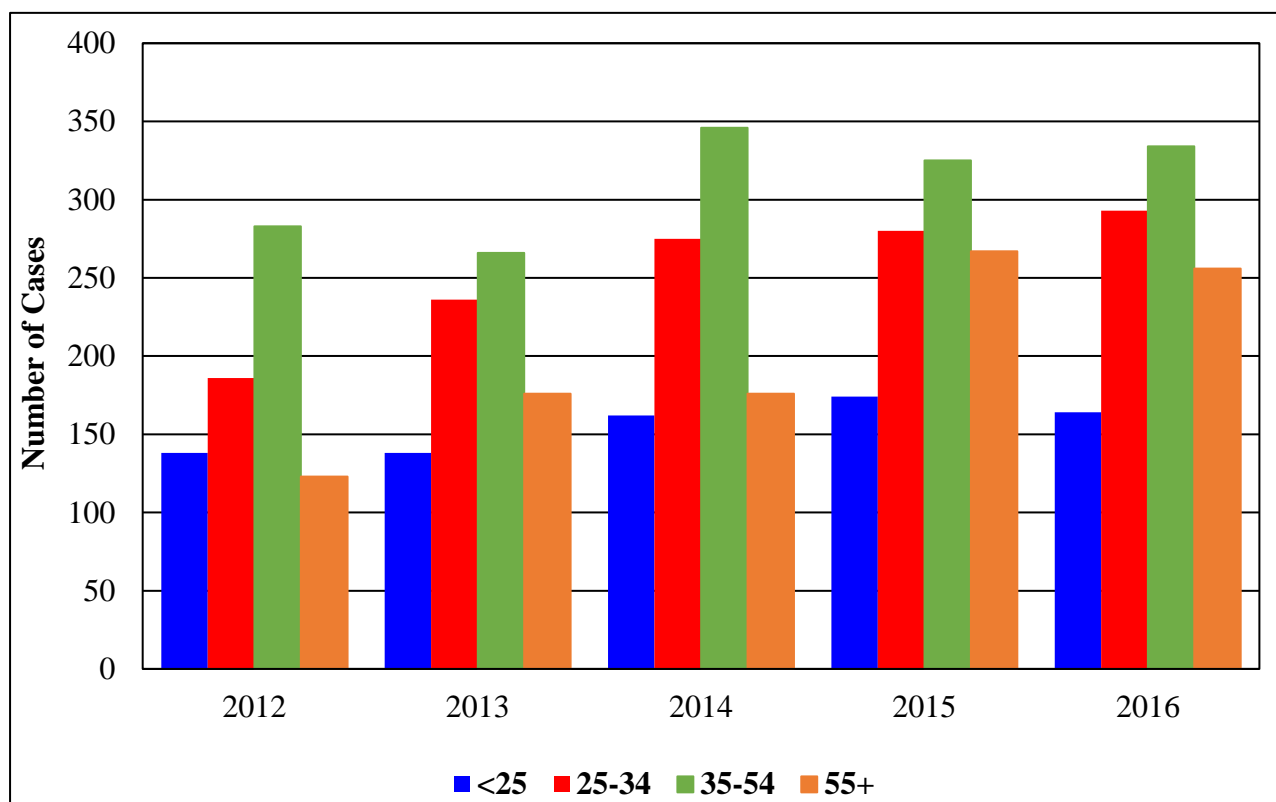
In 2016, the NDDoH received 1,047 reports of newly identified cases as having a positive laboratory result that indicates past or present HCV infection. This number does not distinguish between resolved versus current infections.

**Figure 55: Reported HCV Cases by Year, North Dakota, 2012-2016**



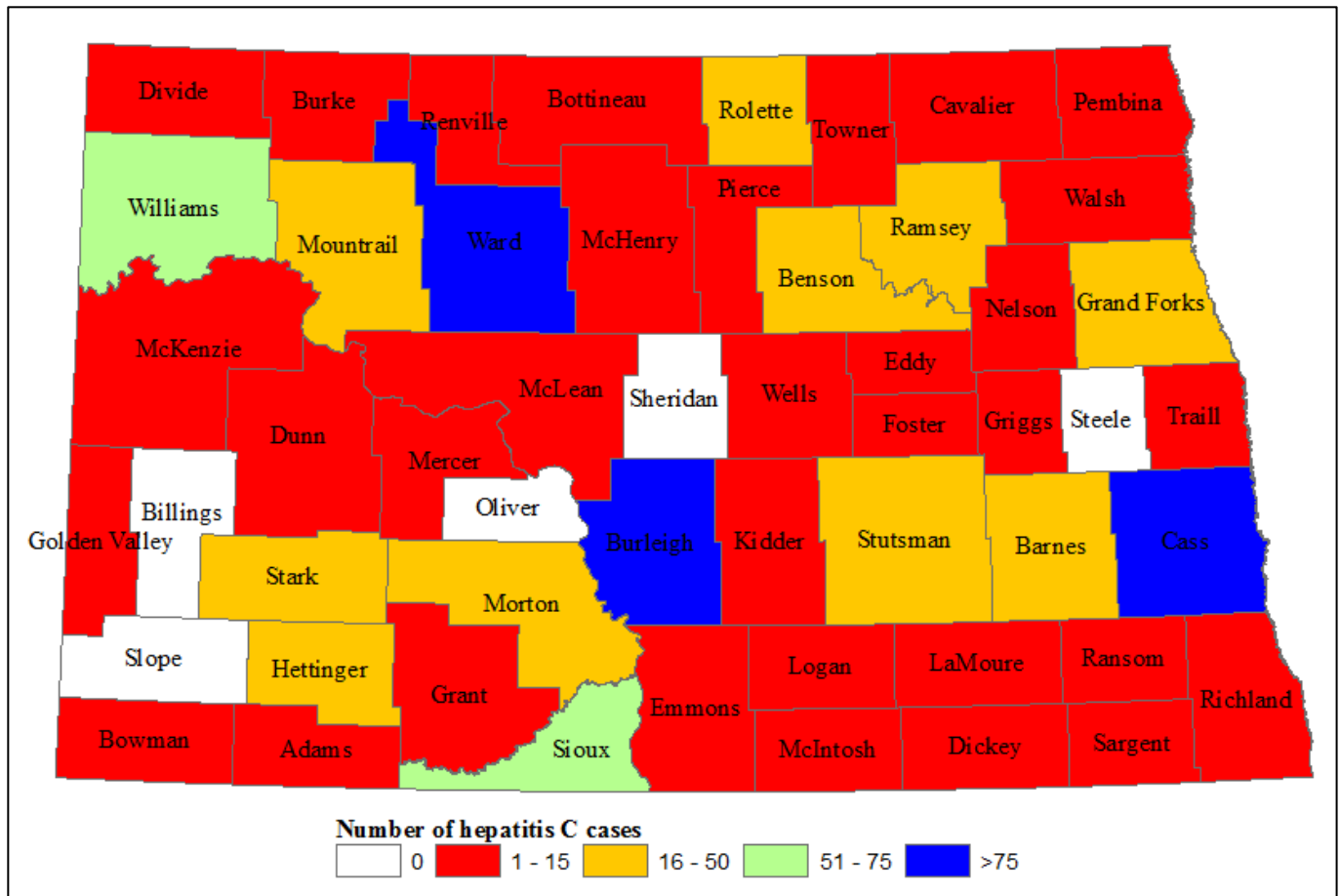
HCV infection in North Dakota is predominantly an adult infection. It is recommended to screen all individuals born between 1945 and 1965. The average age of cases was 40 years (Figure 56), and 55% of cases were male. Of the 1,047 cases in 2016, 704 had a reported race. Among those, the majority were white (66%), followed by American Indians/Alaskan Natives that accounted for 27%. All races saw an increase in HCV rates in 2016.

**Figure 56: Reported HCV by Age Group, North Dakota, 2012-2016**



Forty-six counties reported cases of HCV. Cases per county ranged from zero to 207. The counties with the highest rates include Hettinger (1,183 per 100,000 people), Sioux (1,167 per 100,000 people), and Benson (533 per 100,000 people). Hettinger County cases appear high because state correctional facilities in that county screen inmates for HCV.

**Map 10: North Dakota Hepatitis C Cases by County, 2016**





## Summary of Selected Reportable Conditions North Dakota

Reportable Conditions	January – December 2015	January – December 2016
Anaplasmosis	3	10
Babesiosis	3	1
Brucellosis	2	1
Campylobacteriosis	175	195
Chickenpox	58	45
Chlamydia	3,176	3,463
Cryptosporidiosis	18	39
Dengue	1	2
<i>E. coli</i> , Shiga toxin producing (non-O157)	44	34
<i>E. coli</i> O157	15	6
Ehrlichiosis	2	5
Enterococcus, Vancomycin-resistant (VRE)	321	252
Giardiasis	40	46
Gonorrhea	687	1,005
<i>Haemophilus influenzae</i> (invasive)	24	29
Hantavirus	1	1
Acute Hepatitis A	6	2
Acute Hepatitis B	2	3
Acute Hepatitis C	0	1
HIV/AIDS	84	88
Influenza (2014-15 and 2015-16 seasons)	6,443	1,942
Legionellosis	5	5
Listeriosis	1	0
Lyme Disease	33	32
Malaria	5	7
Meningococcal disease	0	0
Mumps	1	49
Pertussis	44	44
Q fever	0	0
Rabies (animal)	6	16
Rocky Mountain spotted fever	6	1

## Summary of Selected Reportable Conditions North Dakota (continued)

Reportable Conditions	January – December 2015	January – December 2016
Salmonellosis	145	121
Shigellosis	24	16
Staphylococcus aureus, Methicillin-resistant (MRSA)	125	143
<i>Streptococcus pneumoniae</i> (invasive, children <5)	6	4
Syphilis	42	63
Trichinosis	0	0
Tuberculosis	9	22
Tularemia	5	0
Typhoid fever	2	0
West Nile virus disease	23	85
Zika Virus	0	3

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