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# State of Wyoming

# Department of Health

## 2017 Integrated Epidemiologic Profile for Communicable Diseases

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**Director**

**May 7, 2018**

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## 2017 Integrated Epidemiologic Profile for Communicable Diseases

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# Executive Summary

The Wyoming Department of Health Communicable Disease Unit works to create a healthier Wyoming by making resources for communicable diseases accessible, available, and acceptable to persons in Wyoming. The data presented in this document are used to drive prevention and treatment efforts in the state.

As of December 31, 2017, 312 individuals were known to be living with HIV in Wyoming. Of these cases, over 69% were White, 16% were of Hispanic ethnicity (any race), and 9% were Black/African American. Overall, 79% were male.

By transmission category, nearly 50% were men who have sex with men (MSM), 12% reported injection drug use (IDU), and approximately 10% were MSM who also reported IDU (MSM/IDU). Thirteen percent (13%) of individuals had a transmission category of heterosexual sex only. Cases among MSM have continually accounted for the largest number of HIV cases diagnosed in Wyoming. From 2011 through 2015, 57% of all newly diagnosed cases among males were MSM or MSM/IDU.

In recent years (2013-2017), individuals aged 25-34 years represented the largest group newly diagnosed with HIV infection, accounting for 36% of all cases. Pediatric HIV infection remains low in Wyoming with only two cases reported during this time period. Between 2013 and 2017, 13% of newly diagnosed cases of HIV infection were female; 67% of which reported heterosexual sex as their only risk.

Chlamydia rates decreased from 2013 (411 cases per 100,000 population) to 2017 (365 cases per 100,000 population). Females accounted for more cases than males annually since 2013 in Wyoming. The highest rate of infection occurs in individuals aged 15-24 years. The rate of gonorrhea infection increased fivefold from 2013 to 2017. In 2017, females had a higher rate of infection than males, as did those aged 15-24 and 25-34 years. Niobrara, Fremont, and Laramie counties experienced the highest rates of infection in 2017.

The number of hepatitis B cases decreased from 2016 to 2017, as did reported chronic hepatitis C cases. Males had a higher rate of hepatitis C infection than females from 2013-2017. Coinfection with HIV and hepatitis is not uncommon. In Wyoming, 6.4% of HIV infected persons are known to be infected with hepatitis C, and 3.2% are known to be coinfected with hepatitis B.

Active tuberculosis disease (TB) has remained low in Wyoming ranging from zero to four cases annually from 2013 through 2017. The rate in Wyoming has remained lower than that of the U.S. and has met the Healthy People 2020 goal of maintaining a case rate below 1.0/100,000 population.

# Table of Contents

# List of Figures

# List of Tables

# Introduction

This report was created to provide an overview of HIV, STDs, TB, and viral hepatitis B and C in Wyoming. This report will further guide Communicable Disease Prevention and Treatment Program initiatives.

There are seven sections in this report. Section one describes the demographics and economics of Wyoming. Section two provides characteristics relating to HIV/AIDS cases in Wyoming as well as trends of HIV infection over time. Section three addresses the types of HIV prevention and HIV services available in Wyoming. Section four provides characteristics of chlamydia, gonorrhea, syphilis, and viral hepatitis B and C cases in Wyoming. Section five describes both active tuberculosis disease and latent tuberculosis infection in Wyoming. Section six addresses co-infection of HIV with other STDs, TB, and viral hepatitis to include Wyoming specific statistics. Finally, section seven provides characteristics of high risk populations in the state.

In Wyoming, HIV became a reportable disease in 1989. As of December 31, 2017 a total of 312 persons are reported to live in Wyoming with an HIV or AIDS diagnosis. All HIV/AIDS cases are reported to the Communicable Disease Surveillance Program where demographic information and risk factors are obtained. Newly diagnosed patients are referred to Disease Intervention Specialists for partner services and linkage to care.

Other communicable diseases such as chlamydia, gonorrhea, syphilis, hepatitis B, hepatitis C, and active TB are also reportable diseases in the state of Wyoming. Chlamydia is consistently the most frequently reported notifiable communicable disease in Wyoming and the U.S. Laboratories and providers are required to report cases of STDs to include demographic information on the patient, treatment, and risk factor information. The STD data in this report are provided for the last five years (2013-2017).

This report has several weaknesses:

- Actual numbers of STD, hepatitis, and HIV cases are estimated to be higher than reported due to lack of symptoms in individuals who, therefore, do not seek testing;
- Risks and transmission routes are self-reported and therefore may be biased;
- Small numbers of tuberculosis cases in Wyoming make case rates unstable and difficult to interpret; and
- A new HIV, hepatitis B, or hepatitis C diagnosis may not represent a newly acquired infection.

# Section 1- Wyoming Demographics and Economics

**Population:** According to the US Census Bureau, the total population of Wyoming was estimated to be 583,029 in 2016. County populations ranged from 2,498 (Niobrara County) to 96,459 (Laramie County). There are no Metropolitan Statistical Areas in Wyoming. The two largest populated cities in Wyoming are Cheyenne (62,879) and Casper (59,397).

**Table 1. Population size by county, Wyoming, 2016**[1]

| County | Population (%) |
|---|---|
| Albany | 37,836 (6.6) |
| Big Horn | 11,931 (2.1) |
| Campbell | 48,473 (8.4) |
| Carbon | 15,696 (2.7) |
| Converse | 14,223 (2.4) |
| Crook | 7,284 (1.3) |
| Fremont | 40,683 (7.1) |
| Goshen | 13,546 (2.3) |
| Hot Springs | 4,781 (0.8) |
| Johnson | 8,572(1.5) |
| Laramie | 96,459 (16.7) |
| Lincoln | 18,543 (3.2) |
| Natrona | 80,871 (14.2) |
| Niobrara | 2,498 (0.4) |
| Park | 29,083 (5.0) |
| Platte | 8,740 (1.5) |
| Sheridan | 29,924 (5.2) |
| Sublette | 10,032 (1.7) |
| Sweetwater | 44,812 (7.8) |
| Teton | 22,623 (4.0) |
| Uinta | 20,893 (3.6) |
| Washakie | 8,351 (1.4) |
| Weston | 7,175 (1.3) |
| **Total** | **583,029 (100)** |

**Demographic Composition:** The racial and ethnic composition of Wyoming's population in 2016 was estimated by the US Census Bureau to be 91.2% White, 1.1% Black, 0.9% Asian, 2.2% American Indian/Alaska Native, and 0.1% Native Hawaiian/Pacific Islander. Persons of Hispanic ethnicity (any race) comprised 9.7% of the state's population.[1]

**Age and Sex:** The 2016 Census estimates indicated 51.1% of the population was male and 48.9% of the population was female. Individuals under the age of 18 comprised 23.8% of the population while those over the age of 65 represented 13.8% of the population. The median age of Wyomingites was 36.8 years in 2016.[1]

**Table 2. Population by age group, Wyoming, 2016**[1]

| Age Group | Total | |
|---|---|---|
| | No. | % |
| **Under 5** | 37,967 | 6.5 |
| **5-9** | 40,250 | 6.9 |
| **10-14** | 38,635 | 6.6 |
| **15-19** | 36,900 | 6.3 |
| **20-24** | 42,215 | 7.2 |
| **25-34** | 81,662 | 14.0 |
| **35-44** | 70,703 | 12.1 |
| **45-54** | 73,360 | 12.6 |
| **55-64** | 80,630 | 13.8 |
| **65+** | 80,707 | 13.8 |
| **Total** | 575,251 | 100.0 |

**Poverty, Income and Education:** In 2016, 11.1% of the population of Wyoming was living below the poverty line compared to 11.3% in 2011. The average per capita income was $29,381 while the average household income was $58,895. In 2016, 93.7% of individuals aged 25 years or older had at least a high school diploma while 29.3% of Wyoming residents had a Bachelor's degree or higher.[1]

**Public Health Regional Structure:** Each of Wyoming's counties has at least one public health office. Most of these offices offer services including, but not limited to, child/adult immunizations, HIV counseling and testing, STD and hepatitis testing, tuberculosis screening, and communicable disease case management.

**Health Indicators:** As reported by *America's Health: State Health Rankings, 2017,* Wyoming ranked 26th in the nation. *America's Health Rankings* is a comprehensive, multi-dimensional, yearly analysis of the relative healthiness of the American population by state. Information is supplied by sources which include the U.S. Department of Health and Human Services, Commerce, Education, Labor, and the National Safety Council.[2]

Wyoming strengths included a low violent crime rate (244 offenses per 100,000 population), low prevalence of diabetes (8.3% of adults), low cancer death rate (170.3 per 100,000 population), high public health funding ($110.00 per person), low levels of air pollution (3.8 micrograms of fine particulate per cubic meter), and a low percentage of children in poverty (13.9%).

Challenges included high occupational fatalities (12.6 deaths per 100,000 workers), a high prevalence of uninsured persons (11.5%), limited primary care physicians (105.7 per 100,000 population), and the percentage of adults who smoke (18.9%). [2]

# Section 2 – HIV in Wyoming

HIV is a virus that can damage a person's immune system by destroying CD4+ cells which aid the body in fighting diseases. Many people infected with HIV are unaware of their infection because symptoms may be absent. If symptoms do arise they may consist of fever, headache, body ache, and other flu-like symptoms. When a person's immune system becomes so damaged that it can no longer fight off certain diseases and opportunistic infections, the individual is diagnosed with AIDS – now called HIV Stage 3. The Wyoming Department of Health recommends all individuals between the age of 15 and 65 years get tested for HIV at least once in their lifetime and more often with risks. According to the 2016 Behavioral Risk Factor Surveillance Survey, 38.5% of Wyoming's population aged 18-64 years has been tested for HIV at least once in their lifetime, a 6.9% increase from 2014.[3]

**Incidence**

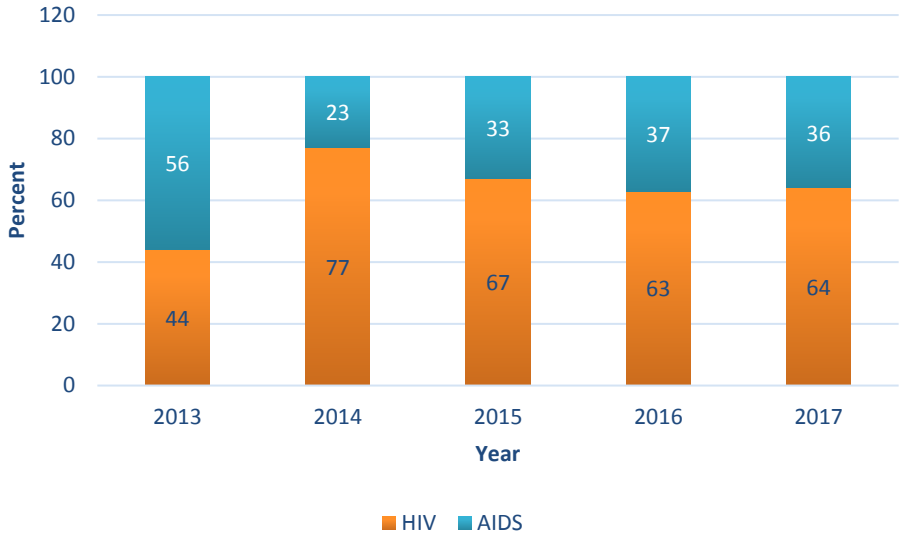
From 2013-2017, 77 people were newly diagnosed with HIV. Of those diagnosed, 36% were considered HIV Stage 3. Characteristics of newly diagnosed cases are presented in Table 3.

**Table 3. Newly diagnosed HIV cases by selected characteristics*, Wyoming, 2013-2017**

| | Number (%) |
|---|---|
| **Diagnosis** | |
| HIV | 49 (64) |
| HIV Stage 3 (AIDS) | 28 (36) |
| **Gender** | |
| Male | 67 (87) |
| Female | 10 (13) |
| **Age Group** | |
| <15 | 2 (3) |
| 15-24 | 12 (16) |
| 25-34 | 28 (36) |
| 35-44 | 16 (21) |
| 45-54 | 14 (18) |
| 55+ | 5 (6) |
| **Race/Ethnicity** | |
| White (Not Hispanic) | 53 (69) |
| Black (Not Hispanic) | 10 (13) |
| Hispanic (Any Race) | 12 (16) |
| Other | 2 (3) |
| **Transmission** | |
| MSM | 32 (42) |
| IDU | 6 (8) |
| MSM & IDU | 5 (6) |
| Heterosexual Contact | 14 (18) |
| Other/Unknown | 17 (22) |
| **Total** | **77 (100)** |

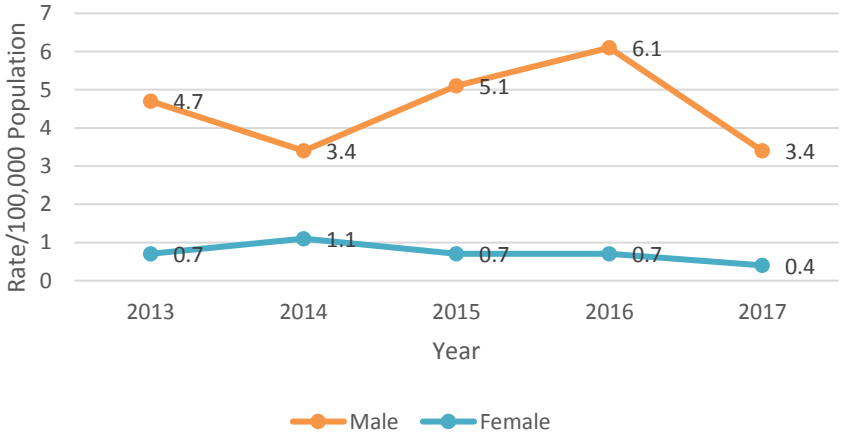
As shown in Figure 1, 44% of newly diagnosed cases were classified as HIV and 56% were classified as AIDS in 2013. From 2013-2017, this number improved to 64% diagnosed as HIV and 36% of newly diagnosed cases were classified as AIDS. This may indicate that individuals are getting tested at an earlier stage of infection than in previous years.

**Figure 1. Proportional distribution of newly diagnosed HIV cases by stage of infection, Wyoming, 2013-2017**



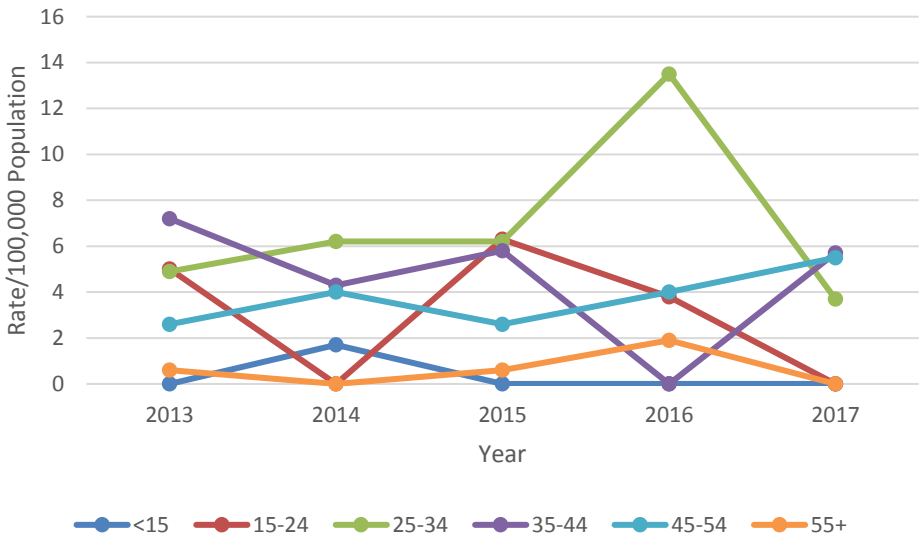

By gender, males had a higher rate of infection from 2013-2017. The rate of infection among females remained stable from 2013-2016 and decreased from 2016 to 2017.

**Figure 2. Newly diagnosed HIV case rate per 100,000 population, Wyoming, 2013-2017**



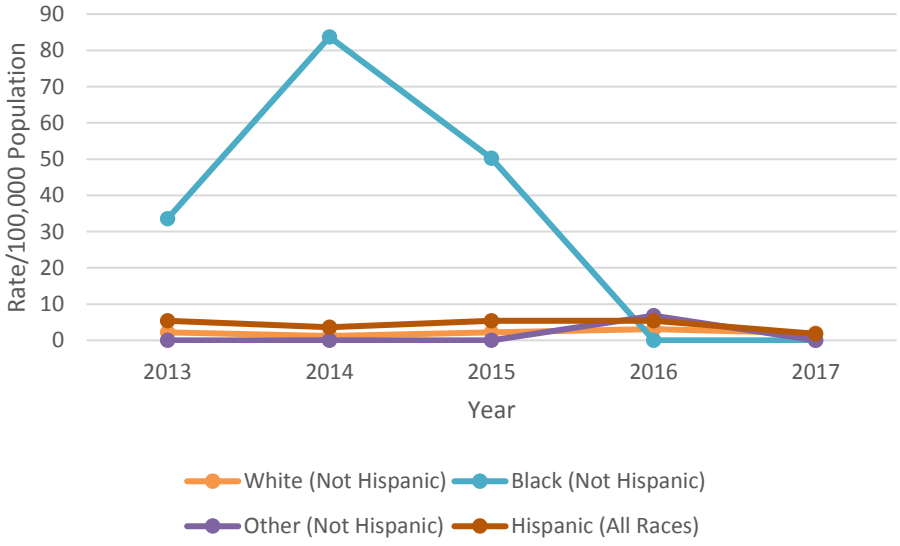
The 35-44 and 45-54 year old age groups had the highest rate of infection in 2017. These two age groups were the only two age groups that had a rate increase from 2016 to 2017.

**Figure 3. Newly diagnosed HIV case rate per 100,000 population by age group, Wyoming 2013-2017**



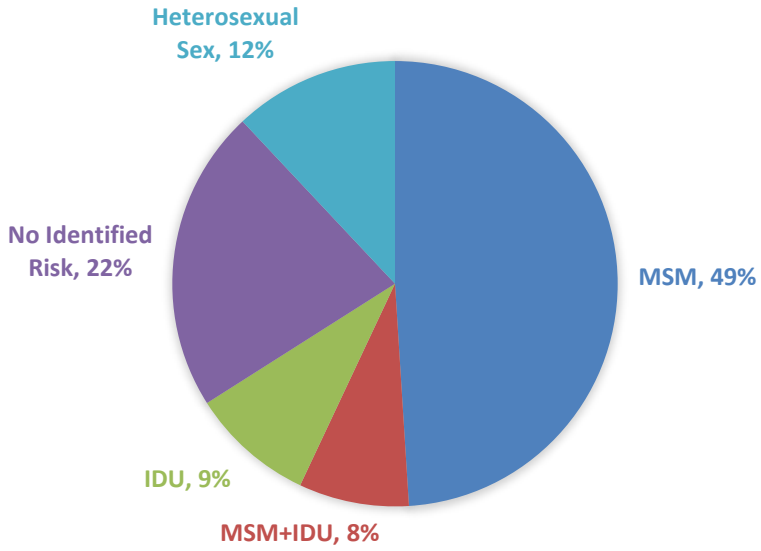

A racial disparity exists among newly diagnosed HIV cases. Non-Hispanic Whites make up 91.2% of Wyoming's population and 69% of cases from 2013-2017, whereas non-Hispanic Blacks only account for 1.1% of Wyoming's population but 13% of cases.

**Figure 4. Newly diagnosed HIV case rate per 100,000 population by race/ethnicity, Wyoming, 2013-2017**



Cases of HIV among MSM represent the largest proportion of cases among men from 2013-2017 (49%). Men also reported heterosexual sex (12%), IDU-only (9%), and both IDU and MSM (8%). Approximately 22% of men diagnosed from 2013-2017 had no risk factor identified.

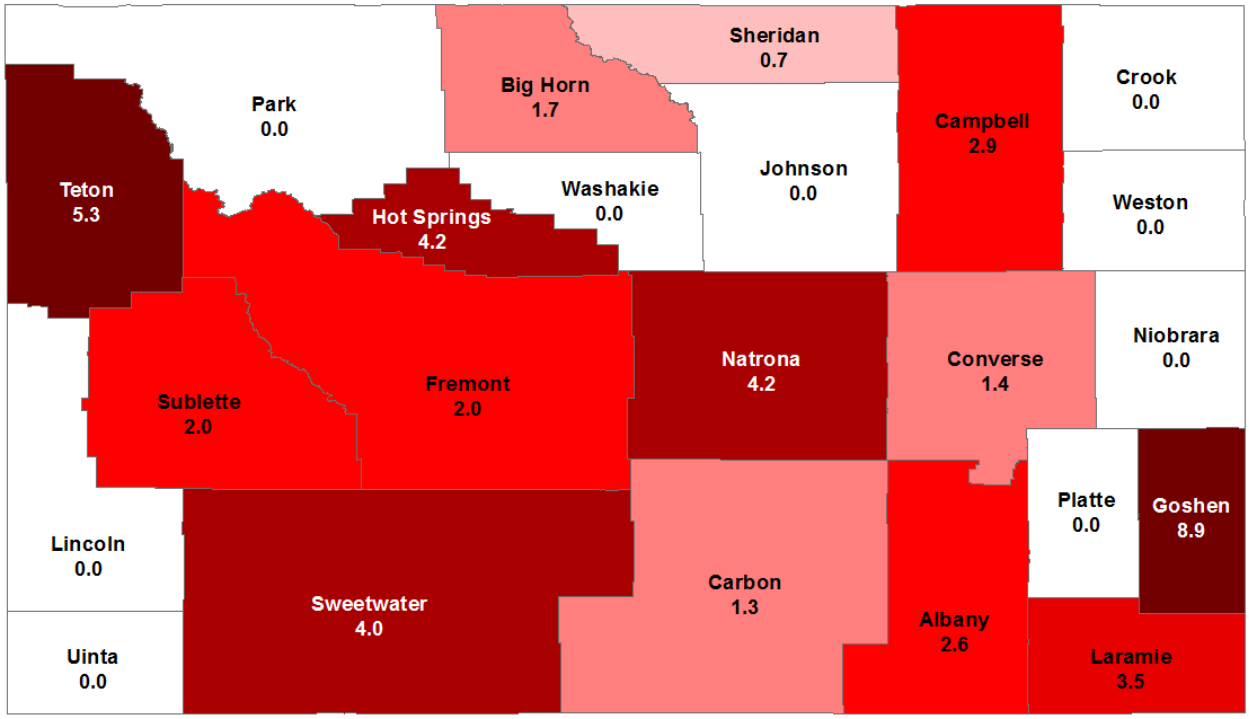
**Figure 5. Newly diagnosed HIV cases among males by transmission category, Wyoming, 2013-2017**




From 2013-2017, nine adult females were reported with newly diagnosed HIV infection in Wyoming. Cases attributed to heterosexual sex accounted for the majority of cases among (67%). For the remaining 33%, no risk was identified. No females reported injection drug use during this time period.

Goshen County had the highest rate of newly diagnosed cases from 2013 -2017, followed by Teton County. Nine of the twenty-three counties in Wyoming reported no new cases of HIV (Figure 6).

**Figure 6. Five year average newly diagnosed HIV case rate per 100,000 population by county, Wyoming, 2013-2017**

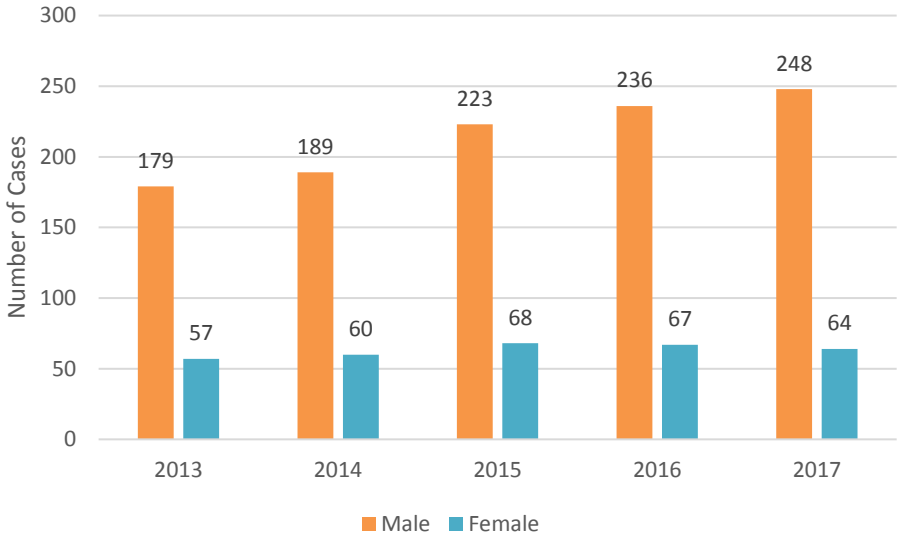



## Prevalence

Prevalence includes persons ever diagnosed with HIV residing in Wyoming. In 2017, there were 312 prevalent cases in Wyoming. Of those, 45% were classified as HIV and 55% were classified as

AIDS. The number of cases has increased in males and females since 2013, and declined in females from 2016 to 2017. Of the 312 cases in 2017, 79% were male.

**Figure 7. HIV prevalence by gender, Wyoming, 2013-2017**




Most prevalent cases were White (69%), between the age of 45 and 54 years (28%), and male (79%).

**Table 4. HIV prevalence by demographic characteristics, Wyoming, 2013-2017**

| Status | HIV No. (%) | HIV Stage 3 (AIDS) No. (%) |
|---|---|---|
| **Total** | **141 (100%)** | **171 (100%)** |
| **Gender** | | |
| Male | 106 (75%) | 142 (83%) |
| Female | 35 (25%) | 29 (17%) |
| **Current Age** | | |
| <15 | 8 (6%) | 0 (0%) |
| 15-24 | 7 (5%) | 2 (1%) |
| 25-34 | 30 (21%) | 12 (7%) |
| 35-44 | 33 (23%) | 36 (21%) |
| 45-54 | 37 (26%) | 50 (29%) |
| 55+ | 26 (18%) | 71 (42%) |
| **Race/Ethnicity** | | |
| White | 99 (70%) | 115 (67%) |
| Black | 16 (11%) | 12 (7%) |
| Hispanic (all races) | 18 (13%) | 32 (19%) |
| Asian | 1 (1%) | 0 (0%) |
| Native Hawaiian/Pacific Islander | 0 (0%) | 1 (1%) |
| American Indian/Alaska Native | 5 (4%) | 7 (4%) |
| Multiple Race | 2 (1%) | 4 (2%) |

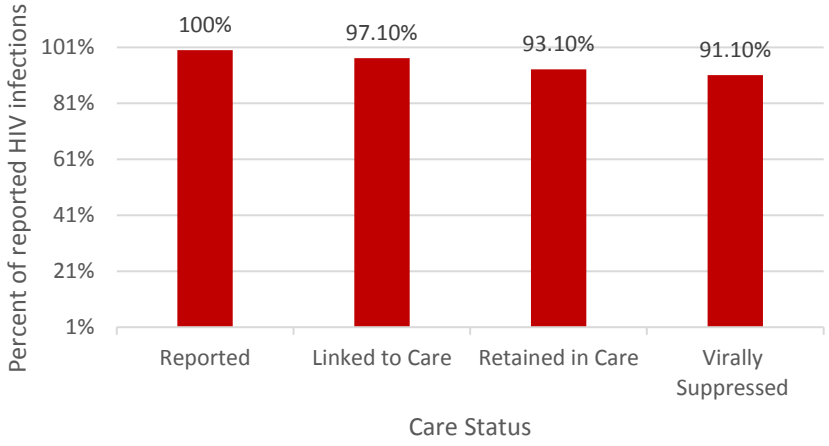
Reported transmission among male cases residing in Wyoming was attributed to MSM (64%) followed by those who were MSM and IDU (13%). Heterosexual sex was the most common risk reported among females (48%)(Table 5).

**Table 5. HIV prevalence by gender and reported exposure category as of December 31, 2017**

| Status | HIV No. (%) | AIDS No. (%) |
|---|---|---|
| **Male** | **101 (100%)** | **142 (100%)** |
| MSM | 64 (63%) | 91 (64%) |
| IDU | 11 (11%) | 11 (8%) |
| MSM and IDU | 12 (12%) | 19 (13%) |
| Heterosexual Contact | 3 (3%) | 7 (5%) |
| No Identified Risk | 10 (10%) | 13 (9%) |
| Other | 1 (1%) | 1 (1%) |
| **Female** | **32 (100%)** | **29 (100%)** |
| IDU | 6 (19%) | 10 (34%) |
| Heterosexual Contact | 17 (53%) | 12 (41%) |
| No Identified Risk | 7 (22%) | 6 (21%) |
| Other | 2 (6%) | 1 (3%) |

The HIV Care Continuum includes the steps a person with HIV goes through from initial diagnosis to successful treatment. The continuum includes cases reported, those who were linked to care after diagnosis, those who remained in care in 2017, and those in care who had a suppressed viral load. Retained in care is defined as having at least one CD4 test or viral load test conducted within the year. Annually, the Communicable Disease Unit assesses and investigates cases that are presumed to be out of care in order to re-engage those who need assistance. The HIV Care Continuum shown in Figure 10 was created after 2017 out of care investigations were completed. Wyoming has a high percentage of cases linked and retained in care. Most of those retained in care had a suppressed viral load in 2017 (91.1%).

**Figure 8. HIV care continuum, Wyoming, 2017**



Wyoming has had 178 deaths since HIV became reportable in 1989 corresponding to a case fatality rate of 39%.

# Section 3- Wyoming HIV Services & Prevention

The Communicable Disease Treatment Program is comprised of the Ryan White Part B/ADAP (AIDS Drug Assistance Program), Ryan White Part C-EIS (Early Intervention Services) and the Housing Opportunities for Persons with AIDS (HOPWA) programs. A combined application serves for enrollment for any services provided through federal and state dollars intended for HIV-positive clients.

**RYAN WHITE CARE ACT**

According to the Health Resources and Services Administration (HRSA), the populations most impacted by the HIV epidemic are those at high risk for poverty, those who lack health insurance, and those who are disenfranchised from the health care system. In August 1990, Congress enacted the Ryan White CARE Act to improve the availability of care for low-income, uninsured, and underinsured individuals and families affected by HIV. The CARE Act legislation is divided into distinct program areas: Part A, Part B, Part C, Part D, AIDS Education and Training Centers (AETC), and Dental Reimbursement Program (DRP).

The State of Wyoming, through various grants and grantees, currently receives Ryan White CARE Act funding under Part B, Part C, and AETC.

**HOPWA**

Housing Opportunities for Persons with AIDS, more commonly referred to as HOPWA, is a program funded by the U.S. Department of Housing and Urban Development (HUD). The program is designed to help low-income individuals who are living with HIV/AIDS to stabilize their housing, which is a key factor contributing to health and well-being. Examples of HOPWA services include rental assistance, utility assistance, mortgage assistance, housing supportive services, and case management.

The purpose of the Communicable Disease Treatment Program funding is to improve the quality, availability, and organization of health care and supportive services for individuals and families living with HIV. In addition, the funding provides access to needed pharmaceuticals through the AIDS Drug Assistance Program (ADAP), which is a component of Part B.

In 2017, 194 individuals, or 62% of prevalent cases, were enrolled in the Communicable Disease Treatment Program in Wyoming. The program spends approximately $125,000 per month providing prescription medications, medical care, diagnostic laboratory testing, and other supportive services such as housing and transportation.

**Table 6. Characteristics of persons enrolled in Communicable Disease Treatment Program, Wyoming, 2017**

| | Persons Enrolled | |
|---|---|---|
| | # | % |
| **Gender** | | |
| Male | 152 | 78 |
| Female | 41 | 21 |
| Other | 1 | 1 |
| **Race** | | |
| White | 144 | 74 |
| Black | 14 | 7 |
| Other | 3 | 2 |
| American Indian /Alaska Native | 6 | 3 |
| Hispanic (Any race) | 27 | 14 |
| **TOTAL** | 194 | 100 |

**HIV PREVENTION**

The Wyoming Department of Health Communicable Disease Prevention Program through a cooperative agreement with the Centers for Disease Control and Prevention (CDC) provides low-cost or free testing at 42 clinics throughout the state. Prevention efforts in Wyoming include the knowyo.org campaign which provides HIV, STD, and hepatitis B and C education, Knowyo vouchers for low- or no-cost HIV, STD, and hepatitis B and C testing, and a map of clinics which accept the vouchers and provide testing throughout the state. The Communicable Disease Prevention Program also provides free testing events for special occasions and HIV awareness days. A total of 3,371 people were tested through the www.knowyo.org voucher program in 2017. Table 7 lists the characteristics of individuals who were tested for HIV through the knowyo.org campaign or testing events in Wyoming.

**Table 7. HIV tests performed by HIV Prevention Program funded sites, Wyoming, 2017**

| | Persons Tested | |
|---|---|---|
| | # | % |
| **Gender** | | |
| Male | 1640 | 49 |
| Female | 1730 | 51 |
| Transgender F to M | 0 | 0 |
| Transgender M to F | 0 | 0 |
| Unknown/Other | 1 | <1 |
| **Race** | | |
| White | 2581 | 75 |
| Black | 104 | 3 |
| Asian | 41 | 1 |
| American Indian/Alaska Native | 40 | 1 |
| Native Hawaiian/Pacific Islander | 11 | <1 |
| Unknown/Other | 199 | 6 |
| Hispanic | 458 | 14 |
| **Risks** | | |
| Sex with male | 1773 | 53 |
| Sex with female | 1264 | 37 |
| Sex with HIV+ | 10 | <1 |
| Sex with IDU | 40 | 1 |
| Sex with MSM | 13 | <1 |
| Used injection drugs | 225 | 7 |
| Shared injection drugs | 20 | <1 |

The Communicable Disease Prevention Program also provides condom dispensers and condoms to clinics, bars, movie theaters, and other locations to make condoms more accessible and available to Wyoming residents. In 2016, a condom mailer program was implemented which provides condoms through direct mail to people who would otherwise be unable to access them. In 2017, the Program supplied 209 condom dispensers for use across Wyoming and over 339,000 condoms were distributed.

The Communicable Disease Prevention Program partners with the Wyoming Department of Youth and Young Adult Health Program to deliver the Personal Responsibility Education Program (WyPREP). The goals of this comprehensive sex education program are to delay initiation of sexual activity, prevent teen pregnancy, and prevent STDs, including HIV. The program teaches youth skills to avoid risky sexual behavior, which translate to avoiding drugs, alcohol, and bullying. The Wyoming program includes adult preparation subjects intended to increase parent/child communication, negotiation and refusal skills, and encourage youth to think about the effects that being sexually active may have on their lives. WyPREP encourages abstinence and also teaches youth about condoms and contraceptives should they choose to become sexually active.

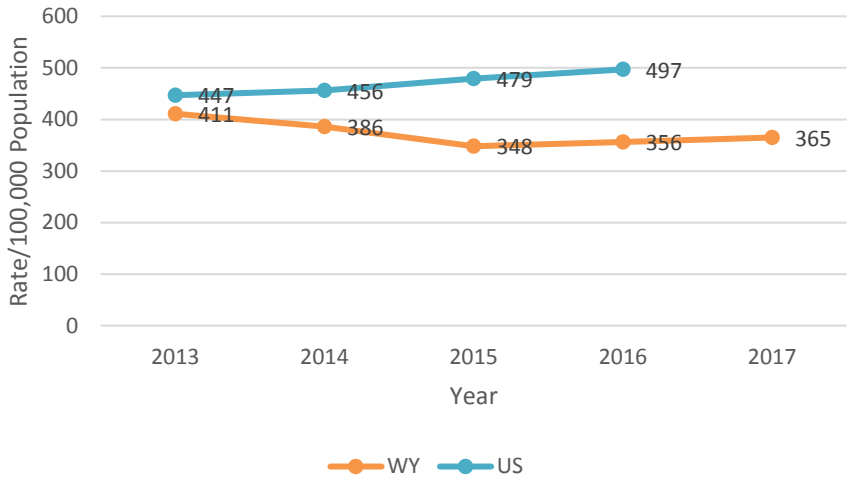
# Section 4- Sexually Transmitted Diseases and Hepatitis

## CHLAMYDIA

Chlamydia is a sexually transmitted bacterial infection caused by *Chlamydia trachomatis.* Approximately 75% of females and 50% of males infected with chlamydia show no symptoms. If symptoms do occur, they present within one to three weeks after exposure. Symptoms may include abnormal discharge from the infected site, burning during urination, itching, and pain during intercourse. If left untreated chlamydia can cause pelvic inflammatory disease (PID). Symptoms of PID can include abdominal pain, fever, and chronic pelvic pain. PID can damage the fallopian tubes and cause infertility. Individuals infected with chlamydia are at greater risk for an HIV infection.

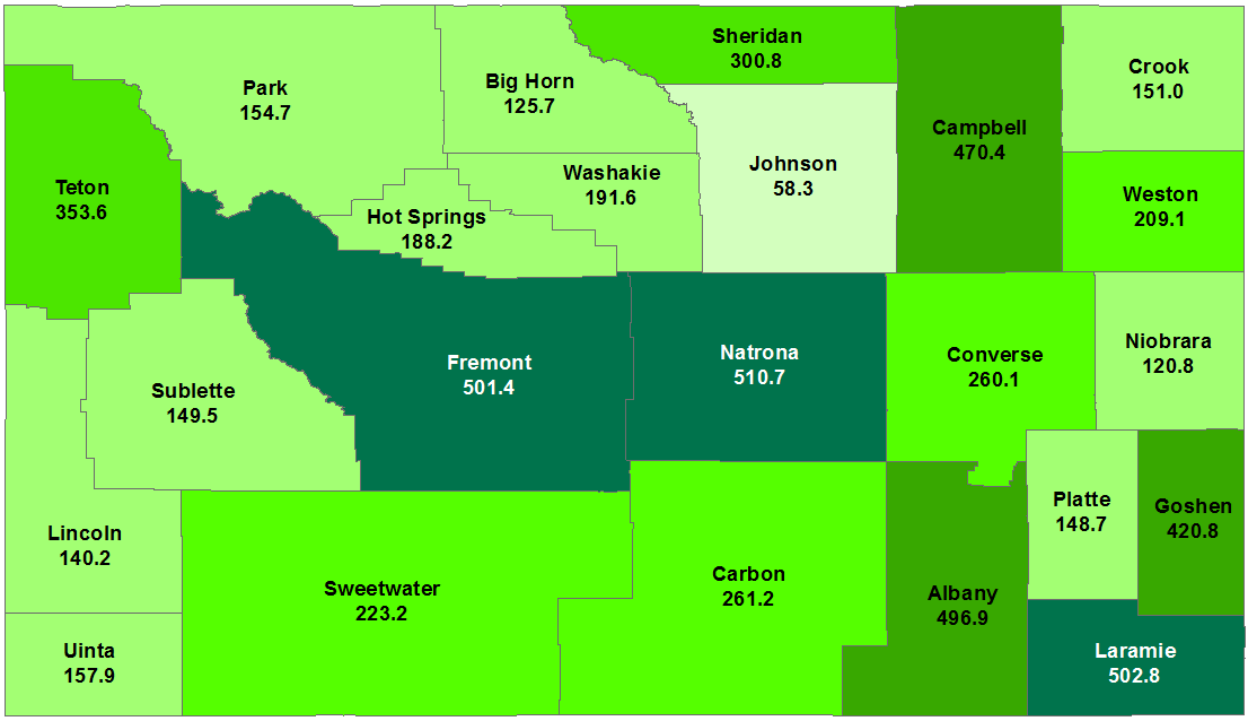
Figure 9 displays the rate of chlamydia in Wyoming against the rate of chlamydia in the United States. National data for 2017 have not yet been published. From 2015 to 2017 the Wyoming rate increased but remained below the national rate in 2016.[4-7]

**Figure 9. Chlamydia rate per 100,000 population, Wyoming and United States, 2013-2017**[4-7]



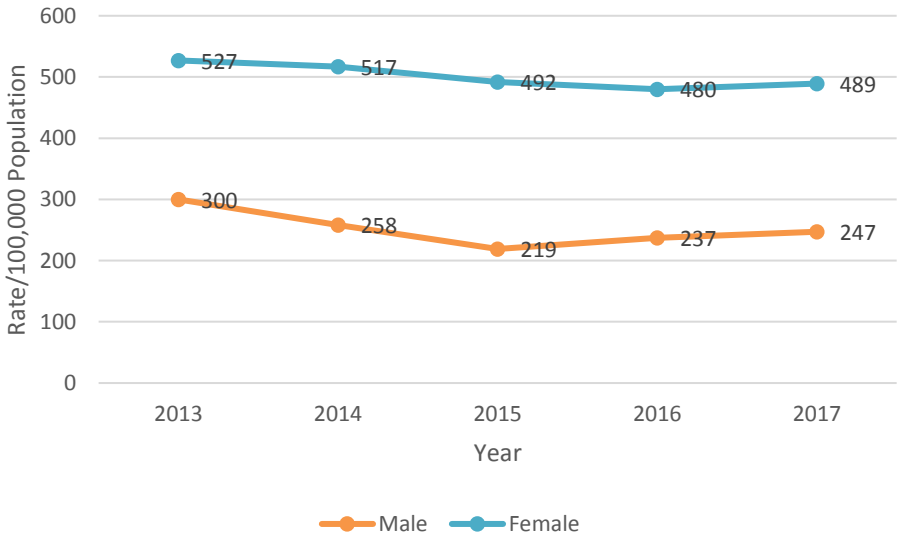

Natrona County reported the highest rate of infection in 2017, followed by Laramie County and Fremont County. All counties reported at least one chlamydia infection in 2017.

**Figure 10. Chlamydia rate per 100,000 population by county, Wyoming, 2017**



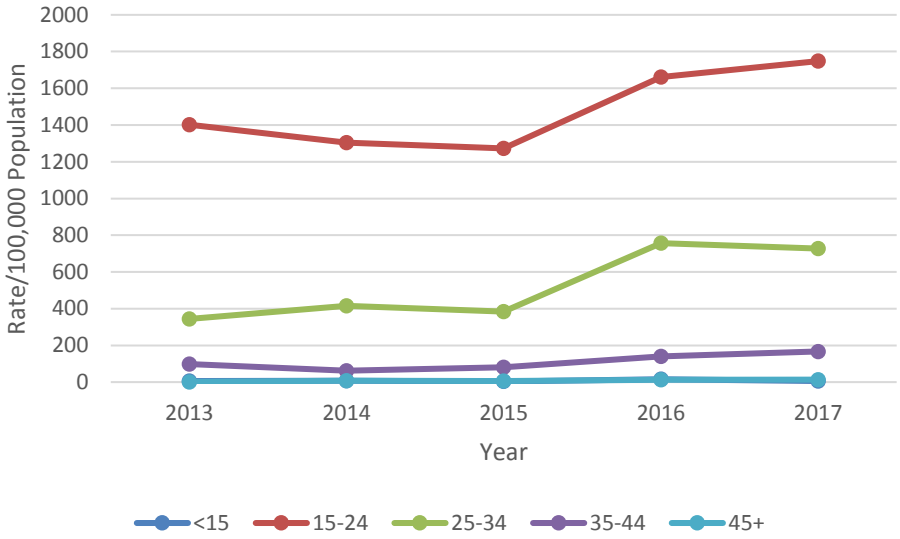

Reported chlamydia cases have increased in Wyoming since 2015. Females had a higher rate of infection than males from 2013-2017. In 2017, females accounted for 65% of all reported chlamydia infections.

**Figure 11. Chlamydia rate per 100,000 population by gender, Wyoming, 2013-2017**



The highest rates of chlamydia infection are found in those aged 15-24 years. In 2017, those in the 15-24 year old age group had twice the rate of chlamydia than 25-34 year olds. The rate of infection in all age groups increased from 2013 to 2017.

**Figure 12. Chlamydia rate per 100,000 population by age group, Wyoming, 2013-2017**

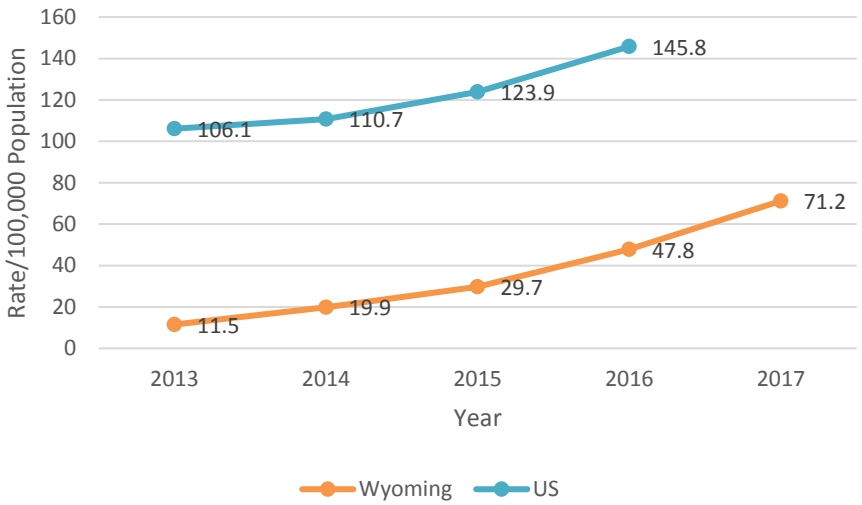



## GONORRHEA

Gonorrhea is a bacterial infection caused by *Neisseria gonorrhoeae* that is transmitted by unprotected oral, anal, and/or vaginal sex. Symptoms of gonorrhea may include painful urination, discharge from the infected site, itching or burning at the infected site, and pain during intercourse. Some people with gonorrhea may not have any symptoms. Complications of gonorrhea include pelvic inflammatory disease, epididymitis, and infertility.

The gonorrhea rate in Wyoming increased fivefold from 2013 (11.5/100,000) to 2017 (71.2/100,000) but remained lower than the U.S. rate. The Communicable Disease Surveillance Program has detected outbreaks of gonorrhea in several counties over the past five years including Laramie, Fremont, Natrona, and Campbell. The most common risks reported among those with gonorrhea include not using condoms, multiple partners, and anonymous partners.

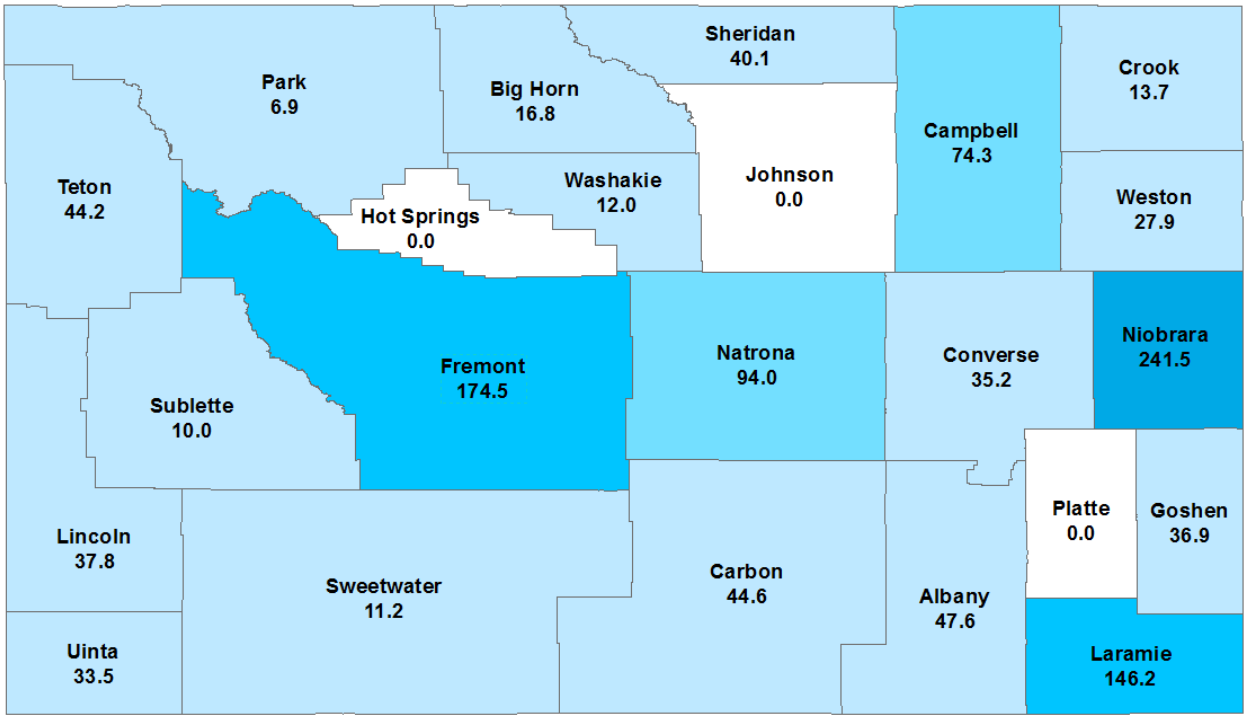
**Figure 13. Gonorrhea rate per 100,000 population, Wyoming and United States, 2013-2017*[4-7]**




*Rate of infection for the US in 2017 was unavailable at the time of this report.

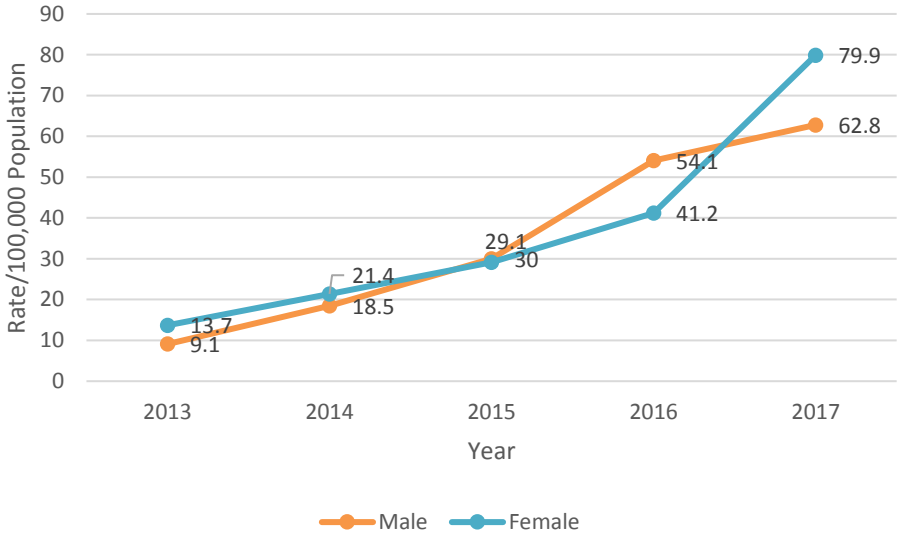
Niobrara, Fremont, and Laramie Counties reported the highest rate of infection in 2017 while Hot Springs, Johnson, and Platte Counties reported no cases.

**Figure 14. Gonorrhea rate per 100,000 population by county, Wyoming, 2017**



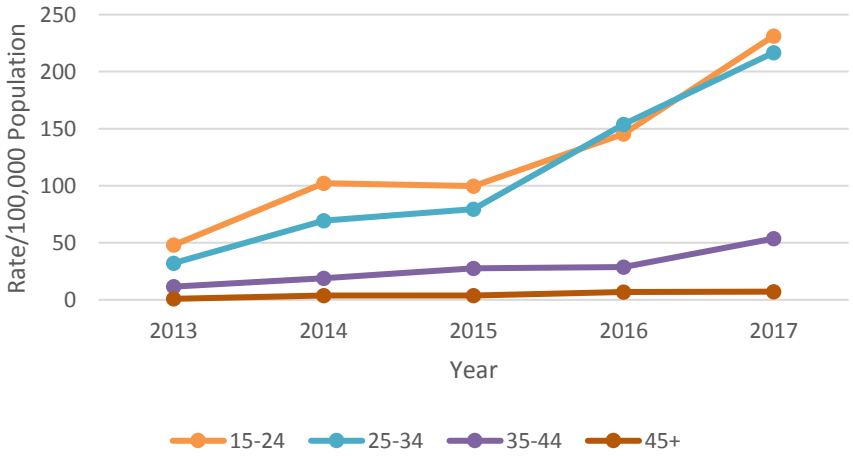
Gonorrhea infection in males and females increased from 2013 to 2017. The sharp increase and higher rate among females in 2017 may indicate that transmission is occurring most frequently among those having heterosexual sex. This contradicts national trends which show the largest increase occurring among males suggesting increased transmission among gay and bisexual men.

**Figure 15. Gonorrhea rate per 100,000 population by gender, Wyoming, 2013-2017**




Individuals aged 15-24 years had the highest rate of infection in 2017, followed by those aged 25-34 years. The rate of infection increased in all age groups from 2013-2017. The most notable increase was observed among those aged 25-34 and 15-24 years which increased six-fold and five-fold, respectively.

**Figure 16. Gonorrhea rate per 100,000 population by age group, Wyoming, 2013-2017**



## SYPHILIS

Syphilis is a sexually transmitted bacterial infection caused by the bacterium *Treponema pallidum.* Syphilis is passed from person to person by direct contact with a syphilis sore which are often found on the penis, in the mouth, anus, or vagina. A syphilis infection may increase the chances of acquiring an HIV infection. Many people with syphilis do not notice symptoms. If symptoms do present, a painless sore, or chancre, will develop at the site of infection 10 to 90 days after exposure. This is indicative of the primary stage of syphilis. The chancre may last 3 to 6 weeks and will disappear on its own.

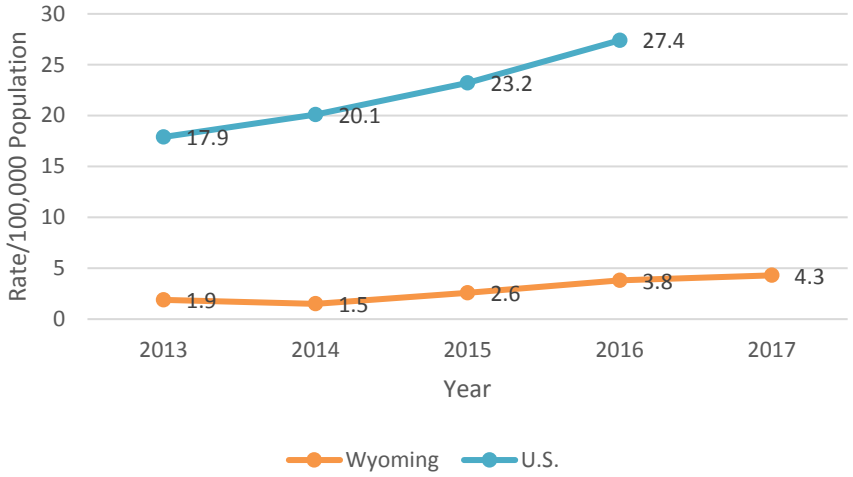
A skin rash or mucous patches indicate the secondary stage of syphilis. The rash can develop on one or more areas of the body and usually does not itch. The rash may develop when the chancre is still present or several weeks after the chancre has disappeared. Other symptoms of secondary syphilis may include fever, alopecia, headaches, weight loss, muscle aches, swollen lymph nodes, or fatigue. Like the chancre, symptoms of secondary syphilis will resolve without treatment.

If left untreated, syphilis may lay dormant in the body for several years. This is called latent syphilis. Untreated syphilis may damage organs and other body parts such as the brain, kidneys, eyes, nerves, blood vessels, bones, joints, and heart. Signs and symptoms of this late stage of syphilis may include difficulty coordinating muscle movements, blindness, dementia, numbness, paralysis, and death.

Syphilis rates are low in Wyoming and screening is recommended for MSM, pregnant women, HIV positive individuals, individuals who are symptomatic, or have a history of incarceration of greater than six months. During 2013-2017, 47 cases of early (primary, secondary, or early latent) syphilis were reported in Wyoming. Males accounted for 83% of early syphilis cases during that time period. Thirty-five late-latent or syphilis of unknown duration cases were reported during the same time period.

The rate of syphilis in the United States increased each year from 2013-2016.[4-7] The rate of syphilis infection in Wyoming increased from 2014 to 2017. Wyoming experienced a higher rate increase (100%) than the U.S. (53%) from 2013 to 2016.

**Figure 17. Syphilis rate per 100,000 population, Wyoming and United States, 2013-2017[*4-7]**




*U.S. data for 2017 has not yet been published

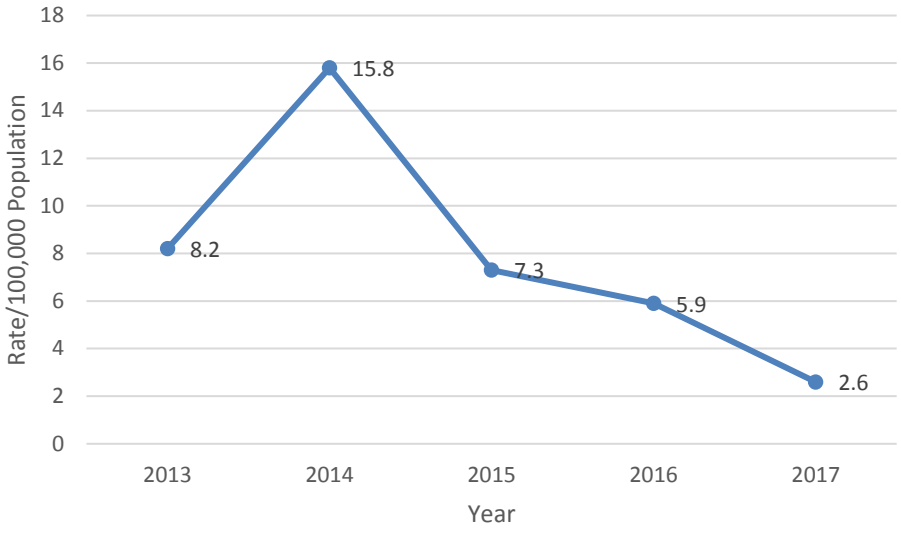
## HEPATITIS B

Hepatitis B is transmitted through infected blood products as well as seminal and vaginal fluids. Risk factors for hepatitis B infection include:

- Infants born to infected mothers
- Sex partners of infected individuals
- Persons infected with an STD
- Men who have sex with men
- Individuals with multiple sex partners
- Injection drug users
- Household contacts of infected individuals
- Individuals in healthcare settings who have experienced a needle stick
- Hemodialysis patients
- Travelers to regions with a hepatitis B antigen prevalence of 2% or greater[8]

There were 15 cases of hepatitis B reported in 2017, a decrease from 2016. Males accounted for 60% of the total reported cases.

**Figure 18. Newly reported hepatitis B rate per 100,000 population, Wyoming, 2013-2017**




The Wyoming Department of Health has identified incarcerated individuals or persons with a history of incarceration as a priority population for hepatitis B vaccination and screening. The Department pays for vaccinations in this population and for any adult who has never before been vaccinated. As of October 2011, all state prisons have initiated mass inmate vaccinations.

## HEPATITIS C

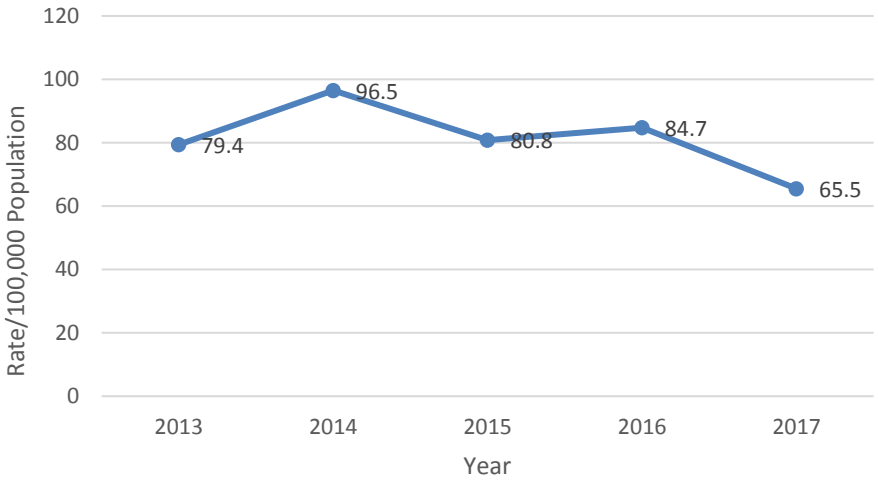
Hepatitis C virus (HCV) is spread primarily through contact with contaminated blood and blood products, but has also recently been documented to be transmitted through sexual activity. Populations at high risk for exposure to hepatitis C include:

- Current or former injection drug users
- Recipients of clotting factor concentrates before the year 1987
- Recipients of blood transfusions or donated organs before July of 1992
- Long-term hemodialysis patients
- Individuals with a known exposure to HCV
- HIV-infected individuals
- Infants born to infected mothers[8,9]

Approximately 75%-85% of individuals newly infected with HCV will develop a chronic infection while the remaining 15%-25% will clear the virus without treatment. Of individuals infected with chronic HCV, 60%-70% will develop chronic liver disease. Therefore, it is recommended that those diagnosed with chronic HCV get vaccinated for HBV and hepatitis A virus to prevent poor medical outcomes from these secondary liver infections.[8]

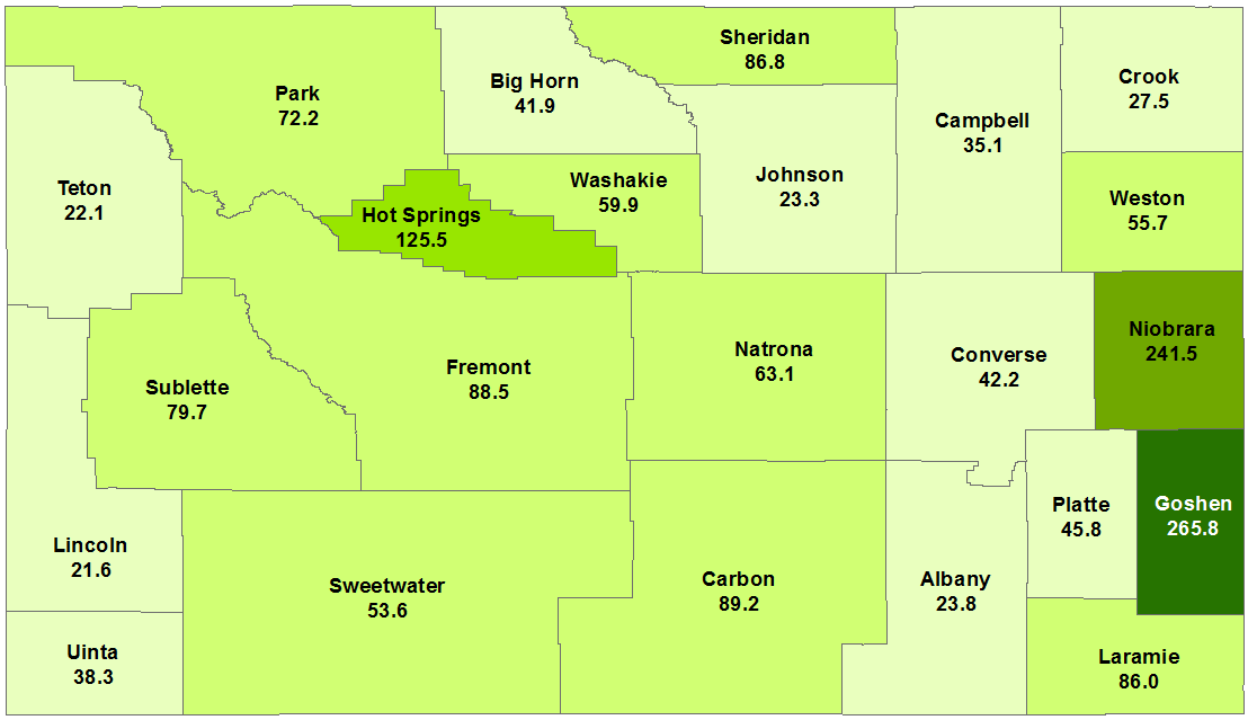
The rate of chronic hepatitis C decreased from 2013 to 2017. The Communicable Disease Unit prioritizes risk ascertainment, risk reduction education, and treatment referrals to those under the age of 36. Injection drug use accounted for 76% of documented risk factors among this population in 2017.

**Figure 19. Newly reported confirmed and probable chronic hepatitis C rate per 100,000 population, Wyoming, 2013-2017**



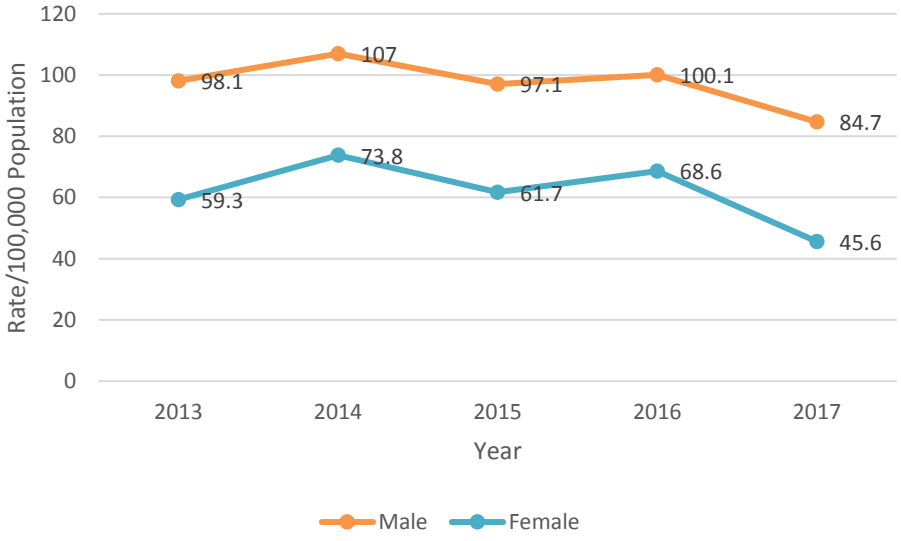

A higher rate of infection is typical for Goshen County where the Wyoming Medium Correctional Institute (WMCI) is located. WMCI is the intake facility for all males incarcerated by the Wyoming Department of Corrections. WMCI screens this population for viral hepatitis C based on risks, request, or symptoms. Niobrara County, which reported the second highest rate of infection, contains the Wyoming Women's Center (WWC) which houses all women incarcerated in Wyoming. WWC also screens their incarcerated population for hepatitis C upon intake. Excluding counties with a correctional intake facility, a high percentage of cases were attributed to injection drug use in 2017 in Park County (33.3%), Sweetwater County (29.2%) and Carbon County (28.6%) (Figure 20).

**Figure 20. Newly reported confirmed and probable viral hepatitis C rate per 100,000 population by county, Wyoming, 2017**



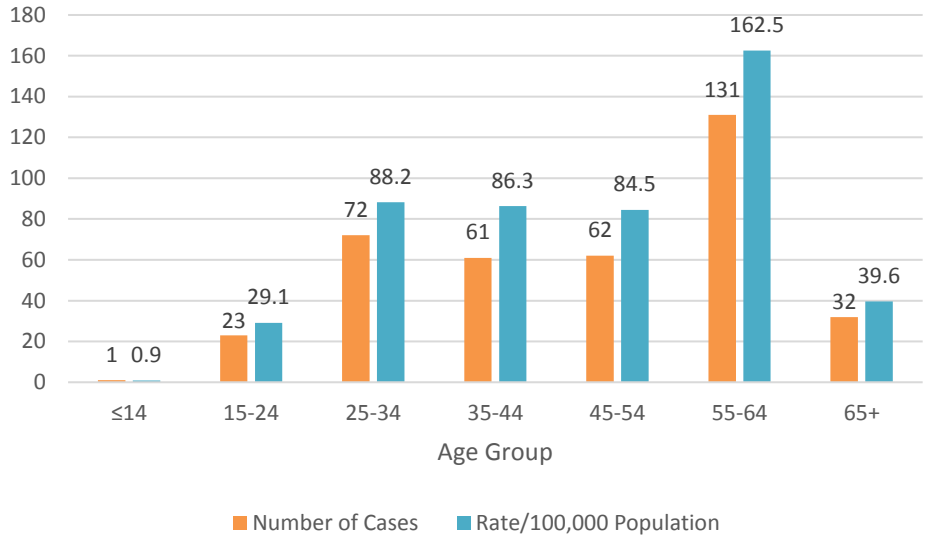

Males consistently had a higher rate of infection than females from 2013 to 2017. The rate of infection in both males and females decreased overall from 2013 to 2017.

**Figure 21. Newly reported confirmed and probable chronic hepatitis C rate per 100,000 population by gender, Wyoming, 2013-2017**



Individuals aged 55-64 years accounted for 34% of infections in 2017. This information is consistent with the information from the CDC regarding an increased risk of infection in individuals born between 1945 and 1965.[9] Those aged 25-34 had the second highest number of reported cases and accounted for 19% of all reported cases. Higher rates among young adults is largely attributed to injection drug use. The Department of Health and Human Services estimates the prevalence of hepatitis C among people who inject drugs to be 30%-70%.[10] Of those under the age of 36 that were interviewed for enhanced surveillance, risk reduction, and partner services (n=86), 76% indicated current or previous injection drug use. Heroin and methamphetamines were the most commonly reported drugs used.

**Figure 22. Number of newly reported hepatitis C cases and rate by age group, Wyoming, 2017**




# Section 5- Tuberculosis

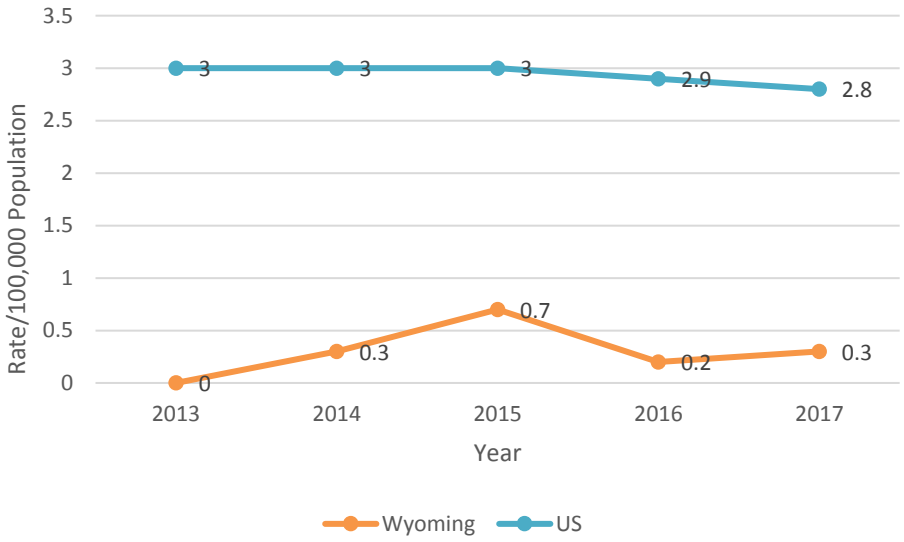
## TUBERCULOSIS

Tuberculosis (TB) is one of the leading causes of death worldwide attributed to an infectious disease. Worldwide approximately 9 million people develop active TB disease and 2 million people die from TB. TB is caused by *Mycobacterium tuberculosis* and is spread person to person through droplet nuclei in the air. An infected person expels the TB bacteria during coughing, sneezing, speaking, and singing. Transmission occurs when an individual inhales the contaminated droplet nuclei. The probability that TB will be transmitted depends on the infectiousness of the infected individual, the environment in which the exposure occurred, the length of the exposure, and the

virulence of the tubercle bacilli. Transmission can be reduced by isolating the infected person and providing treatment as soon as possible. TB may develop into active disease which is infectious, or can remain latent in the body which is not infectious. If not treated, latent TB infection may develop into active disease.[11]

Wyoming is a low incidence state with only nine cases reported from 2013-2017. Of those, 56% reported being born in a country with a high prevalence of TB. The case rate of active TB disease increased from 2016 to 2017; however, this is difficult to interpret due to the low number of reported cases each year. The rate in Wyoming remains lower than that of the U.S. and has met the Healthy People 2020 goal of maintaining a case rate below 1.0/100,000 people.

**Figure 23. Active tuberculosis case rate per 100,000 population, Wyoming and U.S., 2013-2017[12]**




Targeted efforts are placed on detection and treatment of latent TB infection (LTBI). Populations in which there is a greater risk for TB infection in Wyoming include people who inject drugs; homeless individuals; those born in Asia, Africa, or South America; those with parents born in Asia, Africa, or South America; and individuals that reside in a congregate setting (e.g., incarceration). If an individual has a latent infection, there is a 10% chance the infection will progress to active disease in his/her lifetime. To prevent the development of active disease in individuals with a latent infection, the Wyoming Department of Health Communicable Disease Unit provides assistance for medication.

# Section 6- Coinfection

**TB AND HIV**

Though Wyoming has a low incidence of tuberculosis, it still remains a threat in individuals infected with HIV. TB is one of the leading causes of death in HIV-positive individuals worldwide.

Individuals who are infected with HIV and latent TB are much more likely to develop active TB disease. An individual who has both an HIV infection and active TB disease has an AIDS-defining condition. Those newly diagnosed with HIV should be tested for TB, and those with active TB disease should be tested for HIV. From 2013 to 2017, one HIV/TB coinfected case was reported.

**HIV AND VIRAL HEPATITIS B & C**

Injection drug use and MSM are risks for HIV and HCV. Between 50%-90% of HIV-positive injection drug users are coinfected with HCV nationally. Because coinfection with HCV may affect treatment of HIV infection, it is imperative that HIV-positive persons know their HCV status. Hepatitis C can be successfully treated in those with HIV. HIV-positive persons who are not infected with hepatitis C should take preventive steps against HCV. Approximately 6.4% of those living with HIV in Wyoming were known to be coinfected with hepatitis C and 3.2% with hepatitis B in 2017. The Wyoming Department of Health recommends hepatitis A & B vaccinations for all HIV-positive individuals. In 2012, the Communicable Disease Unit amplified efforts to ensure those with HIV infection are receiving recommended vaccines. Table 9 represents the vaccination status of HIV-positive persons residing in Wyoming prior to 2012 and in 2017. An additional 8.3% of HIV cases have laboratory results indicative of immunity to hepatitis B.

**Table 8. Hepatitis A and B vaccination status of HIV-infected persons, Wyoming, 2011 and 2017**

| Vaccinations | % Vaccinated 2011 | % Vaccinated 2017 |
|---|---|---|
| Fully Vaccinated for Hepatitis A | 5.4 | 22.7 |
| Fully Vaccinated for Hepatitis B | 7.7 | 29.2 |

**STDs AND HIV**

Individuals infected with STDs are more likely to acquire HIV infection than those uninfected. An individual with HIV infection and another STD is more likely to spread the HIV infection through sexual contact than an HIV infected individual with no additional STD. There is significant biological evidence which shows that HIV is more likely to be transmitted and acquired if other STDs are present. STDs have been shown to increase susceptibility through genital ulcers and inflammation. Individuals infected with HIV and other STDs are likely to shed HIV in their genital secretions.

In 2015, only 7% of Communicable Disease Treatment Program clients had a documented test for STDs with no infections detected. The Communicable Disease Unit implemented a screening project in 2016 for those enrolled to increase detection of STDs among those living with HIV in Wyoming. Results from this pilot were evaluated and modifications to the testing protocol were made for a second implementation in 2017. In 2017, 52% of clients were offered screening, of which 71% were screened resulting in an STD positivity rate of 16.1%.

# Section 7 – Characteristics of High-Risk Populations

## CHLAMYDIA/GONORRHEA

### Adolescents

Individuals aged 15-24 years in Wyoming have the highest rates of chlamydia and gonorrhea infection compared to any other age group. Adolescents may be at higher risk of infection than adults due to behavioral and cultural reasons. Adolescents are also at a greater biological risk for acquiring chlamydia or gonorrhea.[13]

## SYPHILIS

### Men who have sex with men

The Communicable Disease Surveillance Program has identified MSM to be at increased risk of syphilis infection. In the US, the CDC reported that most cases of syphilis occurred among gay, bisexual, and other men who have sex with men .[14] From 2013 to 2017, MSM accounted for 37% of reported syphilis infections.

### People living with HIV

Syphilis chancres can make transmission and acquisition of HIV infection easier. Individuals with syphilis are two to five times more likely to acquire HIV if exposed. An initial syphilis screening followed by additional annual screenings if the person is at risk are recommended for those infected with HIV.[14] In 2017, 12% of syphilis cases had documentation of HIV infection.

## HIV

### Men who have sex with men

By exposure and transmission categories, MSMs continue to account for the largest number of newly diagnosed cases of HIV infection in Wyoming. Between 2013 and 2017, 49% of newly diagnosed male HIV cases were among MSM. MSM who also reported inject drug use represented and additional 8% of male cases during this time.

### People who inject drugs

Between 2013 and 2017, 9% of newly diagnosed HIV infection among males was attributed to IDU. No females diagnosed during this time reported IDU.

### Women with male sex partners

Thirteen percent (13%) of newly diagnosed HIV infections were among females between 2013 and 2017. Among adult females, 67% of cases were attributed to heterosexual sex.

## HEPATITIS B

Globally, 350 million people are infected with hepatitis B, 1.2 million of which occur in the US.[8] In 2017, 15 chronic cases of hepatitis B were reported. Risk factor data for individuals infected with hepatitis B from 2013-2017 in Wyoming is incomplete.

### Asian and Pacific Islanders (API)

APIs make up 5% of the US population but account for more than 50% of hepatitis B infections. An estimated 70% of APIs that reside in the US were either born in or have parents who were born in a hepatitis B endemic country. The CDC estimates that 1 of every 12 APIs are living with hepatitis B and do not know it.[8]

### People who inject drugs

People who inject drugs are at risk for hepatitis B from sharing needles and other drug equipment. In 2003, an outbreak of hepatitis occurred in Wyoming among injection drug users. As a result of the outbreak, the Wyoming Department of Health added the recommendation for hepatitis B vaccinations for adults at risk of hepatitis B infection.

### Men who have sex with men

The CDC reports men who have sex with men account for 15-25% of new infections. The CDC and Wyoming Department of Health recommend hepatitis B screening and vaccination for MSM.[8]

## HEPATITIS C

### People who inject drugs

The CDC estimates that one third of injection drug users between the ages of 18-30 years are infected with hepatitis C, and 70-90% of older injection drug users are infected.[15] In 2017, 76% of those diagnosed with hepatitis C under the age of 36 indicated injection drug use.

### Incarcerated populations

The National Hepatitis Corrections Network estimates 17.4% of incarcerated people are chronically infected with hepatitis C compared to 1% of the general population.[16] In 2017, hepatitis C case rates were highest among counties with a Wyoming Department of Corrections intake facility.

### Individuals born between 1945 and 1965

The CDC reports individuals born between 1945 and 1965 account for approximately 75% of hepatitis C cases in the U.S.[9] In 2017, 34% of viral hepatitis C cases were reported among those aged 55 to 64.

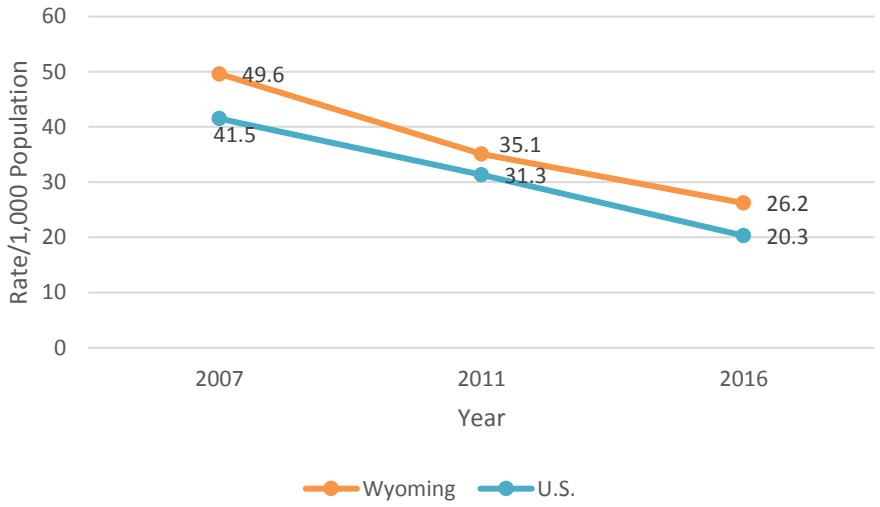
## DIRECT MEASURES OF RISK BEHAVIOR

**Sexual Behaviors:** The Youth Risk Behavior Survey for Wyoming (YRBS-WY) is a self-administered questionnaire given to a representative sample of 6th through 12th grade students throughout the state every other year. In 2015, only high school students completed the survey. The 2015 survey included responses from 2,424 students from 40 public, charter, and alternative schools. The YRBS-WY is not without limitations. The survey is administered during school, therefore, potentially under-representing high risk populations which are more likely to be absent from school. The survey may also under-represent students in older grade levels as they are more likely to not be in school.

The 2015 YRBS-WY indicates that 41.9% (13 students per classroom of 30) of high schools students have engaged in sexual intercourse. Overall, 12.9% of students indicated having four or more sex partners in their lifetime. Of those who have had sexual intercourse, 52.7% indicated using a condom during their most recent time, a decrease of 6% from 2011. Approximately 11.4% of students who participated in the survey indicated they had been tested for HIV at some point in their life.[17]

The Wyoming Department of Health Maternal and Child Health Program routinely collects data on teen birth rates. Teen birth rates declined from 2007 to 2016 from 49.6 to 26.2 births per 1,000 population. Though teen birth rates have been declining in Wyoming since 2007, Wyoming rates were consistently higher than teen birth rates for the United States.[18]

**Figure 24. Teen (15-19 years) birth rate per 1,000 population, Wyoming and U.S., 2007, 2011, and 2016.[18]**




**Substance Use:** The National Survey on Drug Use and Health (NSDUH) and the YRBS provide data on risk behaviors related to substance use. The NSDUH is conducted by SAMHSA's Office of Applied

Studies (OAS) and is a source of information on the prevalence, patterns, and consequences of alcohol, tobacco, and illicit drug use of U.S. civilians age 12 years and older.

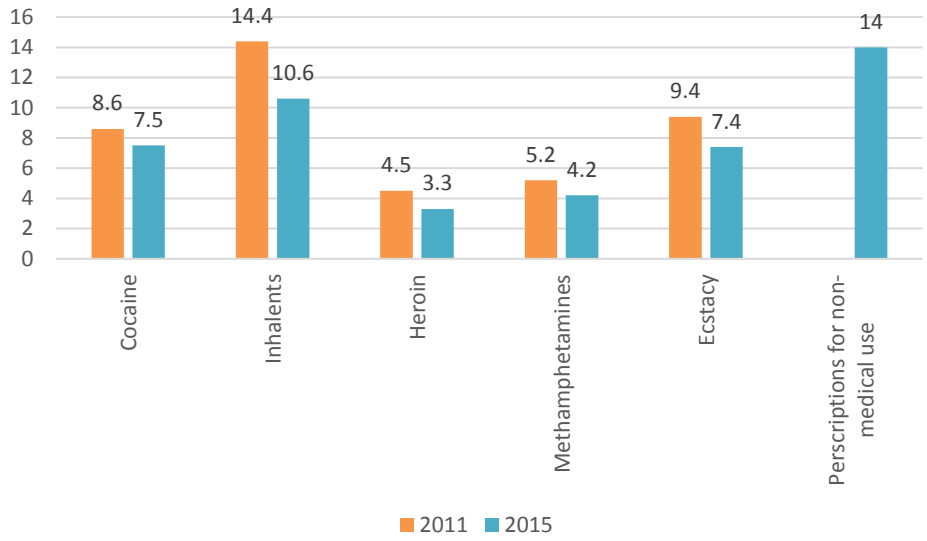
The NSDUH defines illicit drugs as marijuana/hashish, cocaine, inhalants, hallucinogens, heroin, and any other prescription-type psychotherapeutic drug used non-medically. During 2015 and 2016, NSDUH estimated that 7.94% of Wyoming residents over the age of 12 had used illicit drugs in the previous month. An estimated 3.05% of Wyoming residents used illicit drugs other than marijuana which includes heroin, cocaine, hallucinogens, inhalants, or prescriptions used for a non-medical purpose. Table 9 displays the percentage of the population with select substance use by age group.[19]

**Table 9. Percent of population with select substance use by age group, NSDUH, Wyoming, 2015 and 2016[19]**

| Age Group (years) | Any Illicit Drug Use in the Past Month (95% Confidence Interval | Marijuana Use in the Past Month (95% Confidence Interval) | Illicit Drug use Other Than Marijuana in the Past Month (95% Confidence Interval) |
|---|---|---|---|
| **12-17** | 8.30 (6.56-10.45) | 12.63 (10.30-15.41) | 2.52 (1.73-3.66) |
| **18-25** | 17.50 (14.51-20.96) | 26.98 (23.34-30.97) | 6.23 (4.63-8.34) |
| **≥26** | 6.31 (5.01-7.92) | 7.68 (6.18-9.50) | 2.59 (1.98-3.38) |

The YRBS also collects information on substance use of middle and high school students. Figure 25 shows the percentage of high school students who have ever used illicit drugs other than marijuana in their lifetime. In 2015, prescription drugs used for non-medical purposes was the most commonly report drug used, followed by inhalants, and cocaine. The percentage of students who have used illicit drugs decreased for every drug category from 2011 to 2015 except prescriptions. Prescription drug use for non-medical purposes was not evaluated in the 2011 YRBS survey. In addition, the YRBS indicates that 3.3% of high school students have ever used needles to inject drugs.[17]

**Figure 25. Percent of high school students who report select drug use in their lifetime, YRBS, Wyoming, 2015[17]**




The Treatment Episode Data Set (TEDS) provides data that may identify behaviors related to injection drug use. TEDS is maintained by the Substance Abuse and Mental Health Services Administration. Substance use treatment admission data from state and federally funded facilities in the state of Wyoming are routinely reported in TEDS datasets.

It is noted in the TEDS 2002-2012 State Profile that Wyoming had one of the five highest increases in heroin admissions from 2002 (2/100,000 population) to 2012 (14/100,000 population). In 2012, the highest rate of admissions was among methamphetamine users (Table 10).[20] In 2017, admissions for heroin, amphetamines, and non-heroin opioids continued to increase. Heroin admissions increased fourfold from 2012-2017 with amphetamines experiencing the next highest increase of 107%.

**Table 10. TEDS Substance Abuse Treatment Admissions, Wyoming, 2012 and 2017[20]**

| Drug | 2012 Number of Admissions | 2017 Number of Admissions | Percent Change from 2012 to 2017 |
|---|---|---|---|
| **Heroin** | 69 | 281 | 307.25% |
| **Cocaine** | 43 | 38 | -11.63% |
| **Amphetamines** | 638 | 1,318 | 106.58% |
| **Non-heroin Opioids** | 240 | 364 | 51.67% |

# Appendix A: Profile Data Sources

## 1. Population Data

*U.S. Census Bureau*
**Overview:** The Census Bureau collects and provides timely information about the people and economy of the U.S. The Census Bureau's website (http://www.census.gov) includes data on demographic characteristics of the population, family structure, educational attainment, income level, and housing status. Data are available for all geographic areas to the block level. Summaries of the most requested information for states and counties are provided, as well as analytical reports on population changes, race, age, family structure, and apportionment.

**Population:** The U.S. Population.

**Strengths:** The Census provides data on the entire U.S. population which is available in smaller subgroups such as states, counties, and cities.

**Limitations:** The Census is only taken every ten years which may under-represent changes in data through time. This also makes it difficult to compare changes in communicable diseases and risk factor data with demographic and economic changes in the population.

## 2. Core HIV/AIDS Surveillance

**Overview:** Since the human immunodeficiency virus was identified, the CDC and other professional organizations have recommended reporting of HIV infections to health authorities as an integral part of AIDS surveillance activities. As part of ongoing HIV surveillance, health departments educate providers on reporting requirements and establish liaisons with laboratories that test for HIV infection. Moreover, HIV/AIDS surveillance programs routinely evaluate the completeness of HIV reporting and conduct follow-up on HIV cases.

**Population:** All persons who test positive for Human Immunodeficiency Virus (HIV).

**Strengths:** Based upon previous evaluations, HIV infection (non-AIDS) reporting in Wyoming was found to be 99% complete within six months of diagnosis.

**Limitations:** HIV surveillance data may underestimate the level of recently infected persons as people may not seek testing and may not know they are infected. Reporting of behavioral risk information may not be complete as these data are self-reported.

## 3. Behavioral Surveys

*Behavioral Risk Factor Surveillance System (BRFSS)*
**Overview:** The BRFSS is a state-based random digit-dialed telephone survey of adults that monitors state-level prevalence of the major behavioral risks associated with premature morbidity and mortality. Currently all 50 states participate in the BRFSS with help from the CDC. The BRFSS

includes home telephones and cellular telephones. Each month, a sample of households is contacted and one person in the household who is 18 years or older is randomly selected for an interview. In Wyoming, approximately 6,000 interviews are conducted. Multiple attempts are made to contact the selected household. The interview can be done in English or Spanish. Information regarding the Wyoming BRFSS can be found at http://www.health.wyo.gov/phsd/brfss/index.html.

**Population:** All non-institutionalized adults, 18 years and older that reside in Wyoming with a home or cellular telephone.

**Strengths:** Data from the BRFSS survey are population-based; thus, estimates about testing attitudes and practices can be generalized to the adult population of Wyoming. Information collected from the BRFSS survey may be useful for planning community-wide education programs.

**Limitations:** BRFSS data are self-reported and may be subject to recall bias or refusal. BRFSS respondents are contacted by telephone and are therefore not representative of those without telephones. BRFSS does not interview those who are incarcerated, in nursing homes, or other institutionalized settings. The extent of HIV behavioral risk information collected by the BRFSS is limited and inferences can only be made at the state level.

*Youth Risk Behavior Survey (YRBS)*

**Overview:** The YRBS was established to monitor six priority high-risk behaviors that contribute to the leading causes of morbidity, mortality, and social problems among youth and young adults in the United States. YRBS was developed to collect data that are comparable nationally, statewide, and locally. It is a state-wide, self-administered questionnaire given to a representative sample middle and high school students ($6^{th}$-$12^{th}$ grade). The survey includes information on sexual behaviors which contribute to STDs including HIV, and unintentional pregnancy. Questions are also asked about exposure to HIV prevention education materials, sexual activity (age of debut, number of partners, condom use, preceding drug or alcohol use), contraceptive use, and pregnancy history.

**Population:** The YRBS surveys a representative sample of $6^{th}$-$12^{th}$ grade students at the state level.

**Strengths:** The YRBS is a population-based sample of adolescents in public school systems in Wyoming. The YRBS questionnaire is administered to students anonymously during school. Efforts are made to survey students who are not in attendance. Inferences from YRBS estimates can be drawn about behaviors and attitudes of adolescents in public schools, which make information useful for developing community-wide prevention programs aimed at younger persons. The YBRS uses a standardized questionnaire so comparisons can be made across participating jurisdictions. Jurisdictions have the opportunity to ask specific questions to meet their needs.

**Limitations:** The 2015 YRBS excluded middle school children. The YRBS relies on self-reported information which may lead to under- or over-reporting. Since the YRBS questionnaire is administered in school, the data are only representative of children who are enrolled in school and cannot be generalized to all youth. Students at highest risk may be more likely to be absent from school or to have dropped out of school and therefore might be underrepresented. The YRBS does not ask about different types of sex or gender of sexual partners.

**4. Substance Abuse Data**

*Treatment Episode Data Set (TEDS)*
**Overview:** TEDS is a national data set maintained by the Office of Applied Studies, Substance Abuse and Mental Health Services Administration (SAMHSA). Data are captured annually on more than 1.5 million records of treatment admissions for substance abuse. TEDS is comprised of data that are routinely collected by States to help monitor their individual substance abuse treatment programs. TEDS collects information on client demographics, information about the number of prior treatments, usual route of administration for each problem substance, frequency of use, age at first use, and services provided. Facilities that report TEDS data usually receive state funding for the provision of substance abuse treatment.[6]

**Population:** Individuals admitted to substance abuse treatment facilities reporting to TEDS.

**Strengths:** While TEDS does not represent the total demand for substance abuse treatment, it does include a significant proportion of all admissions to substance abuse treatment. TEDS includes admissions that constitute a burden on public funds.

**Limitations:** TEDS is based on admission records and does not represent individuals, as one individual receiving treatment within the same calendar year would be considered two admissions. Also, TEDS is unable to follow individual clients through a sequence of treatment episodes because individuals are given unique IDs at the state level to protect confidentiality. TEDS data does not include data from private entities or federal agencies and can under represent individuals receiving treatment from those facilities.

*The National Survey on Drug Use and Health (NSDUH)*
**Overview:** The NSDUH is a source of information on the prevalence, patterns, and consequences of alcohol, tobacco, and illegal drug use and abuse in the general U.S. civilian, non-institutionalized population, age 12 years and older. The survey is currently conducted by SAMHSA's Office of Applied Studies (OAS).

**Population:** Non-institutionalized, civilian U.S. population age 12 years and older.

**Strengths:** NSDUH is a national, standardized survey of drug use behaviors among the general population. To increase the level of honest reporting, since 1999, information has been collected using a combination of computer-assisted interviewing methods. This provides respondents with a more private and confidential means of responding to questions about substance use and other sensitive behaviors.

**Limitations:** States must rely on statistical estimates as direct data is only available for some states. NSDUH estimates represent behaviors in the general population, thus the survey may underestimate the level of substance use in the population at highest risk for HIV. Furthermore, the data for the NSDUH are self-reported and are subject to recall bias or refusal which can result in under- or over-reporting.

**5. HIV Services Data**

*Communicable Disease Treatment Program Data*

**Overview:** The Wyoming Department of Health provides services to individuals infected with HIV through Ryan White Part B, AIDS Drug Assistance Program (ADAP), Ryan White Part C-EIS (Early Intervention Services) and the Housing Opportunities for Persons with AIDS (HOPWA) programs.

**Population:** Communicable Disease Treatment Program data includes individuals infected with HIV or with an AIDS diagnosis, residents of Wyoming with permanent Wyoming addresses and a valid Wyoming driver's license or ID, and meet the income guidelines.

**Strengths:** All individuals enrolled in Care in Wyoming are represented by these data.

**Limitations:** Data from the Communicable Disease Treatment Program cannot be generalized to all individuals with HIV in Wyoming.

**6. STD Surveillance**

*STD Case Reporting*
**Overview:** The Wyoming Department of Health Communicable Disease Surveillance Program conducts statewide surveillance to determine sexually transmitted disease (STD) incidence and to monitor trends. In Wyoming, chlamydia, gonorrhea, and syphilis are reportable STDs.

**Population:** All persons who are diagnosed with an STD that meets the CDC case definition for the infection and are reported to the STD Program. CDC case definitions can be found at https://www.cdc.gov/std/stats/casedefinitions.htm.

**Strengths:** STD surveillance data can serve as the surrogate marker for unsafe sexual practices and demonstrate the prevalence of STDs in the state. STD data are widely available at the state and county level. Because of shorter incubation time and periods between exposure and infection, STDs can serve as a marker of recent transmission. In addition, STDs can facilitate transmission or acquisition of HIV infection.

**Limitations:** STDs are reportable, but numbers are likely an underestimation due to the asymptomatic nature of STDs.

# Appendix B: Glossary of Terms

**Bias:** Bias occurs when there is a systematic error in data that leads to erroneous results.

**CDC:** The Centers for Disease Control and Prevention (CDC), within the U.S. Department of Health and Human Services, is the lead federal agency for protecting the health and safety of the people of the United States. The CDC accomplishes its mission through developing and applying disease prevention and control, environment health, and health promotion and education activities designed to improve public health in the U.S. The CDC provides the majority of funding for HIV prevention, and all of the funding for HIV surveillance activities in Wyoming.

**Incidence:** Incidence refers to the number of new cases of disease that occur in a population during a specified time period, usually a year.

**Perinatal:** The word "perinatal" means "around birth" and is used to describe events that occur during labor and birth, and immediately following delivery. When "perinatal" is used to describe communicable disease transmission this word applies more broadly and describes any time that a mother may pass the communicable disease to her child – either while she is pregnant, during birth, or through breastfeeding.

**Prevalence:** Prevalence refers to the total number of persons with a specific disease or condition at any given time.

**Proportion (percentage):** A proportion is a type of ratio in which the numerator is included in the denominator. Since the numerator is a subset of the denominator, a proportion can be thought of as a ration of a "part" of the "whole". A proportion is usually expressed as a percentage.

**Rate:** A rate is a special type of ratio that includes a specification on time. In epidemiology, rates express the probability or risk of disease or other events in a defined population over a specified time period, often one year.

**Surveillance:** In a public health context, surveillance refers to the routine, systematic collection of data on diseases or other important health conditions in order to monitor where the condition occurs and to determine the risk factors associated with the condition.

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