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 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

Erratum: case counts were updated for Legionellosis and Listeriosis on page 79 since the original publication date
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- Hepatitis C

### Summary of Selected Reportable Conditions

### Division of Disease Control Contact Information
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, implements evidence-based activities to increase immunization rates, and maintains and updates the North Dakota Immunization Information System (NDIIS).
Vaccine-Preventable Disease Surveillance
Lexie Barber, Surveillance Epidemiologist

Measles
In 2017, the United States saw 120 cases of measles from 15 states and the District of Columbia. Minnesota experienced an outbreak that accounted for 79 of these cases. Over 8,000 people were exposed to measles during the outbreak and 500 were asked to stay home from school, child care, or work. The outbreak occurred in a community with low measles, mumps, and rubella (MMR) vaccination rates in children, and 71 of the cases were unvaccinated. The outbreak serves as an important reminder of 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 start 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 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 2017, there were 5,629 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 percent. In North Dakota, there were 10 confirmed or probable cases of mumps reported in 2017. Mumps cases across the country have increased in recent years. It is now known that immunity from the mumps vaccine wanes over time and more outbreaks continue to occur.

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.
Meningitis
Over 300 cases of meningococcal disease were reported to the CDC in the United States in 2017. 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 2017.

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 provisionally recommended 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 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 2017, North Dakota reported 50 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.
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 2017, 63 cases of Chickenpox were reported to the NDDoH. One outbreak in Williams county was responsible for 22 of these cases. All the outbreak associated cases were in children under the age of 15, and 19 of the cases were unvaccinated. Although some of the outbreak cases were clinically diagnosed by a health care provider, none of the cases in the outbreak were laboratory confirmed. In addition, the outbreak was already occurring before the NDDoH was made aware of any cases. 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 moth 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.
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.

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. There were no cases of hepatitis A reported in North Dakota in 2017.
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 continues to increase in North Dakota. In 2017, there were 47 births to hepatitis B positive women.

**Figure 4: The Number of Births to Hepatitis B Positive Women in North Dakota by Year, 2010-2017**

![Bar chart showing the number of births to hepatitis B positive women in North Dakota by year from 2010 to 2017](chart.png)
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 2017-2018 school year were around 94 percent for all five of the required vaccinations.

Figure 5: North Dakota Kindergarten Entry Immunization Rates for the 2017-2018 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. This was the first year since the 2011-2012 school year that the percent of personal belief exemptions did not increase among kindergarten students.
Figure 6: North Dakota Kindergarten Entry Immunization Rates from 2010 to 2017

Figure 7: North Dakota Kindergarten Entry Exemption Rates for the 2017-2018 School Year
The rise in exemptions becomes more apparent when kindergarten data is separated by school type (Figure 9).

**Figure 9: North Dakota Kindergarten Entry Exemption Rates from 2010 to 2017, 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 2017-2018 school year, Tdap and meningococcal coverage rates were about 91 percent and 90 percent respectively.

Figure 10: North Dakota Seventh Grade Entry Immunization Rates for the 2017-2018 School Year
NDIIS Immunization Coverage Rates
Mary Woinarowicz, NDIIS Manager

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.\textsuperscript{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 94 percent 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 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 remained consistent in 2017 compared to 2016. Quarter 4 2016 had a series rate of 69.7 percent compared to 69.8 percent for quarter 4 of 2017. Coverage rates for hepatitis A saw a 2 percent increase in the second quarter of 2017 but decreased again in quarters three and four.

Figure 11: North Dakota Immunization Rates for Infants Ages 19 – 35 Months Using the 4:1:3:3:1:4 Vaccine Series, 2014-2017
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 2014, North Dakota has seen a steady increase in coverage rates for recommended adolescent immunizations. At the end of 2017, 78.4 percent of adolescents 13-17 years of age were up-to-date with one dose of Tdap and 77.5 percent were up-to-date with one dose of MCV4 vaccine. Approximately 29.8 percent 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 4.7 percent 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 2017, 82.4 percent of adolescents 13-17 years were up-to-date with two doses of varicella vaccine compared to only 64.8 percent in 2014.

Figure 12: North Dakota Immunization Rates for Adolescents Ages 13 – 17 years, 2014-2017
Coverage rates for HPV, although lower than Tdap and MCV4, have seen much greater increases over the last four years. By the end of 2017, 73.7 percent of females and 69.5 percent of males 13 to 17 years had started the HPV vaccine series. This is an increase of 19 percent for females and approximately 33 percent for males since 2014. Additionally, 59.8 percent of females and 53.1 percent of males are up-to-date with the complete HPV vaccine series. This is an increase of approximately 18 percent for females and more than 30 percent for males since 2014.

**Figure 13: North Dakota HPV Immunization Rates for Adolescents ages 13 – 17 years, 2014-2016**

*(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 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, 52.9 percent of adults had received their Tdap vaccine as of the end of 2017. This is a 23 percent increase since 2013 and a 4 percent increase since 2016.

Figure 14: North Dakota Tdap Immunization Rates for Adults 19 and Older, 2014-2017
The coverage rate for zoster vaccine for adults has increased approximately 16 percent since 2013 to 37.5 percent at the end of 2017. The Healthy People 2020 goal for zoster is 30 percent. 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**

![Graph showing North Dakota Zoster Immunization Rates for Adults 60 and Older, 2013-2016](image)
Approximately 51.7 percent of all adults were up-to-date with one dose of PCV13 at the end of 2017. Since 2013, the coverage rate for PPSV23 has seen a slower increase from 34.7 percent to 44.5 percent. 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
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, 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 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 Microbiology. At the end of 2017, NDDoH had 18 laboratories in production with ELR, six of which had been added in 2017.

The total numbers of laboratory results received in 2017 were 32,866. Of those, 26,716 (81%) were reported through ELR (Figure 17).

![Figure 17: Number of ELR Messages Received by NDDoH, 2017](image)

Of the laboratory reports created in Maven by ELR, 92 percent were created in Maven in zero to three days of the result date of the initial laboratory report, 91 percent 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 percent 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), 42 percent were created in Maven in zero to three days of the result date of the initial laboratory report, 80 percent had zero to five days between the collection date of the laboratory specimen and the date of result of the initial laboratory report, and 58 percent were created in Maven in zero to eleven days between collection date of the laboratory specimen. (Figure 18)
The number of laboratory reports received via ELR increased by 10 percent from the 24,212 records received in 2016. ELR timeliness appears to have stayed fairly consistent, with 89 percent of reports being created in Maven in zero to three days, 92 percent of reports having zero to five days between the collection date and the result date, and 96 percent of reports having zero to eleven days between the specimen collection date and the date when the laboratory report was created in Maven in 2016.

There were 117 laboratory reports in Maven in 2017 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 nine cases of E. coli were sent via ELR from the NDDoH Division of Microbiology. The NDDoH Division of Microbiology can serotype E. coli O157:H7. If the specimen does not type out as O157:H7, then the specimens 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. There was one Salmonella case that also was forwarded to CDC for serotyping. The remaining laboratory reports that had 100 or more days between the specimen collection date and the create date or the result date were for HIV, hepatitis C, Carbapenem-resistant Enterobacteriaceae (CRE), syphilis, and active tuberculosis. These are conditions that are chronic infections or often associated with repeated testing. For many of these reports, the initial diagnosis had already been reported in previous years. These laboratory results are merged with the originating case, thereby resulting in a change of a create date 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 to gain more accurate risk factors or exposures and to implement any public health action that is needed. Of the laboratories reporting via ELR, eleven reports 98 percent or more of their results within the seven days that is mandated to be reported. Additionally, fewer data entry errors are made with ELR than non-ELR reporting methods. Ongoing assessments will continue to ensure data timeliness and accuracy of all laboratory reports.
Respiratory Diseases
Jill Baber, Influenza Surveillance Epidemiologist

2016-2017 Influenza Season
Influenza surveillance activities for the 2016-2017 season officially began August 1, 2016. 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 February 18. This season marked a change from the previous season (2015-16), which peaked in March and saw less than 2,000 total reported cases. At 7,507 cases, the 2016-17 season had the most cases ever recorded in a single season in North Dakota. However, this is likely due to increased electronic reporting, meaning fewer cases of influenza were missed by surveillance due to underreporting. This contrasts with the 2014-15 season, which saw fewer cases (6,443 total reported case), but was considered a fairly severe season due to a vaccine mismatch. Overall, the severity of the 2016-17 season was moderate, with the influenza A H3N2 strain predominating. Forty percent of the cases for 2016-17 were influenza B, a higher proportion than normal. The larger-than-average B wave also contributed to the 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 19: North Dakota 2016-2017 Reported Case Count for Seasonal Influenza
Variant Influenza Case
In August 2017, the NDDoH confirmed North Dakota’s first identified novel influenza case. The case, a child who was hospitalized, was first identified when a routine influenza surveillance specimen tested presumptively positive for an influenza A H3N2 swine variant strain at the NDDoH Division of Microbiology. The result was confirmed by the CDC as an influenza A H3N2 strain, similar to the strains circulating among swine populations at that time. Subsequent investigation found the case had multiple exposures to swine at a North Dakota fair. No swine at the state fair were tested for influenza. Nearly all variant influenza cases identified in the United States become ill following some sort of swine contact. A second variant influenza case residing in another state also reported contact with pigs at the same fair. Both cases fully recovered.
**Enteric Diseases**

*Laura Cronquist, Epidemiologist*

**Campylobacteriosis**

In 2017, 227 cases of campylobacteriosis were reported to the NDDoH, a 16 percent increase from the 195 cases reported in 2016 (Figure 21). Statewide, the campylobacteriosis incidence rate was 30.0 cases per 100,000 people in 2017. Forty-five counties reported cases, with Logan (208.6 cases per 100,000 people), Kidder (161.2 cases per 100,000 people), and Adams (129.4 cases per 100,000 people) having the highest incidence of campylobacteriosis.

*Figure 21: North Dakota Campylobacteriosis Case Counts by Year, 2013-2017*
Cryptosporidiosis

In 2017, 43 cases of cryptosporidiosis were reported to the NDDoH, a 10 percent increase from the 39 cases reported in 2016 (Figure 22). Statewide, cryptosporidiosis incidence was 5.7 cases per 100,000 people in 2017. Seventeen counties reported cases, with Sheridan (73.9 cases per 100,000 people), Emmons (60.6 cases per 100,000 people) and Logan (52.1 cases per 100,000 people) having the highest incidence of cryptosporidiosis.

Figure 22: North Dakota Cryptosporidiosis Case Counts by Year, 2013-2017
Giardiasis

In 2017, 36 cases of giardiasis were reported to the NDDoH, which was a 22 percent decrease from the 46 cases reported in 2016 (Figure 23). Statewide, giardiasis incidence was 4.8 cases per 100,000 people in 2016. Sixteen counties reported cases, with Logan (156.4 cases per 100,000 people), Benson (28.8 cases per 100,000 people) and Cavalier (26.6 cases per 100,000 people) having the highest incidence of giardiasis.

Figure 23: North Dakota Giardiasis Case Counts by Year, 2013-2017
Salmonellosis

In 2017, 96 cases of salmonellosis were reported to the NDDoH, a 21 percent decrease from 121 cases reported in 2016 (Figure 24). Statewide, salmonellosis incidence was 12.7 cases per 100,000 people in 2016. Twenty-three counties reported cases, with Grant (84.5 cases per 100,000 people), Hettinger (80.5 cases per 100,000 people), and Golden Valley (55.9 cases per 100,000 people) having the highest incidence of salmonellosis.

Figure 24: North Dakota Salmonellosis Case Counts by Year, 2013-2017

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<tr>
<td>2017</td>
<td>96</td>
</tr>
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Shiga toxin-producing *E. coli* (STEC)

In 2017, 40 cases of STEC were reported to the NDDoH, an 18 percent increase from the 34 cases reported in 2016 (Figure 25). Of the 40 cases in 2017, 12 were *E. coli* O157. In 2016, six of the 34 cases were *E. coli* O157. Statewide, STEC incidence was 5.3 cases per 100,000 people in 2017. Sixteen counties reported cases, with LaMoure (24.5 cases per 100,000 people), Morton (22.7 cases per 100,000 people), and McHenry (16.9 cases per 100,000 people) having the highest incidence of STEC.

*Figure 25: North Dakota STEC Case Counts by Year, 2013-2017*
Shigellosis
In 2017, two cases of shigellosis were reported to the NDDoH, an 88 percent decrease from the 16 cases reported in 2016 (Figure 26). Statewide, shigellosis incidence was 0.26 cases per 100,000 people in 2017. Two counties reported cases, with Ward (1.5 cases per 100,000 people) having the highest incidence of shigellosis followed by Cass (0.6 cases per 100,000 people).

Figure 26: North Dakota Shigellosis Case Counts by Year, 2013-2017

For more information about enteric infections and foodborne gastrointestinal illness, visit www.ndhealth.gov/disease/GI.
Zoonotic Diseases
Laura Cronquist, Epidemiologist

Tickborne Diseases (Anaplasmosis, Babesiosis, Ehrlichiosis, Lyme Disease, Rocky Mountain Spotted Fever)
In 2017, 92 cases of tickborne diseases were reported to the NDDoH, an 88 percent increase from the 49 cases reported in 2016 (Figure 27). Statewide, tickborne disease incidence was 12.2 cases per 100,000 people in 2017. Twenty-four counties reported cases, with Divide (43.7 cases per 100,000 people), Kidder (40.3 cases per 100,000 people), and Emmons (30.3 cases per 100,000 people), having the highest incidence of tickborne diseases.

Figure 27: North Dakota Tickborne Diseases Case Counts by Year, 2007-2017

Of the 92 reported cases of tick-borne diseases in 2017, the majority of cases (61%) were Lyme disease (Figure 28).
Figure 28: North Dakota Tickborne Diseases Case Counts and Incidences, 2017

- Anaplasma: 17 cases, 2.3 incidence
- Babesiosis: 0 cases, 0 incidence
- Ehrlichiosis: 4 cases, 0.5 incidence
- Lyme Disease: 56 cases, 7.4 incidence
- Powassan Virus: 1 case, 0.1 incidence
- Rocky Mountain Spotted Fever: 14 cases, 1.9 incidence
**West Nile Virus (WNV)**

In 2017, 62 cases of WNV infection were reported to the NDDoH, a 27 percent decrease from the 85 cases reported in 2016 (Figure 29). Statewide, WNV incidence was 8.2 cases per 100,000 people in 2017. Twenty-six counties reported cases, with McKenzie (62.9 cases per 100,000 people), Mountrail (58.5 cases per 100,000 people) and Golden Valley (55.9 cases per 100,000 people) having the highest incidence of WNV.

There were 20 cases of neuroinvasive disease, and 42 cases of non-neuroinvasive disease. Two cases were fatal.

**Figure 29: North Dakota West Nile Virus Case Counts by Year, 2007-2017**
Other Mosquito-Borne Diseases (Chikungunya, Dengue, Malaria, Zika)

In 2017, 11 cases of other mosquito-borne diseases were reported to the NDDoH, a 15 percent decrease from the 13 cases reported in 2016 (Figure 30). None of the cases were locally acquired.

**Figure 30: North Dakota Other Mosquito-Borne Diseases Case Counts by Year, 2007-2017**

Statewide, the incidence of other mosquito-borne diseases was 1.45 cases per 100,000 people in 2017.
Figure 31: North Dakota Other Mosquito-Borne Diseases Case Counts and Incidences, 2017

- Chikungunya: 0 cases, 0 incidence
- Dengue: 0 cases, 0 incidence
- Malaria: 11 cases, 1.45 incidence
- Zika: 0 cases, 0 incidence

Legend:
- Number of Cases
- Incidence
Other Zoonotic Diseases (Brucellosis, Hantavirus, Tularemia)

In 2017, two cases of other zoonotic diseases were reported to the NDDoH, which was equal to the number of cases reported in 2016 (Figure 32).

Figure 32: North Dakota Other Zoonotic Diseases Case Counts by Year, 2007-2017
Statewide, other zoonotic disease incidence was 0.26 cases per 100,000 people in 2017.

Figure 33: North Dakota Other Zoonotic Disease Case Counts and Incidences, 2017
**Animal Rabies**

In 2017, 509 animals were tested for rabies. Fourteen animals were positive, a 12.5 percent decrease from the sixteen animals that tested positive in 2016 (Figure 34).

![Figure 34: Cases of Animal Rabies in North Dakota by Year, 2007-2017](image)

Animals from seven counties tested positive for rabies. There were no human cases of rabies in 2017. Most of the reported animal cases were skunks (11), while other animals that tested positive included cats (2) and a goat.
Kingella kingae Cluster in a North Dakota Child Care Facility
Laura Cronquist, Enteric/Vectorborne/Zoonotic Disease Epidemiologist

Kingella kingae is a member of the Neisseriaceae family of bacteria that colonizes the upper respiratory tract of humans. Rarely, the colonized bacteria can enter the bloodstream and cause serious invasive infections, including osteomyelitis, septic arthritis, bacteremia, endocarditis, and meningitis. Outbreaks of severe K. kingae infections among children ages 6 to 36 months have been associated with childcare centers. Children in this age group lack effective immunity to colonization with K. kingae and are more likely to develop invasive infections than older children and adults. Outbreaks can occur in any child care facility and are not the result of the practices or care given at a particular facility.

When a child is diagnosed with an invasive K. kingae infection, consideration for antimicrobial prophylaxis of the child’s young siblings and childcare contacts is warranted. Yagupsky, et. al. recommend a pediatric regimen consisting of dual therapy with rifampin and amoxicillin. Rifampin should be given at a dosage of 20 mg/kg/day in two divided doses for 2 days. Amoxicillin should be given at a dosage of 80 mg/kg/day in two divided doses for 4 days.

On December 18, 2017, a physician notified the NDDoH of a possible K. kingae cluster in a child care facility located in Valley City, ND. Two children who attend child care at the facility had been recently diagnosed with bone and joint infections. K. kingae was isolated from a clinical specimen collected from one of the children. Clinical specimens from the second child did not yield bacterial growth, however, antimicrobials were administered prior to specimen collection.

Upon notification of the cases, the attending physician and public health officials from the local public health unit and NDDoH recommended that all children who attended child care at the same child care facility as the two cases receive chemoprophylaxis. Parents or guardians of the children were given a fact sheet on K. kingae and a letter from the NDDoH advising them to consult with their primary health care provider for appropriate antimicrobial prophylaxis. A health advisory regarding the K. kingae outbreak and subsequent recommendations for chemoprophylaxis of child care contacts was sent to health care providers via the North Dakota Health Alert Network (HAN). No additional cases have been associated with the outbreak.

For further information on K. kingae, please contact the NDDoH at 800.472.2180 or 701.328.2378.

References

Carbapenem-resistant Enterbacteriaceae
McKenzie Kiefer, Healthcare Associated Infections & Multi-Drug Resistant Organisms Surveillance 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 *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 2017, 27 cases of CRE were reported to the NDDoH, a 23 percent decrease from the 35 cases reported in 2016. Statewide in North Dakota, CRE incidence was 3.56 cases per 100,000 people in 2017. Thirteen counties reported cases in 2017 compared to 16 counties in 2016. The counties with the highest incidence of CRE cases were Grand Forks County (7.03 cases per 100,000 people), Ward (7.12 cases per 100,000 people), and Cass (2.3 cases per 100,000 people). The median age of cases of CRE was 63 years. People ages 70-79 had the highest age-specific incidence rate (11.91 cases per 100,000 people). Sixteen (59%) of the reported cases were female. The CRE organisms reported for North Dakota in 2017 include: *Enterobacter cloacae*, *Escherichia coli*, *Klebsiella pneumoniae*, *Enterbacter aerogenes*, and *Pantonea sp.*

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.

**Figure 35: North Dakota CRE Case Counts by Year, 2013-2017**
New Delhi Metallo-beta-lactamase (NDM-1) case in North Dakota

Michelle Feist, ELC Program Manager

On March 8, 2017, the NDDoH was notified by an acute care hospital of a patient testing positive for NDM-1. NDM is a plasmid-mediated resistance mechanism that produces an enzyme that breaks down carbapenems, making them ineffective. Organisms that produce the NDM enzyme generally are found in patients that received medical care outside of the United States where these organisms are known to be present.

The patient’s history included travel to Thailand from October of 2016 which included hospitalization mid-November for about 2 months. The patient returned to North Dakota in January 2017. The patient was hospitalized in January for two and a half weeks and was not screened for carbapenem resistant organisms. The patient was placed on contact isolation precautions due to a positive ESBL Acinetobacter infection isolated from a wound repair a week after being hospitalized. ESBLs are enzymes that mediate resistance to extended-spectrum (third generation) cephalosporins and monobactams. This patient was then discharged to a long-term care facility for transitional care.

The patient was re-admitted to the same hospital and on the same floor as the January stay the beginning of March. Escherichia coli was isolated from a culture of the same wound and was found to be harboring the NDM-1 gene. A rectal swab was collected and sent to the state public health lab that confirmed presence of the NDM-1 gene. The culture grew Klebsiella pneumoniae. As a precaution, a point prevalence screening was conducted at the hospital for 20 patients that were on the same floor receiving care. All screenings were negative. Additionally, contact was made with the infection preventionist at the long-term care facility from where the patient had been admitted. The patient had been independent with cares with the exception of his wound care and also had a private room and bathroom. A screening was done of residents who were still present at the facility from the time the patient had resided there, as well as a resident who occupied the room the patient had been in prior to his discharge. This was an additional thirteen screens that were all negative as well. The patient was discharged to home with home care providing wound care at the end of March.

The NDM-1 gene was discovered in 2008. The gene for NDM-1 is found on plasmids (DNA strands), which can easily spread from one bacteria to another, and this gene makes bacteria resistant to last-resort antibiotics called beta-lactams or carbapenems. NDM-1 is actually just one type of Carbapenem resistant Enterobacteriaceae (CRE) and represents a larger antibiotic resistance issue. Enterobacteriaceae are gram-negative bacteria that normally live in our intestines. When not held in check by our body’s normal defenses, these same bacteria can cause serious infections, especially in hospitalized patients with medical devices such as catheters or ventilators. These infections are typically treated with beta-lactams, but when a resistance gene such as NDM-1 get into the bacteria, the result is a multi-drug resistant organism (MDRO) that can be very difficult to treat.
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 2017, the incident case rate was 5.0 cases per 100,000 people.

In 2017, 90 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 2017, 38 North Dakota residents were diagnosed with HIV/AIDS and reported to the NDDoH. Seven of those newly diagnosed HIV cases were advanced enough to meet the case definition for AIDS at the time of diagnosis. Seventy-six percent of HIV/AIDS cases reported in 2017 were male.

HIV and AIDS have been reportable conditions in North Dakota since 1984. The cumulative reported infections as of December 31, 2017, stands at 981 HIV/AIDS cases.

Figure 36: HIV/AIDS Diagnosed in North Dakota and HIV/AIDS Previously Diagnosed in Other States by Year, 2001-2017

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 2013 to 2017, 163 HIV/AIDS cases were diagnosed in North Dakota. Twenty-eight percent met the criteria for AIDS at time of diagnosis, while the remaining 72 percent were diagnosed as an HIV infection. Seventy-two percent were male and 28 percent were female.

**Figure 37: HIV/AIDS Incident Cases by Gender, 2013-2017**

![Bar chart showing HIV/AIDS incident cases by gender from 2013 to 2017.](chart.png)
The age groups of HIV/AIDS cases diagnosed for the first time in North Dakota between 2013 and 2017 are shown in Figure 38. Fifty-eight 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 64 years.

**Figure 38: Incidence Age of HIV/AIDS Cases Diagnosed in N.D. 2013 – 2017**
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 percent of the North Dakota population, but accounted for 39 percent of new HIV infections in 2017. Black/African American North Dakotans are 26 times more likely to have HIV than white North Dakotans.

**Figure 39: Race/Ethnicity for HIV/AIDS Cases Diagnosed in 2017**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian/Alaska Native</td>
<td>4</td>
</tr>
<tr>
<td>Black/African American</td>
<td>15</td>
</tr>
<tr>
<td>Hispanic (all races)</td>
<td>2</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
</tr>
<tr>
<td>White</td>
<td>17</td>
</tr>
</tbody>
</table>
Figure 40: Newly Reported HIV/AIDS Cases in North Dakota by Country of Birth, 2013-2017

The bar chart shows the number of newly reported HIV/AIDS cases in North Dakota from 2013 to 2017, categorized by country of birth. The data is represented as follows:

- **2013**:
  - Foreign Born: 7
  - US Born: 15

- **2014**:
  - Foreign Born: 10
  - US Born: 16

- **2015**:
  - Foreign Born: 13
  - US Born: 14

- **2016**:
  - Foreign Born: 21
  - US Born: 29

- **2017**:
  - Foreign Born: 12
  - US Born: 26

The chart indicates a notable increase in the number of cases reported for both foreign-born and US-born individuals in 2016.
Male-to-male sexual contact continued to be the most frequently self-reported risk factor among males. Fifty-nine percent of male cases diagnosed between 2013 and 2017 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 2013-2017 separated by gender are shown below (Figure 41).

**Figure 41: Risk Factors of HIV/AIDS Cases Diagnosed in ND by Gender, 2013-2017**

![Risk Factors Chart]

- Male-to-male sexual contact (MSM)
- Heterosexual contact
- Injection drug use (IDU)
- MSM/Injection drug use
- Other/Risk not specified

**Number of Cases**

- **Male**
- **Female**
Map 3: Geographic Location of Newly Identified HIV/AIDS Cases Diagnosed in 2017
Map 4: Geographic Location of HIV/AIDS Cases Currently Living in North Dakota, 2017
Tuberculosis
Dee Pritschet, TB Coordinator

Tuberculosis (TB)
14 cases of active tuberculosis (TB) were reported to the NDDoH in 2017, a decrease of 36 percent from 2016 (22 cases). A total of 9,093 new TB cases were reported in the United States in 2017, this count represents the lowest number of U.S. TB cases on record and a 1.8 percent decrease from 2016. Case management continues to be challenging due to drug resistance and co-morbidities, such as hepatitis C and diabetes.

Figure 42: North Dakota Cases: U.S. and ND Tuberculosis Disease Rates, 2001–2017

In 2017, 45 percent of TB cases among non-U.S.-born persons were diagnosed more than ten years after arriving in the United States. Most (>80%) of U.S. cases are due to reactivation of TB infection. A larger proportion of cases among U.S.-born persons (26%) were attributed to recent transmission vs. cases among non-U.S.-born persons (8%).

TB disease in the United States is most common among people who travel to or who were born in countries with high rates of TB. In 2017, 50 percent of cases reported to NDDoH were US born and 50 percent of cases were non-U.S. born.
Figure 43: Number of Active TB Cases Reported in North Dakota by Country of Birth, 2013-2017
Although incidence of TB in North Dakota is low, cases that are reported demonstrate a racial disparity. 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 44: Tuberculosis Cases by Race/Ethnicity, North Dakota, 2013-2017**
Map 5: North Dakota Tuberculosis Cases by County, 2017
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 LTBI's reported in North Dakota over the past five years is shown in Figure 45.

Figure 45: Reported Cases of LTBI North Dakota, 2013-2017

![Bar graph showing reported cases of LTBI from 2013 to 2017.]

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 2017, 725 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.
Sexually Transmitted Diseases
Shari Renton, STD Surveillance Coordinator

Chlamydia
In 2017, 3,280 cases of chlamydia were reported to the NDDoH, a rate of 434.2 cases per 100,000 persons. There was a 5.3 percent decrease in the number of chlamydia cases from 2016 to 2017, despite an increase in cases from 2015 to 2016 (Figure 46).

Figure 46: Chlamydia Cases by Year, North Dakota, 2013-2017
Of the cases reported in 2017, 2,127 (65%) were reported in females. Individuals ages 20-24 represented 39 percent of cases followed by people ages 15-19 or 22 percent of the cases (Figure 47).

**Figure 47: Chlamydia Cases by Age Group and Gender, North Dakota, 2017**
In 2017, 51 of 53 counties had residents diagnosed with chlamydia. Overall incidence of chlamydia clusters occur near population centers. Ten counties in North Dakota had chlamydia rates higher than the overall North Dakota rate of 434.2 cases per 100,000 persons. Counties reporting the highest chlamydia rates in North Dakota are Sioux (1,988 per 100,000 people), Hettinger (1,329 per 100,000 people), and Benson (1,312 per 100,000 people).

**Table 1: Epi Facts of North Dakota Chlamydia Cases, 2017**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many people are being treated?</td>
<td>80 (2.4%) chlamydia cases were not treated, and in 11 cases treatment did not adhere to treatment guidelines.</td>
</tr>
<tr>
<td>How many cases were interviewed?</td>
<td>45 percent of chlamydia cases were reported as being interviewed. <strong>Note:</strong> The ND DoH 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.</td>
</tr>
<tr>
<td>How many partners were tested and treated?</td>
<td>72 percent of cases reported no sexual partners. Of reported partners, 317 were named for follow-up and partner services.</td>
</tr>
<tr>
<td>What are the risk factors for getting chlamydia?</td>
<td>30 percent reported sex while high or intoxicated, 23 percent reported having more than one sex partner in the previous 12 months, and 9 percent reported having anonymous sex partners.</td>
</tr>
<tr>
<td>How many were also tested for HIV?</td>
<td>33 percent of chlamydia cases were reported as being tested for HIV. All chlamydia cases are recommended to be tested for HIV at time of diagnosis.</td>
</tr>
</tbody>
</table>
**Gonorrhea**

The rise in gonorrhea cases has been seen across the United States, with rates at unprecedented highs. There was a 46 percent increase in gonorrhea cases from 2015 to 2016, but from 2016 to 2017 there was a slight decrease in the number of cases. The case count reported in 2017 was 967 which corresponds to a rate of 128 cases per 100,000 individuals (Figure 48).

![Figure 48: Gonorrhea Cases by Year, North Dakota, 2013-2017](image-url)
Of the cases reported in 2017, 528 (55%) were reported in females. The majority (53%) of gonorrhea cases were reported in people ages 20 to 29 (Figure 49). Male cases are, on average, older than female cases.

**Figure 49: Gonorrhea Cases by Age Group and Gender, North Dakota, 2017**

There were 405 cases of gonorrhea reported among white individuals (61 cases per 100,000 individuals) followed by 377 cases among American Indians/Alaskan Natives (904 cases per 100,000). Among Black/African Americans, 141 cases were reported (641 cases per 100,000).
Counties reporting the highest gonorrhea rates in North Dakota are Sioux (846 cases per 100,000), Rolette (736 cases per 100,000), and Hettinger (644 cases per 100,000) counties. These rates are higher than the rate of 128 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

<table>
<thead>
<tr>
<th>How are cases being treated?</th>
<th>72 (7%) cases were treated inappropriately. <em>Reminder: the appropriate treatment for gonorrhea is dual therapy of 1 gram azithromycin and 250mg IM ceftriaxone.</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>How many cases were interviewed?</td>
<td>70 percent of cases were reported as being interviewed.</td>
</tr>
<tr>
<td>How many partners were tested and treated?</td>
<td>40 percent of cases reported no sexual partners. Of reported partners, 151 were referred for follow-up and partner services,</td>
</tr>
</tbody>
</table>

For cases with risk factor information, 34 percent reported having more than one sex partner in the previous 12 months, 41 percent reported sex while high or intoxicated, and 16 percent reported having anonymous sex partners.

<table>
<thead>
<tr>
<th>What are the risk factors for gonorrhea?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How many were tested for HIV?</td>
<td>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.</td>
</tr>
</tbody>
</table>
Syphilis
In 2017, there was a 24 percent increase in the number of syphilis cases reported in North Dakota, from 63 to 78 cases (Figure 50). The rate of syphilis infection in North Dakota for 2017 was 10.3 cases per 100,000 persons.

Figure 50: Reported Syphilis Cases in North Dakota, 2013-2017

Of the total cases reported in North Dakota, 78 percent were male. The average age of syphilis cases is higher than chlamydia and gonorrhea cases, at 34.3 years. In 2017, 53 syphilis cases were reported in white individuals, 13 were reported in American Indian/Alaskan Natives, and eight were reported in Black/African Americans. The rates of syphilis among American Indian/Alaskan Natives has decreased since 2014.
Male-to-male sexual contact continues to be the most often self-reported risk factor for male syphilis cases in 2017. Heterosexual contact has been the most common self-reported risk factor in female syphilis cases.
Figure 53: Self-Reported Risk Factors of Female Syphilis Cases in North Dakota, 2013-2017
Map 8: North Dakota Syphilis Cases by County, 2017
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 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.

**Hepatitis B Virus**
In 2017, 98 cases of chronic HBV infection were reported from 14 counties in North Dakota. This was a 14 percent decrease from the 113 cases reported in 2016. Of the 98 HBV-positive cases reported to the NDDoH, 43 were female and 55 were male. The average age was 33.

![Figure 54: Reported Chronic HBV Cases by Year, North Dakota, 2013-2017](image)
Among those reporting race, 73 percent were Black/African American, 17 percent were Asian, and 9 percent were white. The majority of HBV cases occur in persons who are born in countries where HBV is endemic. Since vaccination programs 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, 2017
Hepatitis C Virus

In 2017, the NDDoH received 1,109 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 56: Reported HCV Cases by Year, North Dakota, 2013-2017
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 57), and 53 percent of cases were male. Of the 1,109 cases in 2017, 831 had a reported race. Among those, the majority were white (61%), followed by American Indians/Alaskan Natives that accounted for 32 percent.

Figure 57: Reported HCV by Age Group, North Dakota, 2013-2017

Forty-five counties reported cases of HCV. Cases per county ranged from zero to 242. The counties with the highest rates include Sioux (962 per 100,000 people), Hettinger (875 per 100,000 people), and Benson (593 per 100,000 people).
Map 10: North Dakota Hepatitis C Cases by County, 2017
## Summary of Selected Reportable Conditions
### North Dakota

<table>
<thead>
<tr>
<th>Reportable Conditions</th>
<th>January – December 2016</th>
<th>January – December 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaplasmosis</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>Babesiosis</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>195</td>
<td>227</td>
</tr>
<tr>
<td>Carbapenem-resistant Enterobacteriaceae</td>
<td>35</td>
<td>27</td>
</tr>
<tr>
<td>Chickenpox</td>
<td>45</td>
<td>63</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>3,463</td>
<td>3,280</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>Dengue</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>E. coli, Shiga toxin producing (non-O157)</td>
<td>34</td>
<td>28</td>
</tr>
<tr>
<td>E. coli O157</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Ehrlichiosis</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Enterococcus, Vancomycin-resistant (VRE)</td>
<td>252</td>
<td>261</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>46</td>
<td>36</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>1,005</td>
<td>967</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>29</td>
<td>17</td>
</tr>
<tr>
<td>Hantavirus</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Acute Hepatitis A</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Acute Hepatitis B</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Acute Hepatitis C</td>
<td>1</td>
<td>2</td>
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<tr>
<td>HIV/AIDS</td>
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<tr>
<td>Influenza (2015-16 and 2016-17 seasons)</td>
<td>1,942</td>
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<tr>
<td>Legionellosis</td>
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<tr>
<td>Lyme Disease</td>
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<tr>
<td>Malaria</td>
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<tr>
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<td>Meningococcal disease</td>
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<td>Mumps</td>
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<td>Pertussis</td>
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<tr>
<td>Powassan</td>
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<tr>
<td>Q fever</td>
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</tr>
<tr>
<td>Rabies (animal)</td>
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<td>14</td>
</tr>
<tr>
<td>Rocky Mountain spotted fever</td>
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</table>
Summary of Selected Reportable Conditions
North Dakota (continued)

<table>
<thead>
<tr>
<th>Reportable Conditions</th>
<th>January – December 2016</th>
<th>January – December 2017</th>
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<tbody>
<tr>
<td>Salmonellosis</td>
<td>121</td>
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<td>Shigellosis</td>
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<tr>
<td>Staphylococcus aureus, Methicillin-resistant (MRSA)</td>
<td>143</td>
<td>115</td>
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<tr>
<td><em>Streptococcus pneumoniae</em> (invasive, children &lt;5)</td>
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<td>Syphilis</td>
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<td>Tuberculosis</td>
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<td>Tularemia</td>
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<td>West Nile virus disease</td>
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<td>Zika Virus</td>
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</table>
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