All Women Count! Breast and Cervical Cancer Screening for South Dakota Women

Overview

Cervical cancer, a preventable cancer with the appropriate screening, occurs mostly in women older than 30 years of age. In the United States, the age-adjusted incidence rate is 7.2 per 100,000 women per year and 2.3 deaths per 100,000 women.\(^1\) Compared to surrounding states, South Dakota has the second highest age-adjusted incidence rate (7.3), after the state of Nebraska (7.4) (Figure 1).\(^1,2\) However, the age-adjusted mortality rate in South Dakota is one of the lowest (1.6 per 100,000 women).

*Figure 1. Age-adjusted incidence rate of cervical cancer in the United States, 2013*

\(^*\)Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.

\(^\ddagger\)Rates are not shown if the state did not meet USCS publication criteria or if the state did not submit data to CDC.

In 1991, the Centers for Disease Control and Prevention (CDC) established the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) as part of an effort to support low income women in completing the recommended screening schedule for breast and cervical cancer. The NBCCEDP delivers screening and diagnostic services to low income, uninsured, or underinsured women. In South Dakota, the All Women Count! (AWC!) Program is part of the national program funded through CDC since 1997. The AWC! Program works with 230 provider sites across South Dakota.

According to the US Preventive Services Task Force (USPSTF), women ages 21 to 65 should be screened regularly for cervical cancer. The standard screening method is the Pap test (cytology) and the results are categorized using the Bethesda system. The most recent recommendation by the USPSTF for cervical cancer screening is a Pap test every three years among women who have had three normal Pap tests within the last five years. However, the screening frequency may be less if a human papillomavirus (HPV) test is performed along with a Pap test, also called HPV co-testing. HPV is a common virus and two HPV types (16 and 18) are associated with 70% of cervical cancers and pre-cancerous cervical lesions. Hence, the USPSTF recommends the HPV co-test every five years for women ages 30-65 that have had negative HPV and normal Pap test results. Finally, cervical screening is not recommended for women aged 65 and older with low risk for cervical cancer or with previous cervical screening results that were normal. In addition, it is important to mention that CDC also recommends two doses of HPV vaccine for 11- to 12-year-olds to prevent cervical cancer and other cancers caused by HPV.

Eligibility Criteria
Cervical cancer screening and diagnostic services are available through the AWC! Program for women who meet the eligibility criteria. The services provided by the AWC! Program for cervical cancer screening include Pap tests and HPV co-tests. To be eligible, women must be: 1) below or at 200% of federal poverty level, 2) uninsured or underinsured which is defined as those who cannot afford the copayments or deductibles or whose insurance does not cover breast or cervical cancer screening services, and 3) between the ages of 30 and 64 years.

Sociodemographic of AWC! Participants
From 2001-2015, the AWC! Program served 17,794 women in South Dakota. Among AWC! participants whose information on previous screening was available, 1,817 (13%) had rarely or never been screened (last screen > 5 years). The race and ethnicity distribution of women screened and served in the AWC! Program is shown in Figure 2. The majority of women screened were white (71%), 17% were American Indian, followed by Hispanics (8%), and other/unknown (4%) (e.g., Asian and Black/African American).

According to the data shown in Figure 3, 52% of the AWC! participants reported having some college or higher degree as their highest level of education. Women with a high school degree accounted for 31%, followed by some high school or less (17%).
AWC! Cervical Screenings

Figure 4 shows trends in the number of cervical cancer screening services (Pap test and HPV co-test) received by women in All Women Count!. From 2001 to 2009, an increase in the number of Pap tests was observed; an increase in the number of HPV co-tests was seen from 2012-2015. A steady decrease in the number of Pap tests occurred from 2012-2015. This may be due to changes in cervical cancer screening guidelines in 2009 (introduction of HPV testing) and in 2012 (USPSTF screening guideline change).
AWC! Cervical Results and Diagnosis

From 2001-2015, the AWC! Program provided 33,650 Pap tests. Over this period, the percentage of women with an abnormal Pap test was 8.5% (Table 1). An abnormal Pap test includes low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL), atypical squamous cells of undetermined significance - cannot exclude HSIL (ASC-H), atypical glandular cells (AGC), and squamous cell cancer.

Table 1. Pap test results among women receiving screening services through the AWC! Program, 2001 - 2015

<table>
<thead>
<tr>
<th>Pap Test Results (2001-2015)</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative for intraepithelial lesion or malignancy (NIL)</td>
<td>30,701</td>
<td>91.2</td>
</tr>
<tr>
<td>Atypical squamous cells of undetermined significance (ASC-US)</td>
<td>1,539</td>
<td>4.6</td>
</tr>
<tr>
<td>Low-grade squamous intraepithelial lesion (LSIL) (including HPV/mild dysplasia/CINI)</td>
<td>795</td>
<td>2.4</td>
</tr>
<tr>
<td>Atypical squamous cells cannot exclude HSIL (ASC-H)</td>
<td>119</td>
<td>0.4</td>
</tr>
<tr>
<td>High-grade squamous intraepithelial lesion (HSIL)</td>
<td>326</td>
<td>1.0</td>
</tr>
<tr>
<td>Squamous cell carcinoma</td>
<td>9</td>
<td>0.0</td>
</tr>
<tr>
<td>Atypical glandular cells (including Atypical, Endocervical Adenocarcinoma in situ, and Adenocarcinoma)</td>
<td>82</td>
<td>0.2</td>
</tr>
<tr>
<td>Other/result pending/unsatisfactory/unknown</td>
<td>79</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Total Pap test provided (2001-2015)</strong></td>
<td><strong>33,650</strong></td>
<td><strong>100.0</strong></td>
</tr>
<tr>
<td><strong>Total number of abnormal results</strong></td>
<td><strong>2,870</strong></td>
<td><strong>8.5</strong></td>
</tr>
</tbody>
</table>

*Abnormals include Pap test results of: low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL), atypical squamous cells of undetermined significance - cannot exclude HSIL (ASC-H), atypical glandular cells (AGC), and squamous cell cancer.

According to the data shown on Table 2, 388 women who had an HPV co-test were positive for HPV. In addition, 146 women who were diagnosed with a pre-malignant cancer were also HPV positive on the HPV co-testing. Of the women that have had an HPV co-test through the AWC! Program since 2009, 42% were under 40, 32% were 40-49 years old, and 26% were 50-64 years old.

Table 2. HPV results among women served through the AWC! Program, 2009 - 2015

<table>
<thead>
<tr>
<th>HPV test (2009-2015)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of HPV tests</td>
<td>1,397</td>
</tr>
<tr>
<td>HPV -</td>
<td>1,009</td>
</tr>
<tr>
<td>HPV +</td>
<td>388</td>
</tr>
<tr>
<td>HPV + and abnormal Pap test</td>
<td>312</td>
</tr>
<tr>
<td>HPV + and cervical pre malignant cancer</td>
<td>146</td>
</tr>
<tr>
<td>HPV + and cervical cancer (malignant and in situ)</td>
<td>5</td>
</tr>
</tbody>
</table>

Note. HPV + results are not mutually exclusive.

Table 3 provides the number of cervical cancers detected. Among the 1,493 diagnostic tests provided, 31% were CINI/Mild dysplasia, followed by CINIII (15%), and CINII (11%).

Table 3. Diagnostic results among women served through the AWC! Program, 2001 - 2015

<table>
<thead>
<tr>
<th>Final Diagnosis (2001-2015)</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal/Benign/Inflammation</td>
<td>564</td>
<td>37.8</td>
</tr>
<tr>
<td>HPV/Condylomata/Atypia</td>
<td>21</td>
<td>1.4</td>
</tr>
<tr>
<td>CINI/Mild dysplasia (biopsy diagnosis)</td>
<td>464</td>
<td>31.0</td>
</tr>
<tr>
<td>CINII/Moderate dysplasia (biopsy diagnosis)</td>
<td>158</td>
<td>10.6</td>
</tr>
<tr>
<td>CINIII/Severe dysplasia/Carcinoma in situ (stage 0) or Adenocarcinoma In Situ of the cervix (AIS) (biopsy diagnosis)</td>
<td>227</td>
<td>15.2</td>
</tr>
<tr>
<td>Invasive cervical carcinoma (biopsy diagnosis)</td>
<td>40</td>
<td>2.7</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,493</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Since 2004, the AWC! Program has linked the cases of cancer the program has detected with the South Dakota Cancer Registry. Figure 5 shows trends in the number of cervical cancers detected through the AWC! Program from 2004 to 2015. The highest number of cancers diagnosed was in 2011, with a considerable decrease observed in the following years (2012 to 2015).

![Malignant cases only (N=34)](image)

**Figure 5**
Number of cervical cancers diagnosed among AWC! participants, 2004 - 2015 (N=34)

**Conclusion**

The AWC! Program, which strives to reach and screen low-income, uninsured, and underinsured women in SD, has served nearly 18,000 women and provided 33,650 Pap tests, 1,397 HPV co-tests, and 1,493 diagnostic tests from 2001-2015 combined. Moreover, 34 cervical cancers were diagnosed from 2004-2015. The AWC! Program has the capacity to screen more women for cervical cancer. In order to find women eligible for cervical cancer screening and the AWC! Program, clinicians are encouraged to utilize electronic medical records (EMR) to implement provider and client reminders to increase cervical cancer screening. Early diagnosis of cervical cancer improves survival rates and reduces mortality rates. Continued efforts targeting the underserved population in South Dakota is a priority of the AWC! Program.

**References**

6. CDC. Human Papillomavirus (HPV). [Available at https://www.cdc.gov/hpv/].
7. The Community Guide. [Available at https://www.thecommunityguide.org/content/task-force-findings-cancer-prevention-and-control#cancerscreening].

Authors: Patricia Da Rosa, Public Health Data Analyst, College of Nursing, SDSU
Ashley Miller, Chronic Disease Epidemiologist, SD Department of Health
Karen Cudmore, Cancer Programs Director, SD Department of Health
INFLUENZA: The 2016-2017 Flu Season in South Dakota and the United States

National Influenza Surveillance Data

During the 2016-17 season, influenza activity was moderate. The season was notable for the predominant circulation of influenza A (H3N2) viruses. Nationally, influenza activity peaked in mid-February, with influenza A (H3N2) viruses predominating early in the season through the week ending March 25, 2017 (week 12). Influenza B viruses became the predominant virus starting during week 13 (the week ending April 1, 2017) and remained the predominant virus through the end of May. The timing of peak influenza activity varied across the United States. Influenza activity peaked at least one month earlier (week 52 to week 2) in the western states than in the rest of the country. During the 2016-17 season, severity indicators (e.g., hospitalization and mortality rates) were within the range that has been observed during previous seasons when influenza A (H3N2) viruses predominated. Previous influenza A(H3N2) predominant seasons have been associated with increased hospitalizations and deaths compared with A(H1N1) predominant, especially among children aged <5 years and adults aged ≥ 65 years. The majority of influenza viruses antigenically characterized at CDC were similar to the reference viruses representing the recommended components for the 2016-17 vaccine. A small subset of antigenically distinct influenza B/Victoria viruses was detected. No antiviral resistance to oseltamivir, zanamivir, or peramivir was identified among tested influenza viruses from the 2016-17 season.

Final vaccine effectiveness estimates of 34% (95% CI = 24%-42%) against illness caused by influenza A (H3N2) viruses and 56% (95% CI = 47%-64%) against illness caused by influenza B viruses were similar to previous seasons when recommended vaccine viruses have been well-matched to (i.e., “like”) circulating viruses, including the lower effectiveness observed against well-matched A(H3N2) viruses. Evidence of reduced protection against A(H3N2) viruses, even when vaccine viruses and circulating viruses are well-matched, has been observed since the 2011-12 season. In general, vaccination with inactivated influenza vaccine has offered better protection against influenza A(H1N1) and influenza B viruses. Even during seasons when vaccine effectiveness is reduced, vaccination can offer substantial benefit and reduce the likelihood of severe outcomes such as hospitalization and death. During the 2012-13 season with estimated vaccination effectiveness against A(H3N2) related illness of 39% (95% CI = 39-47%), vaccination averted an estimated 5.6 million illnesses, 2.7 million medical visits, 61,500 hospitalizations, and 1,800 deaths.

Influenza antiviral medications are an important adjunct to vaccination in the treatment and prevention of influenza. Treatment with influenza antiviral medications as close to the onset of illness as possible is recommended for patients with confirmed or suspected influenza who have severe, complicated, or progressive illness; who require hospitalization; or who are at high rate for influenza complications. Antiviral treatment should not be withheld from patients who are high risk for complications or who are severely ill with suspected influenza infection, even if rapid antigen – detection influenza diagnostic test results are negative.

Although summer influenza activity in the United States typically is low, influenza cases and outbreaks have occurred during summer months and clinicians should remain vigilant in considering influenza in the differential diagnosis of summer respiratory illnesses. Testing for seasonal influenza viruses and monitoring for novel influenza A virus infections should continue year-round. Health care providers also are reminded to consider novel influenza virus infections in persons with influenza-like illness and swine or poultry exposure, or with severe acute respiratory infection after travel to areas where avian influenza viruses have been detected. Providers should alert the local public health department if novel influenza virus infection is suspected. Clinical laboratories using a commercially available influenza diagnostic assay that includes influenza A virus subtype determination should contact their state public health laboratory to facilitate, transport, and additional testing of any specimen that is positive for influenza A, but for which the subtype cannot be determined. Public health laboratories should immediately send influenza A virus specimens that they cannot subtype using standard methods to CDC and submit all specimens that are otherwise unusual as soon as possible after identification.

Ref: MMWR/June 20, 2017/Vol.66/No 25
South Dakota Influenza Epidemiology and Laboratory Surveillance

The South Dakota Department of Health (SDDOH) and SD Public Health Laboratory (SDPHL) conduct surveillance for influenza year-round and enhanced surveillance October through May. The components of South Dakota’s influenza surveillance program for the 2016-17 season included 63 laboratory sentinel sites; 40 Influenza Like Illness Network (ILINet) providers; viral culture, PCR, and DFA testing for confirmatory testing; reporting of aggregate rapid antigen results; influenza associated hospitalizations and deaths; and institutional outbreaks. During the influenza season, weekly summary reports are posted on the SDDOH website at http://doh.sd.gov/flu.

During the 2016-17 flu season, there were 2,070 confirmed influenza cases reported to SDDOH: A(H3N2) 837 (40%), A(H1N1) 20 (1%), A-not subtyped 537 (26%), and 675 (33%) influenza B. Additionally, 74,720 rapid antigen influenza tests were accomplished with 16,397 positive (22%) – 10,614 (14%) positive for influenza A and 5,783 (8%) positive for influenza B. The 2016-17 influenza viruses had a substantial impact on all age groups. The median age of confirmed cases was 41 years with an age range of one week to 105 years.

The first confirmed case of influenza was reported the first week of October 2016 and the last case reported late August 2017. The peak of the season was the third week in February 2017, with A(H1N1), A (H3N2), and Influenza B viruses all circulating at the same time.

Forty-three individuals died due to influenza and its complications during the 2016-17 season. Gender breakdown was 53% female and 47% male. The median age was 88 years with an age range of 32 years to 105 years. Seventy-nine percent of the influenza associated deaths were White, 16% were unknown, and 5% were Native American.

There were 960 hospitalizations reported during the 2016-17 influenza season. This was the most influenza associated hospitalizations in South Dakota ever reported. The first hospitalization was identified in the first week of October 2016 and the last was reported late August 2017. Hospitalizations peaked in the third week of February. For patients who were hospitalized with influenza, the age range was one week to 100 years with a median age of 71 years.

Other viral respiratory pathogen reports included 183 Adenovirus, 271 Corona Virus OC43, 135 Corona Virus 229E, 4 Chlamydiophila Pneumonia, 30 Human Metapneumo Virus, 522 Parainfluenza-1, 180 Parainfluenza-2, 6 Parainfluenza-3, 53 Parainfluenza-4, 259 Respiratory Syncytial Virus, and 918 Rhino/Enterovirus.

Author: Vickie Horan, Influenza Surveillance Coordinator, SD Department of Health
Summary

This report updates the 2016–17 recommendations of the Advisory Committee on Immunization Practices (ACIP) regarding the use of seasonal influenza vaccines (MMWR Recomm Rep 2016;65[No. RR-5]). Routine annual influenza vaccination is recommended for all persons aged ≥6 months who do not have contraindications. A licensed, recommended, and age-appropriate vaccine should be used.

For the 2017–18 season, quadrivalent and trivalent influenza vaccines will be available. Inactivated influenza vaccines (IIVs) will be available in trivalent (IIV3) and quadrivalent (IIV4) formulations. Recombinant influenza vaccine (RIV) will be available in trivalent (RIV3) and quadrivalent (RIV4) formulations. Live attenuated influenza vaccine (LAIV4) is not recommended for use during the 2017–18 season due to concerns about its effectiveness against (H1N1)pdm09 viruses during the 2013–14 and 2015–16 seasons. Recommendations for different vaccine types and specific populations are discussed. No preferential recommendation is made for one influenza vaccine product over another for persons for whom more than one licensed, recommended product is available.

Updates to the recommendations described in this report reflect discussions during public meetings of ACIP held on October 20, 2016; February 22, 2017; and June 21, 2017. New and updated information in this report includes the following:

- Vaccine viruses included in the 2017–18 U.S. trivalent influenza vaccines will be an A/Michigan/45/2015 (H1N1)pdm09–like virus, an A/Hong Kong/4801/2014 (H3N2)-like virus, and a B/Brisbane/60/2008–like virus (Victoria lineage). Quadrivalent influenza vaccines will contain these three viruses and an additional influenza B vaccine virus, a B/Phuket/3073/2013–like virus (Yamagata lineage).
- Information on recent licensures and labelling changes is discussed, including licensure of Afluria Quadrivalent (IIV4; Seqirus, Parkville, Victoria, Australia); Flublok Quadrivalent (RIV4; Protein Sciences, Meriden, Connecticut); and expansion of the age indication for FluLaval Quadrivalent (IIV4; ID Biomedical Corporation of Quebec, Quebec City, Quebec, Canada), previously licensed for ≥3 years, to ≥6 months.
- Pregnant women may receive any licensed, recommended, age-appropriate influenza vaccine.
- Afluria (IIV3; Seqirus, Parkville, Victoria, Australia) may be used for persons aged ≥5 years, consistent with Food and Drug Administration–approved labeling.
- FluMist Quadrivalent (LAIV4; MedImmune, Gaithersburg, Maryland) should not be used during the 2017–18 season due to concerns about its effectiveness against influenza A(H1N1)pdm09 viruses in the United States during the 2013–14 and 2015–16 influenza seasons.

This report focuses on the recommendations for use of vaccines for the prevention and control of influenza during the 2017–18 season in the United States. A background document containing further information and a summary of these recommendations are available at https://cdc.gov/vaccines/hcp/acip-recs/vacc-specific/flu.html. These recommendations apply to licensed influenza vaccines used within Food and Drug Administration–licensed indications, including those licensed after the publication date of this report. Updates and other information are available at CDC’s influenza website (https://cdc.gov/flu). Vaccination and health care providers should check CDC’s influenza website periodically for additional information.

The above excerpt is reprinted from Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2017–18 Influenza Season. Visit https://cdc.gov/mmwr/volumes/66/rr/rr6602a1.htm to view the full report online.
South Dakota Strategic Plan 2015-2020—Childhood Immunizations

Increase the percent of children aged 19-35 months who receive recommended vaccinations from 76.3% in 2014 to 80% by 2020.

<table>
<thead>
<tr>
<th>South Dakota Percent</th>
<th>South Dakota 2020 Target</th>
<th>U.S. Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>75.6% (2015)</td>
<td>80.0</td>
<td>72.2% (2015)</td>
</tr>
</tbody>
</table>

**Significance:**
Vaccination is one of the greatest public health achievements of the 20th century, resulting in dramatic declines in morbidity and mortality for many infectious diseases. Childhood vaccination in particular is considered among the most cost-effective preventive services available as it can prevent a potential lifetime lost to death and disability. Sustaining vaccination rates requires a constant effort to reach new children.

South Dakota has achieved high immunization coverage rates for many childhood vaccines with at least a 96% coverage rate for DTaP, MMR, Polio, and Varicella in the 2016-2017 kindergarten survey. For younger children 19-35 months of age however, South Dakota falls short in immunizing children for the 4th dose of DTaP and 4th dose of Pneumococcal vaccines. Some parents either refuse to vaccinate, delay vaccination or use an alternate vaccination schedule for their children due to anxiety about adverse effects. Other parents don’t perceive vaccination to be a high priority, partly because vaccine-preventable diseases are relatively uncommon. This puts their children and other vulnerable individuals not able to be vaccinated because of a medical condition at risk for getting a vaccine-preventable disease. Serious reactions to childhood vaccination are extremely rare. A person is far more likely to be seriously injured by a vaccine-preventable disease than by a vaccine. As the measles outbreak in late 2014/early 2015 shows, continued vigilance is needed to maintain the state’s immunization coverage rate. In order to reach the South Dakota target of 80% of children aged 19-35 months who received the recommended vaccinations, the DOH will continue to work with parents, healthcare providers, and childcare providers to increase the coverage rate for childhood vaccinations utilizing evidence-based practices. Effective November 1, 2016, the requirements for children in licensed/registered childcare settings were enhanced based on recommendations from CDC and the Advisory Committee on Immunization Practices.

**Definition:** Percent of children, ages 19-35 months, that completed the 4:3:1:3:3:1:4 (4 DTaP, 3 polio, 1 MMR, 3 Hib, 3 Hep B, 1 Varicella, 4 Pneumococcal) combined series of vaccines

**Data Source:** National Immunization Survey (SD data by race is not available due to insufficient sample size)

**Statistical Trend:**

<table>
<thead>
<tr>
<th>Percent of children aged 19-35 months who receive recommended vaccinations, 2012-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012: 63.6</td>
</tr>
<tr>
<td>2013: 75.9</td>
</tr>
<tr>
<td>2014: 76.3</td>
</tr>
<tr>
<td>2015: 75.6</td>
</tr>
<tr>
<td>2016*: 76.3</td>
</tr>
</tbody>
</table>

*2016 data not yet available

**Date Last Updated:** 10/18/2017

For more information see the Department of Health’s strategic plan website at [http://doh.sd.gov/strategicplan/](http://doh.sd.gov/strategicplan/).
Sexually Transmitted Disease Surveillance in South Dakota

15 September 2017
South Dakota Department of Health

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Definitions of sexually transmitted disease (STD):

- “Any disease that may be acquired as a result of sexual intercourse or other intimate contact with an infected individual.” Taber’s Cyclopedic Medical Dictionary 20th Edition.

- “About 25 miscellaneous diseases with a variety of causal agents, having in common the fact all are transmitted from person to person by direct contact, and the responsible pathogen usually resides in the genital tract and/or in the blood or other body fluids. The epidemiologically important STDs in North America include syphilis, gonorrhea, genital herpes, chlamydia, human papilloma virus infection and HIV/AIDS. Synonym: sexually transmitted infection (STI); venereal disease (obsolete).” John Last, 2007. A Dictionary of Public Health.

For more information or a copy of this report please see the South Dakota Department of Health website
https://doh.sd.gov/diseases/infectious/std/
Summary

Sexually transmitted diseases (STD) are personal health issues and growing public health problems in South Dakota. STDs are the most commonly reported infectious diseases in South Dakota, and they are increasing. Gonorrhea has increased five-fold over the past decade, chlamydia has doubled since 2003, and syphilis has increased 10-fold from over the past decade. Although these increases might be partially explained by better clinical screening programs and more sensitive laboratory technologies, the upward trend is real and concerning. STDs amplify the risk of HIV transmission and contribute to infertility. This report summarizes South Dakota STD data, trends, demographics and national context. Key points include:

- Sexually transmitted diseases are increasing in South Dakota.
- South Dakota had the 19th highest gonorrhea rate, 22nd highest chlamydia rate and 27th highest syphilis rate in the United States in 2015.
- South Dakota has the lowest male-to-female gonorrhea ratio in the United States.
- American Indian STD rates are higher than the rest of the population.
- Over 60% of South Dakota’s male syphilis cases were male-to-male sexual transmission.
- 37% of South Dakota high school students have had sexual intercourse and 12.6% have had 4 or more sexual partners.
- Prevention measures include abstinence, monogamy, condoms and screening.
- Expedited partner therapy is encouraged and should be considered.

Conclusion

Sexually transmitted disease rates have been increasing in South Dakota during the past decade. STD prevention should be directed to individuals and groups at highest risk, including young people less than 25 years of age. Areas and demographic groups with high STD rates should be assisted in developing local prevention programs.
Summary of state and national STD cases and rates

Annual STD cases for South Dakota residents are reported in Table 1, and county STD cases and rates for the five-year period from 2012-2016 are shown in Table 2. National and state STD case counts, rates and rankings for 2015 are reported in Table 3. South Dakota aggregate race and sex rates are shown in Figure 1.

Table 1. Sexually transmitted disease cases reported in South Dakota, 2007-2016

<table>
<thead>
<tr>
<th>County</th>
<th>Gonorrhea* Cases</th>
<th>Chlamydia* Cases</th>
<th>Syphilis (P&amp;S) Cases</th>
<th>Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
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<tr>
<td></td>
<td></td>
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<td>Total</td>
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<td></td>
<td></td>
<td></td>
<td>Median</td>
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</tbody>
</table>

Table 2. STD cases and average annual rates* by county, South Dakota 2012-2016

*cases per 100,000 population per year. Counties with 1 or 2 cases are shown as ≤2.

<table>
<thead>
<tr>
<th>County</th>
<th>Gonorrhea* Cases</th>
<th>Chlamydia* Cases</th>
<th>Syphilis (P&amp;S) Cases</th>
<th>Rate*</th>
</tr>
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<tbody>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>Median</td>
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*Early syphilis (primary, secondary and early latent) and congenital syphilis.
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(1) RATE per 100,000 population
GONORRHEA. Gonorrhea is a bacterial disease caused by *Neisseria gonorrhoeae* infections of the reproductive and urinary tracts. Gonorrhea can also infect the mouth, throat, eyes and anus, and may spread to the blood or joints. Transmission of gonorrhea occurs during contact with secretions from mucus membranes of infected individuals — almost always during sexual activity. Neonatal transmission may occur when an infected mother gives birth. Classic gonorrhea symptoms in women include burning during urination and increased vaginal discharge. Symptoms usually appear two to five days after exposure, but can take as long as 30 days to manifest. Although female gonorrhea infections are sometimes asymptomatic or mild, severe and permanent complications may result. Untreated infections may lead to chronic pelvic pain, internal abscesses, damaged fallopian tubes, infertility or ectopic pregnancy. Male gonorrhea is sometimes asymptomatic, but often causes stinging while urinating, a whitish-greenish urethral discharge and epididymitis which may cause male infertility. Gonorrhea infection amplifies the risk of contracting and transmitting HIV.

During the past 80 years the number of gonorrhea cases reported in South Dakota peaked in 1974, when gonorrhea was diagnosed by Gram stain and culture, with 2,254 cases reported. Thereafter, gonorrhea decreased dramatically to fewer than 200 cases annually during the 1990s. Since the 1960s South Dakota’s annual incidence of gonorrhea has been well below the national rate; however, during recent years South Dakota’s incidence surpassed the national rate (Figure 2). A decade ago, in 2006, South Dakota had the 39th highest gonorrhea rate (47.3 cases per 100,000) in the United States [1], but by 2015, our ranking had increased to 19th, and by 2016 our incidence rate had tripled to 147.1 cases per 100,000 population. Since 2007, gonorrhea has been increasing every year reaching 1,269 cases in 2016, which was the highest number of cases in 35 years.
In 2015, which is the most recent year with available nationally published data, 87.8% of 3,140 US counties reported at least one case of gonorrhea. Five South Dakota counties ranked in the top 25 county incidence rates out of 3,140 counties in the United States\(^\text{(2)}\): Dewey County 1\(^{\text{st}}\) (1,289 cases per 100,000 population), Oglala Lakota 5\(^{\text{th}}\) (858 incidence), Todd 7\(^{\text{th}}\) (799 incidence), Ziebach 18\(^{\text{th}}\) (460 incidence), and Bennett 22\(^{\text{nd}}\) (437 incidence). Our two largest counties, Minnehaha and Pennington ranked 406\(^{\text{th}}\) (162 incidence) and 308\(^{\text{th}}\) (186 incidence), respectively. Nineteen South Dakota counties reported no gonorrhea cases in 2015 (Figure 3).
In 2016, South Dakota reported 1,269 cases of gonorrhea, which is a rate of 147.1 cases per 100,000 population. During the past five years, 2012-2016, 58 of South Dakota’s 66 counties have reported cases of gonorrhea (Table 2). The map in Figure 4 shows South Dakota county average annual incidence. Five counties with the highest average annual gonorrhea incidence rates include Dewey, Oglala Lakota, Todd, Corson and Ziebach counties. During this five-year period, eight counties reported no gonorrhea cases: Campbell, Deuel, Hand, Hanson, Harding, Hyde, McPherson and Perkins counties.

The map in Figure 4 shows South Dakota county average annual incidence. Five counties with the highest average annual gonorrhea incidence rates include Dewey, Oglala Lakota, Todd, Corson and Ziebach counties. During this five-year period, eight counties reported no gonorrhea cases: Campbell, Deuel, Hand, Hanson, Harding, Hyde, McPherson and Perkins counties.

![Figure 4. Gonorrhea average annual incidence by county, South Dakota 2012-2016](cases per 100,000 population per year)

The peak age for gonorrhea was 22 years of age during the 5-year period, 2012-2016 (Figure 5). Females accounted for 60.6% of the gonorrhea cases reported in South Dakota. The median age of female cases was 24 years (range 0-64 years), while the median male case age was 26 years (range 13-76 years).

![Figure 5. Gonorrhea cases by age, South Dakota 2012-2016](Number of cases vs Age in years)
Typically female gonorrhea cases reported exceed male cases in South Dakota. Since 1980 there have been only five years when more male cases than female cases were reported: 1981, 1983, 1994, 1995 and 1997 (Figure 7). In 2015, the most recent year of nationally published data, South Dakota had the lowest male-to-female gonorrhea ratio in the United States\(^1\). South Dakota’s male gonorrhea incidence was 99.5 cases per 100,000 population, whereas the female incidence was 146.5, which is a ratio of 0.68. The national male-to-female gonorrhea ratio was 1.37. Only 12 states had male-to-female gonorrhea ratios less than 1.0. This low ratio suggests that South Dakota males may be under-reported, under-diagnosed, under-screened or may actually have less disease.

During the five year period, 2012-2015, American Indian cases accounted for 62.0% of South Dakota’s gonorrhea cases, 24.6% of cases were White race, 9.9% were Black race, 1.2% other races and 2.3% were individuals of unknown race (Figure 1). Although race status is self-designated by the case patients themselves, race classifications are often ambiguous, ephemeral and sometimes inaccurate. In 2015, South Dakota’s American Indian gonorrhea incidence, 827 cases per 100,000 population, was highest in the United States among state American Indian rates. The overall national American Indian gonorrhea incidence was 179 cases per 100,000 population.\(^2\) The three states with the highest American Indian gonorrhea rates were South Dakota (827 incidence) and our neighboring states North Dakota (700 incidence) and Montana (664 incidence).
CHLAMYDIA. *Chlamydia trachomatis* (serovars D-K) is an intracellular bacterium that infects the genital tract. Chlamydia transmission occurs during contact with mucus membrane secretions of infected individuals – almost always during sexual activity. Neonatal transmission occurs when an infant is born to an infected mother, and may then cause pneumonia or conjunctivitis in the newborn. Most female infections are asymptomatic or mild, but can cause mucus-pus discharges, pelvic inflammatory disease, infertility and ectopic pregnancy. Men experience urethral discharge, epididymal pain and sexually reactive arthritis.

Formal public health monitoring of chlamydia started in the mid-1980s. Figure 8 graphs chlamydia’s increasing incidence in South Dakota and the United States over the past 23 years. Since the early 1990s national and state chlamydia incidence rates have more than doubled. South Dakota’s chlamydia incidence has been fairly similar to the national incidence, with South Dakota exceeding the national rate during nine of these years. Chlamydia is now the most frequently reported infectious disease in South Dakota and the United States.

Chlamydia’s historical trend has been upward in South Dakota, ranging from a 1,313 cases reported in 1995 increasing to 4,331 cases in 2016, a +230% increase over 22 years (Figure 9). During the past five years, 2012-2016, all of South Dakota’s 66 counties have reported chlamydia cases.
During 2015, the most recent year of nationally available data, 98.6% of 3,140 US counties reported cases of chlamydia. Nationally, five South Dakota counties ranked in the highest 25 county incidence rates in the United States\(^2\): Oglala Lakota County ranked 3\(^{rd}\) (2,448 cases per 100,000 population), Dewey 4\(^{th}\) (2,420 incidence), Todd 7\(^{th}\) (1,856 incidence), Corson 23\(^{rd}\) (1,244 incidence) and Buffalo 25\(^{th}\) (1,204 incidence). Our two largest counties, Minnehaha and Pennington, ranked 452\(^{nd}\) (563 incidence) and 543\(^{rd}\) (524 incidence), respectively. Five South Dakota counties had no chlamydia cases reported in 2015.

Females accounted for 71% of the chlamydia cases reported in South Dakota during the five-year period, 2012-2016 (Figure 11). The peak age for chlamydia was 19 years of age (Figure 12). The median female age was 21 years (range 0-81 years), while the median male case age was 23 years (range 4-81 years). Four South Dakota cases were in children 10 years and younger. Overall, female chlamydia cases exceeded male cases in South Dakota, and all other states, by double or more. Nationally in 2015, the female incidence of chlamydia was 645.5 cases per 100,000 population and 305.2 for males, while in South Dakota the rates were 667.9 for females and 206.4 for males.\(^1\) South Dakota had the 45\(^{th}\) lowest male-to-female chlamydia incidence ratio in the United States, suggesting that South Dakota males may be under-reported, under-diagnosed, under-screened or may have less disease.

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**Figure 10. Chlamydia rates by county, United States, 2015**

www.cdc.gov/std/stats15/figures/16.htm

**Figure 11. Chlamydia cases by age and sex, South Dakota 2012-2016**
During the five year period, 2012-2015, American Indian cases accounted for 40.5% of South Dakota’s chlamydia cases, 39.7% of cases were White race, 4.8% were Black race, 2.3% other races and 12.7% were individuals of unknown race (Figure 1). Although race status is self-designated by the case patients themselves, race classifications are often ambiguous, ephemeral and sometimes inaccurate. In 2015, South Dakota’s American Indian chlamydia incidence, 2,130 cases per 100,000 population, was second highest in the United States when compared with all state’s American Indian rates. The overall national American Indian chlamydia incidence was 655 cases per 100,000 population. Alaska had the highest rate (2,358 incidence). The states with the next highest American Indian chlamydia rates were South Dakota (2,130 incidence) and our neighboring states Montana (1,473 incidence), North Dakota (1,447 incidence), Wyoming (1,273 incidence) and Nebraska (1,151 incidence).[2]

The map in Figure 13 shows the average annual incidence of chlamydia for South Dakota counties. Counties with the highest rates include Dewey, Oglala Lakota, Todd, Corson, Buffalo and Roberts.
SYPHILIS. Syphilis is caused by the spirochete bacterium *Treponema pallidum*. Syphilis manifests as primary, secondary, latent and tertiary stages in adults or children. Congenital syphilis may cause stillbirth or developmental anomalies in infected infants. Syphilis infection is clinically multi-staged as:

- **Primary syphilis**: chancre, a painless ulcer on skin or mucus membrane at the site of exposure. Chancres are highly infectious, appearing about three weeks (range 10-90 days) after exposure and heal spontaneously in about two weeks.
- **Secondary syphilis**: 3-8 weeks after the primary chancre disappears systemic symptoms start: fever, malaise, rash, lymphadenopathy with spontaneous resolution in 3-12 weeks.
- **Early latent, late latent syphilis**: asymptomatic.
- **Early syphilis**: defined as primary, secondary and early latent stages.
- **Tertiary syphilis**: 15-30 years after initial infection, exhibits varied clinical manifestations including neurosyphilis, mental deterioration, blindness, aortitis and gumma growths.
- **Congenital syphilis**: range from asymptomatic infection to severe cases with rash, snuffles, hepatosplenomegaly, condyloma lata warts, jaundice, pseudoparalysis, anemia or edema.

Syphilis is not a new disease in South Dakota (Figure 14). Over 500 syphilis cases were reported annually in the 1940s, thereafter case numbers dwindled so that zero cases were reported during some years in the early 2000s when the hope of syphilis elimination in South Dakota was near. Since 2006, however, the state has experienced a resurgence peaking in 2014 when 76 early syphilis cases and three congenital cases were reported. During the past five years, 2012-2016, South Dakota syphilis cases have included five congenital, 139 primary, 85 secondary, 51 early latent and 72 late latent cases.

![Figure 14. Syphilis cases reported, South Dakota 1920-2016](image)

Since 1995, South Dakota’s annual incidence of syphilis has been well below the national rates for all stages; however, in 2013 and 2014 our rate of primary and secondary syphilis was near the national rate (Figure 15). In 2011, South Dakota had the lowest rate of primary and secondary syphilis in the United States, zero, but increased to 14th highest in 2014 with a rate of 6.3 cases per 100,000 population.
During 2015, which is the most recent year with nationally published data available, 42.3% of 3,140 US counties reported at least one case of primary or secondary syphilis (Figure 16). The overall national incidence in 2015 was 7.5 cases of primary or secondary syphilis per 100,000 population, while South Dakota’s incidence was 4.6 (Table 3). Corson County ranked first in the United States with 95.6 cases per 100,000 population. Our two largest counties, Minnehaha and Pennington ranked 302nd (8.7 incidence) and 1,129th (1.8 incidence), respectively. 

Figure 16. Syphilis rates (primary and secondary) by county, United States 2015
During the five year period, 2012-2016, 26 of South Dakota’s 66 counties reported cases of primary, secondary or congenital syphilis. Three counties, Minnehaha, Corson and Dewey, accounted for 74% of the state’s cases.

Unlike gonorrhea and chlamydia, males accounted for the majority, 67.1%, of primary and secondary syphilis cases reported in South Dakota during the five-year period, 2012-2016 (Figure 18). The peak age for syphilis was 22 years of age. The median male age was 33 years (range 17-70 years), while the female median age was 28 years (15-53 years). During 2015, the national male primary and secondary syphilis rate exceeded the female rate over five-fold.

Heterosexual transmission (male-to-female or female-to-male) accounted for 57.1% of South Dakota’s early syphilis cases, whereas 41.8% were male-to-male sexual transmission mode, and 1.1% were unknown transmission mode during the past five years. Of just the men, 62.2% were male-to-male sexual transmission, 36.2% were heterosexual transmission and 1.6% were unknown transmission mode.

During the five year period, 2012-2016, 49.3% of early syphilis cases were American Indian, 41.4% were
designated by the case patients themselves, race classifications are often ambiguous, ephemeral and sometimes inaccurate.

Among the White race early syphilis cases (n=115), 74.7% were male-to-male sexual transmission, 22.6% were heterosexual and 2.6% were unknown transmission. Among the American Indian cases (n=133) 7.5% were male-to-male sexual transmission and 92.5% were heterosexual transmission. Among Black race cases (n=16), 68.8% were male-to-male sexual transmission and 31.2% were heterosexual transmission.

Congenital syphilis in South Dakota had been rare until 2014 when three cases were reported, prior to which our last case was reported in 1999. Two cases of congenital syphilis were also reported in 2016. Four of these five congenital syphilis cases were born healthy. There were four syphilis-associated stillbirths during 2013-2016.

**Diagnosis of sexually transmitted diseases**


**Treatment of sexually transmitted diseases**


**Prevention of sexually transmitted diseases**

Effective strategies for reducing STD risk (www.cdc.gov/std/prevention):

- **Practice abstinence**: The surest way to avoid STDs is to not have sex. This means not having vaginal, oral or anal sex.
- **Mutual monogamy**: Agree to be sexually active with only one person, who has agreed to be sexually active only with you. Being in a long-term mutually monogamous relationship with an uninfected partner is one of the most reliable ways to avoid STDs. You must both be certain you are not infected with STDs. It is important to have an open and honest conversation with your partner.
- **Condoms**: Correct and consistent use of the male latex condom is highly effective in reducing STD transmission. Use a condom every time you have vaginal, anal or oral sex.
- **Talk with partner**: Talk with your sex partner(s) about STDs and staying safe before having sex. It might be an uncomfortable conversation to start, but protecting your health is your responsibility.
• **Get tested**: Many STDs don’t have symptoms, but they can still cause health problems. The only way to know if you have an STD is to get tested.

• **If you test positive**: Many STDs are curable and all are treatable. If either you or your partner has an STD, both of you need to start treatment immediately to avoid getting re-infected.

• **The goal of the South Dakota Sexually Transmitted Disease (STD) Control Program** is to reduce and prevent the incidence of sexually transmitted diseases, including HIV. The STD Program provides statewide consultation and technical assistance, partner services, screening, surveillance, health care provider education, case management and partner notification for reportable STDs in the state. [https://doh.sd.gov/diseases/infectious/std/](https://doh.sd.gov/diseases/infectious/std/)

**Screening recommendations and considerations**

- **Screening for Chlamydia and Gonorrhea:**
  U.S. Preventive Services Task Force Recommendation Statement

- **Syphilis screening during pregnancy:**
  U.S. Preventive Services Task Force Recommendation Statement

- **Gonorrhea screening:**

  **Women:**
  - Sexually active women under 25 years of age.
  - Sexually active women age 25 years and older if at increased risk*.
  - Retest 3 months after treatment.

  **Pregnant Women:**
  - All pregnant women under 25 years of age and older women if at increased risk*.
  - Retest 3 months after treatment.

  **Men who have sex with men (MSM):**
  - At least annually for sexually active MSM at sites of contact (urethra, rectum, pharynx) regardless of condom use.
  - Every 3 to 6 months if at increased risk*.

- **Chlamydia screening:**

  **Women:**
  - Sexually active women under 25 years of age.
  - Sexually active women age 25 years and older if at increased risk*.
  - Retest approximately 3 months after treatment.
Pregnant Women:
- All pregnant women under 25 years of age.
- All pregnant women aged 25 years and older women if at increased risk*.
- Retest during the third trimester for women less than 25 years of age or at risk*.
- Pregnant women with chlamydial infection should have a test-of-cure 3-4 weeks after treatment and be retested within 3 months.

Men who have sex with men (MSM):
- At least annually for sexually active MSM at sites of contact (urethra, rectum) regardless of condom use.
- Every 3 to 6 months if at increased risk*.

- **Syphilis screening:**

Pregnant Women:
- All pregnant women at first prenatal visit.
- Retest early in the third trimester and at delivery if at high risk*.

Men who have sex with men (MSM):
- At least annually for sexually active MSM.
- Every 3 to 6 months if at increased risk*.

*Increased risk includes “those who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI; inconsistent condom use among persons who are not in mutually monogamous relationships; previous or coexisting sexually transmitted infections; and exchanging sex for money or drugs.”

**Expedited partner therapy (EPT)**

EPT is the clinical practice of treating the sex partners of patients diagnosed with chlamydia or gonorrhea by providing prescriptions or medications to the patient to take to their partner without the health care provider first examining the partner. Effective clinical management of STD patients requires treatment of the patients’ current sex partners to prevent reinfection and curtail further transmission.

[www.cdc.gov/std/ept](http://www.cdc.gov/std/ept)
Behaviors that contribute sexually transmitted diseases in high school students

Questions about self-reported sexual behaviors by high school students are part of the biannual Youth Risk Behavior Survey (YRBS). YRBS is conducted in South Dakota and most other states during the spring of odd numbered years. The YRBS asks students a variety of questions including tobacco use, injuries, alcohol and other drug use, sexual behaviors, dietary behaviors and physical activity. Survey questions relating to sexual behavior include the following:

- Have you ever had sexual intercourse?
- How old were you when you had sexual intercourse for the first time?
- During your life, with how many people have you had sexual intercourse?
- During the past 3 months, with how many people did you have sexual intercourse?
- Did you drink alcohol or use drugs before you had sexual intercourse the last time?
- The last time you had sexual intercourse, did you or your partner use a condom?
- The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?
- Have you ever been physically forced to have sexual intercourse when you did not want to?
- During the past 12 months, how many times did anyone force you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)
- During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)

Over the past 25 years, the rate of South Dakota high school students responding that they ever had sexual intercourse decreased from 52.0% in 1993 to 37.2% in 2015 (Figure 19, Table 4). The percentage of South Dakota high school students reporting having had sexual intercourse with four or more partners decreased over time from 16.5% in 1993 to 12.2% in 2013. Paradoxically, while the reported high school sexual activity decreased, the STD rates increased in South Dakota.
### Table 4. High school student sexual behaviors, South Dakota 1991-2015

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<td>46.1</td>
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<td>Percent of students who had sexual intercourse.</td>
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<tr>
<td>Girls</td>
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<td>Boys</td>
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<td>3.8</td>
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<td>Percent of students who had sexual intercourse before age 13 years.</td>
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<tr>
<td>Girls</td>
<td>15.6</td>
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<td>8.8</td>
<td>16.9</td>
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<td>15.4</td>
<td>11.5</td>
<td>10.9</td>
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<tr>
<td>Boys</td>
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<td>11.5</td>
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<tr>
<td>Percent of students who had sexual intercourse with four or more partners.</td>
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<tr>
<td>Girls</td>
<td>33.9</td>
<td>36.4</td>
<td>29.7</td>
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<td>33.5</td>
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<td>33.7</td>
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<td>33.7</td>
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<td>Percent of students ever having been physically forced to have sexual intercourse.</td>
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<tr>
<td>Girls</td>
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<td>12.5</td>
<td>13.5</td>
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<td>6.1</td>
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<tr>
<td>Boys</td>
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<td>16.3</td>
<td>13.9</td>
<td>12.5</td>
<td>13.5</td>
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<td>6.1</td>
<td></td>
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<tr>
<td>Among sexually active students, percent who used alcohol or drugs before last sexual intercourse.</td>
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<tr>
<td>Girls</td>
<td>34.5</td>
<td>25.6</td>
<td>24.8</td>
<td>31.4</td>
<td>29.0</td>
<td>26.8</td>
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<td>23.3</td>
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<td>Boys</td>
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<td>35.6</td>
<td>37.7</td>
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<td>30.4</td>
<td>35.6</td>
<td>36.1</td>
<td>29.5</td>
<td>24.1</td>
<td>26.7</td>
<td>25.9</td>
<td>18.1</td>
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<tr>
<td>Percent who used a condom at last sexual intercourse.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>53.1</td>
<td>53.7</td>
<td>58.4</td>
<td>58.7</td>
<td>45.1</td>
<td>46.2</td>
<td>45.3</td>
<td>46.3</td>
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<td>44.6</td>
<td>48.2</td>
<td>39.2</td>
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<tr>
<td>Boys</td>
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<td>47.4</td>
<td>47.8</td>
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<td>36.7</td>
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<td>35.4</td>
<td>31.2</td>
<td>29.3</td>
<td>40.7</td>
<td>36.5</td>
</tr>
</tbody>
</table>

### High school students having sexual intercourse

During 2015, 37.2% of South Dakota high school students reported having ever had sexual intercourse, which was below the national rate of 41.2%. South Dakota students ranked 23rd out of the 34 states asking that question (Figure 20). States with the highest rates include Mississippi, Delaware and West Virginia, whereas states with the lowest rates include Maryland, California and New York.
During the three most recent YRBS reports for South Dakota (2011, 2013 and 2015), the overall percent of high school students having sexual intercourse decreased by 10 percentage points, from 47.4% in 2011 to 37.2% in 2015 (Figure 21). In 2015, male students reported being more sexually active than female students (39.4% vs. 34.9%, respectively). The American Indian sample was large enough to be statistically reliable in 2011 only. During that year, 71.9% American Indian students reported sexual intercourse compared to 43.5% of White race students. The rate of sexual experience increased by grade level, from 15.7% among 9th graders to 61.4% among 12th graders in 2015.

### Figure 21. South Dakota high school students (percent) who reported ever having had sexual intercourse, 2011, 2013 and 2015 (YRBS)

<table>
<thead>
<tr>
<th>Race</th>
<th>Grade</th>
<th>2011</th>
<th>2013</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Male</td>
<td>43.5</td>
<td>50.8</td>
<td>73.6</td>
<td></td>
</tr>
<tr>
<td>White Female</td>
<td>46.1</td>
<td>53.8</td>
<td>76.7</td>
<td></td>
</tr>
<tr>
<td>American Indian Male</td>
<td>43.8</td>
<td>50.1</td>
<td>74.2</td>
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</tr>
<tr>
<td>American Indian Female</td>
<td>43.8</td>
<td>50.1</td>
<td>74.2</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>41.9</td>
<td>48.9</td>
<td>69.4</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>48.9</td>
<td>50.8</td>
<td>73.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>46.1</td>
<td>53.8</td>
<td>76.7</td>
<td></td>
</tr>
</tbody>
</table>

High school students having had four or more sexual partners

Non-monogamy, having multiple sexual partners is a risk factor for acquiring STDs. During 2015, 12.6% of South Dakota high school students reported having four or more lifetime sexual intercourse partners, which was more than the national rate of 11.5%. South Dakota ranked 9th out of the 32 states asking that question (Figure 22). States with the highest rates include Arkansas, Mississippi and Alabama, whereas states with the lowest rates include New York, Hawaii and Connecticut.

### Figure 22. High school students (percent) in South Dakota and other states who reported 4 or more sexual intercourse partners, 2015 (YRBS)
During the three most recent YRBS reports for South Dakota (2011, 2013 and 2015), the overall percent of high school students who reported four or more sexual partners decreased by two percentage points (Figure 23). In 2015, male students reported being more sexually experienced than female students (14.2% vs. 10.9%, respectively). The American Indian sample was large enough to be statistically reliable in 2011 only. During that year, 24.6% American Indian students reported having four or more sex partners compared to 13.2% of White race students. The rate of sexual experience increased by grade level.

![Figure 23. South Dakota high school students (percent) who reported 4 or more sexual intercourse partners, 2011, 2013 and 2015 (YRBS)](image)

High school students having been physically forced to have sexual intercourse

Forced sexual intercourse is a risk factor for acquiring STDs. During 2015, 5.1% of South Dakota high school students reported having been forced to have had sexual intercourse when they did not want to, which was fewer than the national rate of 6.7%. South Dakota ranked 35th out of the 35 states asking that question (Figure 24). States with the highest rates include Arkansas, Mississippi and Alabama, whereas states with the lowest rates include California, Massachusetts and South Dakota.

![Figure 24. High school students (percent) in South Dakota and other states who were ever forced to have sexual intercourse (when they did not want to), 2015 (YRBS)](image)
During the three most recent YRBS reports for South Dakota (2011, 2013 and 2015), the overall percent of high school students forced to have sex decreased by 4.5 percentage points from 9.6% in 2011 to 5.1% in 2015 (Figure 25). In 2015 female students reported having been forced into sex at a higher rate than male students (6.1% vs. 4.2%, respectively). The American Indian sample was large enough to be statistically reliable in 2011 only. During that year 13.0% American Indian students reported having had forced sex compared to 8.5% of White race students. The rate of forced sex increased by grade level, but each grade deceased during the survey years.

Youth Risk Behavior Survey (YRBS). The YRBS is conducted biannually on odd years in randomly selected high schools in South Dakota by the Department of Health or the Department of Education in collaboration with and funded by the Centers for Disease Control and Prevention (CDC). Participating schools are from the public and private sectors, and Bureau of Indian Education schools. YRBS is a voluntary, confidential, self-reporting survey with questions on tobacco use, sexual behaviors, eating habits, physical activity, alcohol/drug use, suicide ideation, suicide attempts, bullying, violence and many other topics. During the 2015 survey, 1,313 South Dakota high schoolers participated, including 48.7% female and 51.3% male students.
YRBS Sexual Behavior Questions

Have you ever had sexual intercourse?
A. Yes  B. No

How old were you when you had sexual intercourse for the first time?
A. I have never had sexual intercourse  E. 14 years old
B. 11 years old or younger  F. 15 years old
C. 12 years old  G. 16 years old
D. 13 years old  H. 17 years old or older

During your life, with how many people have you had sexual intercourse?
A. I have never had sexual intercourse  E. 4 people
B. 1 person  F. 5 people
C. 2 people  G. 6 or more people
D. 3 people

During the past 3 months, with how many people did you have sexual intercourse?
A. I have never had sexual intercourse  E. 3 people
B. I have had sexual intercourse, but not during the past 3 months  F. 4 people
C. 1 person  G. 6 or more people
D. 2 people

Did you drink alcohol or use drugs before you had sexual intercourse the last time?
A. I have never had sexual intercourse  C. No
B. Yes

The last time you had sexual intercourse; did you or your partner use a condom?
A. I have never had sexual intercourse  C. No
B. Yes

The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy?
A. I have never had sexual intercourse  E. IUD or implant
B. No method was used to prevent pregnancy  F. A shot, patch, or birth control ring
C. Birth control pills  G. Withdrawal or some other method
D. Condoms  H. Not sure

Have you ever been physically forced to have sexual intercourse when you did not want to?
A. Yes  B. No

During the past 12 months, how many times did anyone force you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)
A. 0 times  D. 4 or 5 times
B. 1 time  E. 6 or more times
C. 2 or 3 times

During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do? (kissing, touching, or being physically forced to have sexual intercourse.)
A. I did not date or go out  B. 0 times  E. 4 or 5 times
  with anyone during the  C. 1 time  F. 6 or more times
  past 12 months  D. 2 or 3 times
Case definitions for gonorrhea, chlamydia and syphilis

Chlamydia Trachomatis infection case definition (2010)  

Clinical Description  
Infection with Chlamydia trachomatis may result in urethritis, epididymitis, cervicitis, acute salpingitis or other syndromes when sexually transmitted; however, the infection is often asymptomatic in women. Perinatal infections may result in inclusion conjunctivitis and pneumonia in newborns. Other syndromes caused by C. trachomatis include lymphogranuloma venereum (see Lymphogranuloma venereum) and trachoma.

Laboratory Criteria for Diagnosis  
- Isolation of C. trachomatis by culture, OR  
- Demonstration of C. trachomatis in a clinical specimen by detection of antigen or nucleic acid.

Case Classification  
Confirmed: A case that is laboratory confirmed

Gonorrhea (Neisseria gonorrhoeae) (2014)  
https://wwwn.cdc.gov/nndss/conditions/gonorrhea/case-definition/2014/  

Clinical Description  
A sexually transmitted infection commonly manifested by urethritis, cervicitis, proctitis, salpingitis, or pharyngitis. Infection may be asymptomatic.

Laboratory Criteria for Diagnosis  
- Observation of gram-negative intracellular diplococci in a urethral smear obtained from a male or an endocervical smear obtained from a female, OR  
- Isolation of typical gram-negative, oxidase-positive diplococci by culture (presumptive Neisseria gonorrhoeae) from a clinical specimen, OR  
- Demonstration of N. gonorrhoeae in a clinical specimen by detection of antigen or nucleic acid.

Case Classification  
Probable: Demonstration of gram-negative intracellular diplococci in a urethral smear obtained from a male or an endocervical smear obtained from a female.  
Confirmed: A person with laboratory isolation of typical gram-negative, oxidase-positive diplococci by culture (presumptive Neisseria gonorrhoeae) from a clinical specimen, or demonstration of N. gonorrhoeae in a clinical specimen by detection of antigen or detection of nucleic acid via nucleic acid amplification (e.g., Polymerase Chain Reaction [PCR]) or hybridization with a nucleic acid probe.

Syphilis (Treponema pallidum) (2014)  
https://wwwn.cdc.gov/nndss/conditions/syphilis/case-definition/2014/  

Subtypes: Syphilis, primary; Syphilis, secondary; Syphilis, early latent; Syphilis, late latent; Syphilis, late with clinical manifestations (including late benign syphilis and cardiovascular syphilis); Syphilitic stillbirth; Syphilis, congenital.

Syphilis, primary:  
Clinical Description  
A stage of infection with Treponema pallidum characterized by one or more ulcerative lesions (e.g. chancre), which might differ considerably in clinical appearance.

Laboratory Criteria for Diagnosis  
Demonstration of T. pallidum in clinical specimens by darkfield microscopy, or by polymerase chain reaction (PCR) or equivalent direct molecular methods.
Case Classification
Probable: A case that meets the clinical description of primary syphilis with a reactive serologic test (nontreponemal: Venereal Disease Research Laboratory (VDRL), rapid plasma reagin (RPR) or equivalent serologic methods; treponemal: fluorescent treponemal antibody absorbed (FTA-ABS), *T. pallidum* particle agglutination (TP-PA), enzyme immunoassay (EIA), chemiluminescence immunoassay (CIA) or equivalent serologic methods). These treponemal tests supersede older testing technologies, including microhemagglutination assay for antibody to *T. pallidum* (MHA-TP).

Confirmed: A case that meets the clinical description of primary syphilis that is laboratory confirmed.

Syphilis, secondary:
Clinical Description
A stage of infection caused by *T. pallidum* characterized by localized or diffuse mucocutaneous lesions (e.g., rash — such as non-pruritic macular, maculopapular, papular or pustular lesions), often with generalized lymphadenopathy. Other symptoms can include mucous patches, condyloma lata and alopecia. The primary ulcerative lesion may still be present. Because of the wide array of symptoms possibly indicating secondary syphilis, serologic tests for syphilis and a thorough sexual history and physical examination are crucial to determining if a case should be classified as secondary syphilis.

Laboratory Criteria for Diagnosis
Demonstration of *T. pallidum* in clinical specimens by darkfield microscopy, or by polymerase chain reaction (PCR) or equivalent direct molecular methods.

Case Classification
Probable: A case that meets the clinical description of secondary syphilis with a nontreponemal (VDRL, RPR or equivalent serologic methods) titer ≥4 AND a reactive treponemal test (FTA-ABS, TP-PA, EIA, CIA or equivalent serologic methods).

Confirmed: A case that meets the clinical description of secondary syphilis (with at least one sign or symptom) that is laboratory confirmed.

Syphilis, early latent:
Clinical Description
A subcategory of latent syphilis (a stage of infection caused by *T. pallidum* in which organisms persist in the body of the infected person without causing symptoms or signs) when initial infection has occurred within the previous 12 months.

Case Classification
Probable: A person with no clinical signs or symptoms of syphilis who has one of the following:
- No past diagnosis of syphilis, AND a reactive nontreponemal test (e.g., VDRL, RPR or equivalent serologic methods), AND a reactive treponemal test (e.g., FTA-ABS, TP-PA, EIA, CIA or equivalent serologic methods), OR
- A current nontreponemal test titer demonstrating fourfold or greater increase from the last nontreponemal test titer.

AND evidence of having acquired the infection within the previous 12 months based on one or more of the following criteria:
- Documented seroconversion or fourfold or greater increase in titer of a nontreponemal test during the previous 12 months.
- Documented seroconversion of a treponemal test during the previous 12 months.
- A history of symptoms consistent with primary or secondary syphilis during the previous 12 months.
- A history of sexual exposure to a partner within the previous 12 months who had primary, secondary or early latent syphilis (documented independently as duration < 12 months).
- Only sexual contact was within the last 12 months (sexual debut).

There is no confirmed case classification for early latent syphilis.
Syphilis, late latent:

Clinical Description
A subcategory of latent syphilis (a stage of infection caused by T. pallidum in which organisms persist in the body of the infected person without causing symptoms or signs) when initial infection has occurred >12 months previously.

Case Classification
Probable: A person with no clinical signs or symptoms of syphilis who has one of the following:
- No past diagnosis of syphilis, AND a reactive nontreponemal test (e.g., VDRL, RPR or equivalent serologic methods), AND a reactive treponemal test (e.g., FTA-ABS, TP-PA, EIA, CIA or equivalent serologic methods), OR
- A past history of syphilis therapy and a current nontreponemal test titer demonstrating fourfold or greater increase from the last nontreponemal test titer.

AND who has no evidence of having acquired the disease within the preceding 12 months (see Syphilis, early latent).

There is no confirmed case classification for early latent syphilis.

Syphilis, late with clinical manifestations (including late benign syphilis and cardiovascular syphilis):

Clinical Description
Clinical manifestations of late syphilis may include inflammatory lesions of the cardiovascular system, (e.g., aortitis, coronary vessel disease), skin (e.g., gummatous lesions), bone (e.g., osteitis) or other tissue. Rarely, other structures (e.g., the upper and lower respiratory tracts, mouth, eye, abdominal organs, reproductive organs, lymph nodes and skeletal muscle) may be involved. Late syphilis usually becomes clinically manifest only after a period of 15–30 years of untreated infection. If only neurologic manifestations of syphilis (e.g., tabes dorsalis, dementia) are present and infection occurred more than 12 months ago, the case should be reported as “late syphilis”.

Laboratory Criteria for Diagnosis
Demonstration of T. pallidum in late lesions by special stains (although organisms are rarely visualized in late lesions), or equivalent methods, or by polymerase chain reaction (PCR) or equivalent direct molecular methods.

Case Classification
Probable: Characteristic abnormalities or lesions of the cardiovascular system (e.g., aortitis, coronary vessel disease), skin (e.g., gummatous lesions), bone (e.g., osteitis) or other tissue AND a reactive treponemal test (e.g., FTA-ABS, TP-PA, EIA, CIA or equivalent serologic methods), in the absence of other known causes of these abnormalities. CSF abnormalities and clinical symptoms or signs consistent with neurologic manifestations of syphilis might be present.

Confirmed: A case that meets the clinical description of late syphilis that is laboratory confirmed

Syphilitic stillbirth:

Clinical Description
A fetal death that occurs after a 20-week gestation or in which the fetus weighs greater than 500 g and the mother had untreated or inadequately treated* syphilis at delivery

Comments
For reporting purposes, syphilitic stillbirths should be reported as cases of congenital syphilis.

*Inadequate treatment consists of any non-penicillin therapy or penicillin given less than 30 days before delivery.

Syphilis, congenital:

Clinical Description
A condition caused by infection in utero with Treponema pallidum. A wide spectrum of severity exists, and only severe cases are clinically apparent at birth. An infant or child (aged less than 2 years) may have signs such as hepatosplenomegaly, rash, condyloma lata, snuffles, jaundice (nonviral hepatitis), pseudoparalysis, anemia or
edema (nephrotic syndrome and/or malnutrition). An older child may have stigmata (e.g., interstitial keratitis, nerve deafness, anterior bowing of shins, frontal bossing, mulberry molars, Hutchinson teeth, saddle nose, rhagades or Clutton joints).

**Laboratory Criteria for Diagnosis**

Demonstration of *T. pallidum* by darkfield microscopy, fluorescent antibody or other specific stains in specimens from lesions, placenta, umbilical cord or autopsy material.

**Case Classification**

Probable: A condition affecting an infant whose mother had untreated or inadequately treated* syphilis at delivery, regardless of signs in the infant, or an infant or child who has a reactive treponemal test for syphilis and any one of the following:

- Any evidence of congenital syphilis on physical examination.
- Any evidence of congenital syphilis on radiographs of long bones.
- A reactive cerebrospinal fluid (CSF) venereal disease research laboratory (VDRL).
- An elevated CSF cell count or protein (without other cause).
- A reactive fluorescent treponemal antibody absorbed–19S-IgM antibody test or IgM enzyme-linked immunosorbent assay.

Confirmed: A case that is laboratory confirmed.

**Comments**

Congenital and acquired syphilis may be difficult to distinguish when a child is seropositive after infancy. Signs of congenital syphilis may not be obvious, and stigmata may not yet have developed. Abnormal values for CSF VDRL, cell count and protein, as well as IgM antibodies, may be found in either congenital or acquired syphilis. Findings on radiographs of long bones may help because radiographic changes in the metaphysis and epiphysis are considered classic signs of congenitally acquired syphilis. The decision may ultimately be based on maternal history and clinical judgment. In a young child, the possibility of sexual abuse should be considered as a cause of acquired rather than congenital syphilis, depending on the clinical picture. For reporting purposes, congenital syphilis includes cases of congenitally acquired syphilis among infants and children as well as syphilitic stillbirths.

*Inadequate treatment consists of any non-penicillin therapy or penicillin given less than 30 days before delivery.

**Neurosyphilis Surveillance Case Definition:**

**Clinical description**

Infection of the central nervous system with *T. pallidum*, as evidenced by manifestations including syphilitic meningitis, meningovascular syphilis, optical involvement including interstitial keratitis and uveitis, general paresis, including dementia, and tabes dorsalis.

**Laboratory criteria for diagnosis**

A reactive VDRL in cerebrospinal fluid (CSF) AND either:

1. a reactive treponemal serologic test for syphilis (e.g., FTA-ABS, TP-PA, EIA, CIA or equivalent serologic methods), OR
2. a reactive nontreponemal serologic test for syphilis (VDRL, RPR or equivalent serologic method).

**Case classification**

Probable: Syphilis of any stage with a negative VDRL test in CSF specimen and either:

1. a reactive treponemal serologic test for syphilis (e.g., FTA-ABS, TP-PA, EIA, CIA or equivalent serologic methods), OR
2. a reactive non-treponemal serologic test for syphilis (VDRL, RPR, or equivalent serologic method),

AND both the following:

- Elevated CSF protein† or leukocyte count† in the absence of other known causes of these abnormalities, AND
- Clinical symptoms or signs consistent with neurosyphilis without other known causes for these clinical abnormalities.

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†CSF protein >50 mg/dL, >5 white blood cells/cubic millimeter CSF; in HIV-positive individuals, these parameters are less specific.

Confirmed: Syphilis of any stage that meets the laboratory criteria for neurosyphilis.

Comments
Neurosyphilis can occur at any stage of syphilis. If the patient has neurologic manifestations of syphilis, the case should be reported with the appropriate stage of infection (as if neurologic manifestations were not present) and neurologic manifestations should be noted in the case report data. If no other stage is appropriate, the case should be staged as "late, with clinical manifestations".

South Dakota Department of Health STD testing and counseling locations

For testing and counseling for HIV/AIDS and other sexually transmitted diseases, contact one of the following department Disease Intervention offices or call 1-800-592-1861.

<table>
<thead>
<tr>
<th>Aberdeen</th>
<th>Sioux Falls</th>
</tr>
</thead>
<tbody>
<tr>
<td>402 S. Main St.</td>
<td>1200 North West Ave.</td>
</tr>
<tr>
<td>Aberdeen, SD 57401-4127</td>
<td>Sioux Falls, SD 57104-1335</td>
</tr>
<tr>
<td>Phone: 1-866-805-1007</td>
<td>Phone: 1-866-315-9214</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pierre</th>
<th>Watertown</th>
</tr>
</thead>
<tbody>
<tr>
<td>740 E. Sioux, Suite 107</td>
<td>2001 9th Ave. SW #500</td>
</tr>
<tr>
<td>Pierre, SD 57501-3395</td>
<td>Watertown, SD 57201-4038</td>
</tr>
<tr>
<td>Phone: 1-866-229-4927</td>
<td>Phone: 1-866-817-4090</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rapid City</th>
</tr>
</thead>
<tbody>
<tr>
<td>909 E. St. Patrick, Suite 7</td>
</tr>
<tr>
<td>Rapid City, SD 57701</td>
</tr>
<tr>
<td>Phone: 1-866-474-8221</td>
</tr>
</tbody>
</table>

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References

1. CDC, Sexually Transmitted Disease Surveillance annual reports. www.cdc.gov/std/stats/default.htm

This monograph prepared by Lon Kightlinger, with the invaluable assistance of Amanda Gill, Nato Tarkhashvili, Michelle Hoffman, Bonnie Jameson, Cassie Deffenbaugh and Katie Hill.
<table>
<thead>
<tr>
<th>Disease</th>
<th>2017 year-to-date</th>
<th>5-year median</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diphtheria</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Tetanus</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Pertussis</strong></td>
<td>5</td>
<td>24</td>
<td>-79%</td>
</tr>
<tr>
<td><strong>Polioomyelitis</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Measles</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Mumps</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Rubella</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Haemophilus influenza</strong></td>
<td>10</td>
<td>0</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disease</th>
<th>2017 year-to-date</th>
<th>5-year median</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIV infection</strong></td>
<td>28</td>
<td>23</td>
<td>+22%</td>
</tr>
<tr>
<td><strong>Hepatitis B, acute</strong></td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Chlamydia</strong></td>
<td>2,938</td>
<td>2,702</td>
<td>+9%</td>
</tr>
<tr>
<td><strong>Gonorrhea</strong></td>
<td>743</td>
<td>600</td>
<td>+24%</td>
</tr>
<tr>
<td><strong>Syphilis, early</strong></td>
<td>35</td>
<td>22</td>
<td>+59%</td>
</tr>
<tr>
<td><strong>Tuberculosis</strong></td>
<td>10</td>
<td>10</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Meningococcal, invasive</strong></td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Strep. Pneumo., invasive</strong></td>
<td>90</td>
<td>72</td>
<td>+25%</td>
</tr>
<tr>
<td><strong>E. coli, Shiga toxin-producing</strong></td>
<td>60</td>
<td>35</td>
<td>+71%</td>
</tr>
<tr>
<td><strong>Campylobacteriosis</strong></td>
<td>289</td>
<td>229</td>
<td>+26%</td>
</tr>
<tr>
<td><strong>Salmonellosis</strong></td>
<td>161</td>
<td>128</td>
<td>+26%</td>
</tr>
<tr>
<td><strong>Shigellosis</strong></td>
<td>23</td>
<td>17</td>
<td>+35%</td>
</tr>
<tr>
<td><strong>Giardiasis</strong></td>
<td>71</td>
<td>80</td>
<td>-11%</td>
</tr>
<tr>
<td><strong>Cryptosporidiosis</strong></td>
<td>114</td>
<td>103</td>
<td>+11%</td>
</tr>
<tr>
<td><strong>Hepatitis A</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Animal Rabies</strong></td>
<td>15</td>
<td>23</td>
<td>-35%</td>
</tr>
<tr>
<td><strong>Tularemia</strong></td>
<td>11</td>
<td>7</td>
<td>+57%</td>
</tr>
<tr>
<td><strong>Rocky Mountain Spotted Fever</strong></td>
<td>8</td>
<td>3</td>
<td>+167%</td>
</tr>
<tr>
<td><strong>Malaria (imported)</strong></td>
<td>4</td>
<td>4</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Hantavirus Pulmonary Syndrome</strong></td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Lyme disease</strong></td>
<td>10</td>
<td>4</td>
<td>+150%</td>
</tr>
<tr>
<td><strong>West Nile Virus disease</strong></td>
<td>55</td>
<td>101</td>
<td>-46%</td>
</tr>
<tr>
<td><strong>Legionellosis</strong></td>
<td>9</td>
<td>5</td>
<td>+80%</td>
</tr>
<tr>
<td><strong>Zika</strong></td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Additional reports include: Brucellosis (1); Chicken Pox (15); Coccidioidomycosis (4); CRE (17); Cyclosporiasis (4); Ehrlichiosis (1); Hep B, chronic (31); Hep C (370); MRSA, invasive (86); Q fever (6); Vibriosis (8).