

# WASHOE COUNTY HEALTH DISTRICT

ENHANCING QUALITY OF LIFE



**Public Health**  
Prevent. Promote. Protect.



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Cover picture by Cindy Hawks

# 2017

## Annual Communicable Disease Summary

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Communicable diseases are a continuing threat to all people, regardless of age, gender, lifestyle, ethnic background or socioeconomic status. They cause illness, suffering and even death, and place an enormous financial burden on society. Indeed, Joshua Lederberg, Nobel laureate once commented “We live in evolutionary competition with microbes – bacteria and viruses. There is no guarantee that we will be the survivors.” Although some communicable diseases have been controlled by modern advances, new ones are constantly emerging. The Washoe County Health District (WCHD) relies on healthcare providers, laboratories, and others to report the occurrence of notifiable diseases. Without such data, trends cannot be accurately monitored, unusual occurrences of diseases (such as Ebola Virus, Zika Virus, and outbreaks) might not be detected or appropriately investigated, and the effectiveness of control and prevention activities cannot be easily evaluated.

Under the direction of the District Health Officer, Mr. Kevin Dick and the Director of Epidemiology and Public Health Preparedness, Dr. Randall Todd, staff of the WCHD Communicable Disease Control Program coordinate the countywide disease surveillance and reporting system. They work in conjunction with the following prevention and control programs: tuberculosis (TB), foodborne illness, sexually transmitted disease (STD), HIV/AIDS, vaccine preventable diseases and vector-borne diseases.

Nevada Administrative Code Chapter 441A<sup>1</sup> identifies diseases of public health significance that must be reported to the WCHD. Persons required to report include health care providers and directors of hospitals, diagnostic laboratories, schools, child care facilities, correctional facilities, permitted food establishments and others. In general, each report is investigated to characterize the illness, collect demographic information about the case, identify possible sources of the infection and take steps necessary to minimize the risk of further disease transmission. Data are collected, maintained and analyzed at the program level. The 2017 Annual Communicable Disease Summary is a compilation of communicable disease surveillance data in Washoe County. It is recognized these data have the following limitations:

- 1.) For most diseases, reported cases represent a fraction of the true number. This is because many patients with mild disease do not seek medical care. Even if they do, the health care provider may not order a test to identify the causative agent.
- 2.) Health care providers may fail to report a case as required by law. For example, CDC estimates that there are as many as 1.2 million persons in the US who may be sick due to salmonellosis; however, only approximately 50,000 cases of salmonellosis are reported each year in the United States, which represents only 5% of the estimated level of illness.<sup>2</sup>
- 3.) Reported cases represent a skewed sample of the total. Severe illnesses are more likely to be reported than milder ones. Health care providers may be more likely to report contagious diseases such as TB than vector-borne diseases such as Lyme disease.
- 4.) Epidemics of disease or media coverage of a particular disease can greatly increase testing and reporting rates.

With these limitations in mind, surveillance data are valuable in a variety of ways. Analysis of disease incidence by various demographic variables is useful for identifying segments of the population that may be at higher risk of illness allowing public health officials to target prevention and control measures in ways that will have maximum impact. Further, analysis of surveillance data allows for identification of disease trends and may help to detect disease outbreaks or epidemics. However, for diseases that only occur sporadically, presentation of demographic information has limited value and may serve to compromise the privacy of individual case patients. Therefore, in this report, the amount of detail related to the population affected by any particular disease will vary depending on the number of reported cases.

<sup>1</sup> NAC 441 A <http://www.leg.state.nv.us/nac/NAC-441A.html>

<sup>2</sup> <http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html>

It should be noted that in several places throughout this report, data have been included that are not current. These areas have been highlighted with a blue shading to make it clear that they do not represent current data. They are included so that the reader may gain a better understanding and perspective based on information that may be somewhat dated but still relevant.

The intent of this report is to provide local health care providers, infection control practitioners and other interested persons with useful data. Please contact the WCHD Division of Epidemiology and Public Health Preparedness (EPHP) at (775) 328-2447 for additional information or comments.

**SUMMARY****Table A. Total Reported Cases of Selected Communicable Diseases by Year, Washoe County, 2013–2017.**

	2013	2014	2015	2016	2017
AIDS	21	21	11	14	13
Campylobacteriosis	47	45	35	47	37
<i>Chlamydia trachomatis</i> , genital	1675	1755	2033	2200	2504
<i>E. coli</i> O157:H7	6	1	25	3	9
Giardiasis	15	12	14	20	10
Gonorrhea	364	492	547	598	743
<i>Hemophilus influenzae</i> type b	0	0	0	0	0
Hepatitis A	4	1	0	0	2
Hepatitis B (Acute)	3	2	4	2	5
Hepatitis B (Chronic)	45	52	62	73	65
Hepatitis C (Acute)	5	3	1	4	13
Hepatitis C (past or present)*	461	575	525	527	648
HIV infection	26	27	32	35	22
Listeriosis	1	0	0	0	0
Malaria	0	2	1	0	1
Measles	0	0	0	0	0
Meningococcal invasive disease	0	0	1	0	0
Mumps	3	4	2	3	2
Pertussis	22	56	13	2	11
Rotavirus	20	21	31	16	10
RSV	428	305	241	410	635
Rubella	0	0	0	0	0
Salmonellosis	32	35	53	30	28
Shigellosis	2	5	12	12	3
Syphilis (primary and secondary)	33	36	27	33	56
Tuberculosis	9	7	11	6	17
Typhoid Fever	1	0	0	0	1

**Table B. Cases per 100,000 Population of Selected Communicable Diseases by Year Compared to Healthy People 2020 Target, Washoe County, 2013-2017.**

Disease	2013	2014	2015	2016	2017	Healthy People 2020 Target
<b>Met Healthy People 2020 Target in 2017</b>						
Salmonellosis	7.4	8.0	12.0	6.9	6.2	6.8
HIV	0.4	1.3	1.8	1.3	1.3	3.3
Listeriosis	0.2	0.0	0.0	0	0	0.2
Campylobacteriosis	10.9	10.3	7.9	10.5	8.2	8.5
Hepatitis A	0.9	0.2	0.0	0	0	0.3
<b>Did Not Meet Healthy People 2020 Target in 2017</b>						
<i>E. coli</i> 0157:H7	1.4	0.2	5.7	0.7	2.0	0.6
Gonorrhea (Female, 15-44)	161.5	250.4	266.6	239.9	305.8	157.0
Gonorrhea (Male, 15-44)	209.8	250.4	293.6	361.3	390.6	198.0
Primary or Secondary Syphilis (Male)	12.6	14.3	10.1	12.6	18	6.8
Primary or Secondary Syphilis (Female)	2.7	2.3	2.3	2.2	7.1	1.4
Tuberculosis	2.1	1.6	2.5	1.3	3.8	1.0

**ENTERIC DISEASES**

**I. Bacterial Enteric Diseases**

**A. Campylobacteriosis**

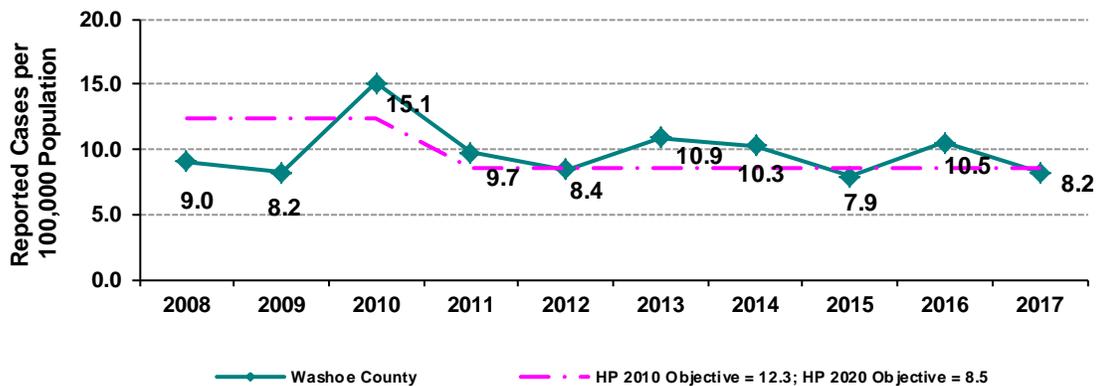
*Campylobacter* is the most common bacterial cause of diarrheal illness in the United States. Campylobacteriosis usually occurs in single, sporadic cases, but it can also occur in outbreaks. Campylobacteriosis is most commonly associated with handling raw poultry or eating raw or undercooked poultry.

**1. Reported Incidence**

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2006-2017 data. In 2017, the estimated national incidence of campylobacteriosis was 19.1 cases per 100,000 population. Compared with incidence during 2014-2016, the 2017 incidence was significantly higher for campylobacteriosis (10% increase). The Healthy People 2020 national health objective is 8.5 cases per 100,000 population. It is important to note that positive culture-independent diagnostic tests (CIDT) reports for campylobacter was 63%.

Thirty-seven (37) cases of campylobacteriosis were reported in Washoe County in 2017 for a reported incidence of 8.2 cases per 100,000 population. Of the 37 cases, 35 (95%) were laboratory confirmed and 2 (5%) were probable cases epidemiologically linked to a confirmed case.

**Figure 1.1 Rates of Reported Cases\* of Campylobacteriosis, Washoe County, 2008 – 2017**



\*Effective in 2009, probable cases became reportable in Washoe County.

**2. Population Affected**

The median age of cases in Washoe County was 45 years (range: <1 year - 91 years); 22 (54%) of 37 reported cases were male. Eight (8) cases (22%) were hospitalized, with a median length of hospitalization of 4.5 days (range: 1 day - 27 days). Two (2) cases were food handlers. No deaths were reported.

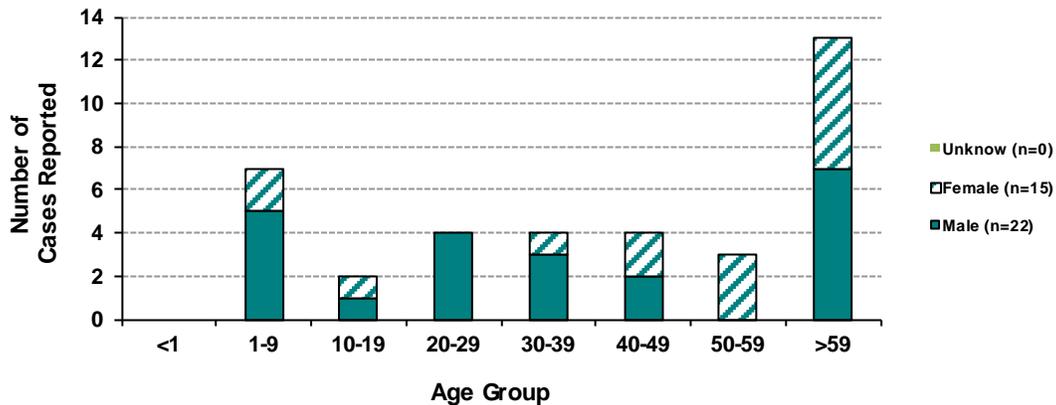
**Table 1.1 Reported Campylobacteriosis Cases by Race/Ethnicity, Washoe County, 2017**

Race/Ethnicity	Number of Cases	Percent of Cases	# Cases per 100,000
White, non-Hispanic	20	54.1	6.9
Hispanic	12	32.4	10.6
Others* (A/PI, AI/AN, Black)	2	5.4	4.0
Unknown	3	8.1	N/A

\* A/PI = Asian/Pacific Islander

AI/AN = American Indian/Alaskan Native

**Figure 1.2 Campylobacteriosis Cases by Age and Gender, Washoe County, 2017**



**Table 1.2 Reported Risk Factors among Campylobacteriosis Cases, Washoe County, 2016/7(N=37)**

Risk Factor (not mutually exclusive)	Number of Cases	%
Contaminated foods	21	57
Travel (8 international, 10 domestic)	18	49
Contact to a similarly ill person	8	22
Contact to animals*	4	11
Recreational water exposure	5	14
Day care associated**	1	3
Drank untreated water	2	5
Unknown risk factors (unable to interview or review medical record, exclusive)	0	0
No known risk factors*** (exclusive)	3	8

\*Puppies, sick animal, birds, chicken, reptile

\*\* Includes daycare attendees, staff, or persons who live with a day care attendee.

\*\*\*No risk factors were identified.

One campylobacteriosis outbreak was reported or detected from surveillance systems in 2017. A family of eight traveled to Mexico. Five (5) of them consumed an unidentified contaminated food during the vacation. One household contact who did not travel to Mexico got sick from person-to-person transmission. None of the cases were hospitalized.

**B. *Escherichia coli* 0157:H7 (Shiga toxin-producing *E.coli* O157 = STEC O157)**

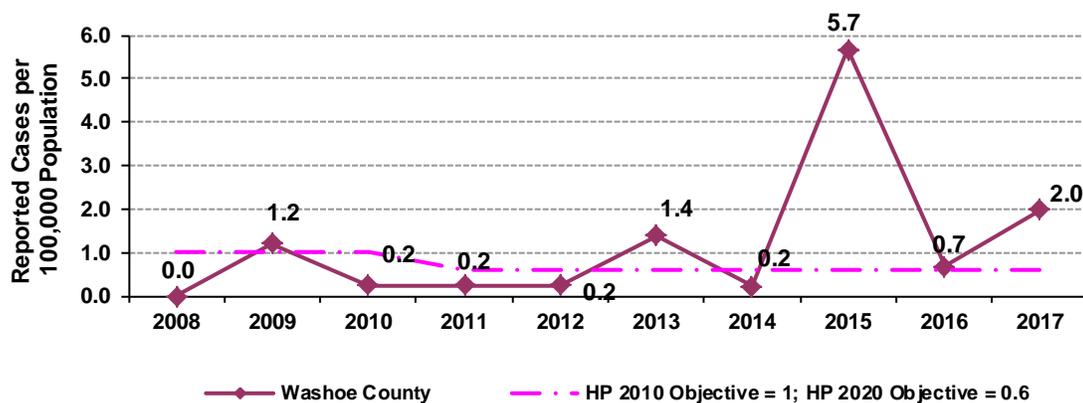
The new terminology for *Escherichia coli* species that cause human disease includes “Shiga toxin-producing *Escherichia coli* O157” (STEC O157) and “Shiga toxin-producing *Escherichia coli* non-O157” (STEC non-O157). Infection often leads to bloody diarrhea. Hemolytic uremic syndrome (HUS) is a serious, sometimes fatal complication often associated with STEC infection. Most illness has been associated with eating undercooked, contaminated ground meat. Other vehicles implicated in outbreaks are sprouts, lettuce, salami, unpasteurized milk and juice, and swimming in or drinking sewage-contaminated water. Person-to-person contact in families and child care centers is also an important mode of transmission.

**1. Reported Incidence**

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 baseline data. In 2017, the estimated national incidence of culture-based STEC infection was 4.2 cases per 100,000 population. The incidence of STEC infection was significantly higher for confirmed infection (27% increase). The Healthy People 2020 national health objective is 0.6 cases per 100,000 population. The national incidence of culture-based STEC non-O157 in 2015 was 1.64 cases per 100,000 population and 0.95 for STEC O157 (latest available data). The incidence of STEC non-O157 in 2017 was significantly higher (25% increase) and the incidence of STEC O157 was unchanged.

Nine (9) laboratory-confirmed cases of STEC O157 were reported in Washoe County in 2017 for a reported incidence of 2.0 cases per 100,000 population. Five (5) cases of STEC non-O157 infection were reported for a reported incidence of 1.1 cases per 100,000 population, lower than the national incidence rate 2.84 in 2016 (latest available data). The total 2017 STEC incidence rate for Washoe County was 3.1 cases per 100,000 population. In 2015 Washoe County had the highest incidence rate in recent history due to a foodborne outbreak. Two (2) cases of HUS were reported in Washoe County in 2017. No deaths were reported. No cases were associated with a multi-state outbreak in 2017.

**Figure 1.3 Rates of Reported Cases\* of STEC O157 Infection, Washoe County, 2008–2017**



\*Effective in 2009, probable cases became reportable in Washoe County.

**2. Population Affected**

The median age of cases in Washoe County was 14 years (range: 1 year - 75 years); 7 (50%) of 14 reported cases were female. Eight (8) of 14 cases (57%) with known race/ethnicity were White, non-Hispanic, three (3) (21%) were Hispanic. Five (5) cases (36%) were hospitalized with a median length

of hospitalization of 5 days (range: 2 day - 42 days). None of the cases were food handlers. No deaths were reported.

**Table 1.3 Reported Risk Factors Among STEC Cases, Washoe County, 2017 (N=14).**

Risk Factor (not mutually exclusive)	Number of Cases	%
Contaminated foods	4	29
Travel (3/14 domestic travel)	3	21
Contact to a similarly ill person	3	21
Contact to animals*	3	21
Recreational water exposure	2	14
Day care associated**	5	36
Drank untreated water	1	7
Unknown risk factors (unable to interview or review medical record, exclusive)	0	0
No known risk factors*** (exclusive)	0	0
<b>Total</b>	<b>14</b>	<b>100</b>

\*Puppies, sick animal, birds, chicken, reptile  
 \*\*Includes day care attendees, staff, or persons who live with a day care attendee.  
 \*\*\* No risk factors identified.

### C. Listeriosis

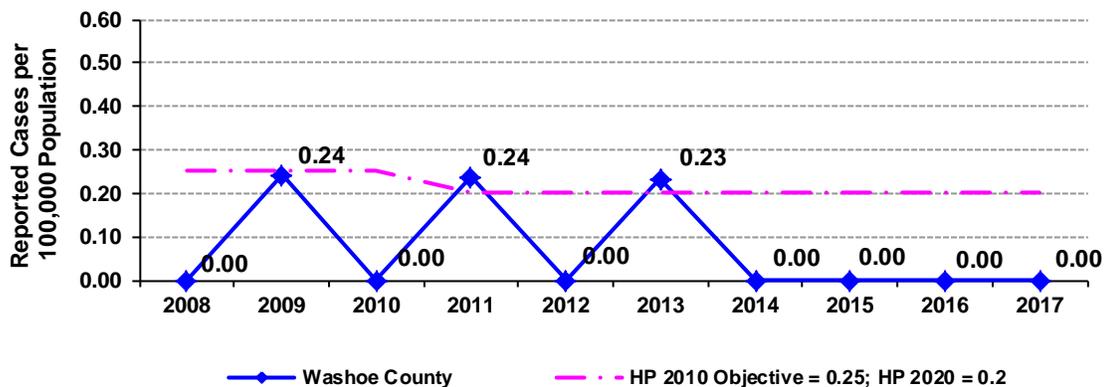
Listeriosis is a serious infection caused by eating food contaminated with the bacterium *Listeria monocytogenes*. In the United States, an estimated 1,600 persons become seriously ill with listeriosis each year. Approximately 16% of these infections are fatal.

#### 1. Reported Incidence

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 data. In 2017, the estimated national incidence of listeriosis was 0.3 cases per 100,000 population. This incidence shows an increase by 26% from the 2014-2016 data. The Healthy People 2020 national health objective is 0.2 cases per 100,000 population.

No (0) cases of listeriosis were reported in Washoe County in 2017.

**Figure 1.4 Rates of Reported Cases of Listeriosis, Washoe County, 2008 – 2017**



## 2. Population Affected

No (0) cases of listeriosis were reported in Washoe County in 2017. The last case of listeriosis reported in Washoe County was reported in 2013.

### D. Salmonellosis

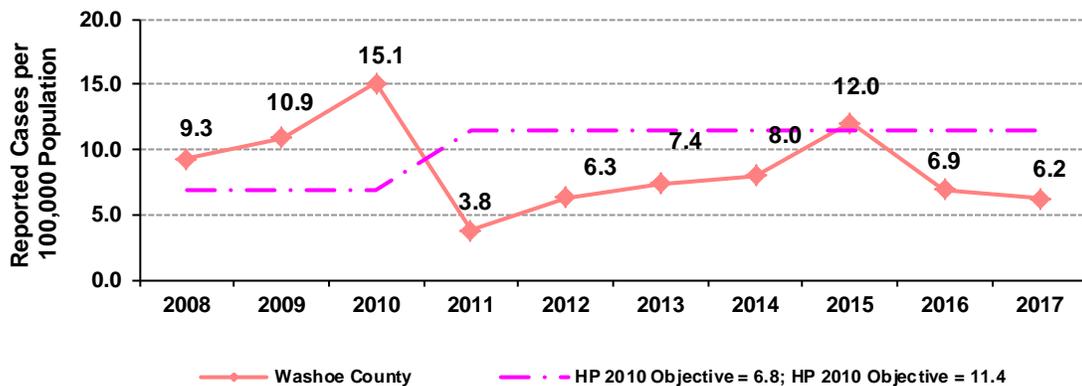
Salmonellosis is a bacterial infection that is transmitted among people and/or animals via the fecal-oral route. Although foods of animal origin are one source of *Salmonella*, transmission through fresh produce and direct contact have been increasingly recognized. Salmonellosis is one of the most frequently reported foodborne illnesses in the United States. Over 45,000 cases of Salmonellosis are reported nationally every year with 23,000 hospitalizations, and 450 deaths.

#### 1. Reported Incidence

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 data. In 2016, the national incidence of salmonellosis was 16 cases per 100,000 population. The overall rate shows a 5% decrease from the 2014-2016 data. The Healthy People 2020 national health objective is 11.4 cases per 100,000 population.

Twenty-four (24) laboratory-confirmed cases and four (4) probable case of salmonellosis were reported in Washoe County in 2017 for a reported incidence of 6.2 cases per 100,000 population.

**Figure 1.5 Rates of Reported Cases\* of Salmonellosis, Washoe County, 2008– 2017**



\* Effective in 2009, probable cases become reportable in Washoe County.

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* states that of the 89% of *Salmonella* isolates serotyped in 2017, the top five (5) serotypes are Enteritidis (2.6 cases per 100,000 population), Newport (1.3 cases per 100,000 population), Typhimurium (1.4 cases per 100,000 population), Javiana (1.1 cases per 100,000 population), and I 4,[5],12:i:- (0.9 cases per 100,000 population). The incidence in 2017 compares with 2014-2016 was significantly lower for Typhimurium (decrease by 14%) and Heidelberg (decrease by 38%).

Twenty-four (24) *Salmonella* isolates reported in Washoe County in 2018 were serotyped either by the Nevada State Public Health Laboratory (NSPHL) or by the Centers for Disease Control and

Prevention (CDC). Local data indicated the two serotypes Enteritidis and I4,[5], 12:i:- accounted for 33.3% of salmonellosis in 2017.

**Table 1.4 *Salmonella* Isolates by Serotype, Washoe County, 2017**

<b>Salmonella Isolate Serotype</b>	<b>Number of Cases</b>	<b>Percent of Cases</b>
Agona	1	4.2
Braenderup	1	4.2
Derby	1	4.2
Durban	1	4.2
Enteritidis	6	25.0
Javiana	1	4.2
Montevideo	1	4.2
Muenchen	1	4.2
Muenster	1	4.2
Newport	1	4.2
Oranienburg	1	4.2
Saintpaul	1	4.2
Typhimurium	1	4.2
I 4,[5],12:i:-	2	8.3
Weltevreden	1	4.2
Unknown Serotype	3	12.5

## 2. Population Affected

The elderly, infants, and those with impaired immune systems are more likely to have severe symptoms of salmonellosis. In 2017, the median age of cases in Washoe County was 40 years (range: 2 year - 70 years). Five (5) cases (18%) were hospitalized with a median length of hospitalization of 3 days (range: 2 days - 3 days) and no deaths were reported. No cases were food handlers; three (3) cases were associated with child care facilities.

**Table 1.5 Reported Salmonellosis Cases by Race and Ethnicity, Washoe County, 2017**

<b>Race/Ethnicity</b>	<b>Number of Cases</b>	<b>Percent of Cases</b>	<b>Cases per 100,000 Population</b>
White/non-Hispanic	23	82	7.9
Hispanic	4	14	3.5
Black	1	4	8.8
Asian/Pacific Islander	0	0	0.0
American Indian/Alaskan Native	0	0	0.0
Unknown	0	0	N/A
<b>Total cases</b>	<b>28</b>	<b>100</b>	<b>6.2</b>

Figure 1.6 Salmonellosis Cases by Age and Gender, Washoe County, 2017

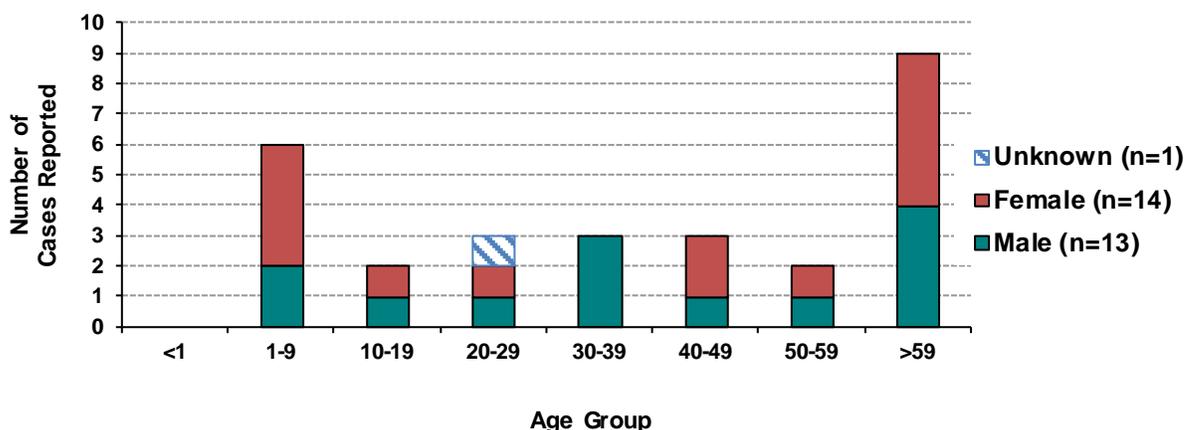


Table 1.6 Reported Risk Factors Among Salmonellosis Cases, Washoe County, 2017

Risk Factors (not mutually exclusive)	Number of Cases	%
Contaminated foods	16	57
Contact with symptomatic person	9	32
Travel (7/9 international travel)	9	32
Contact with high risk animal (reptile/bird/puppy)	3	11
Recreational water exposure	5	18
Day care associated*	3	11
Drank untreated water	0	0
Unknown or missing data (Exclusive)	0	0
No known risk factors identified (exclusive)	18	64

\* Includes day care attendees, staff, or persons who live with a day care attendee

Three clusters with Salmonellosis were investigated in 2017. Two of the cases were associated with multi-state outbreaks. (One with Salmonella Muenchen and the other one with Salmonella Enteritidis).

## E. Shigellosis

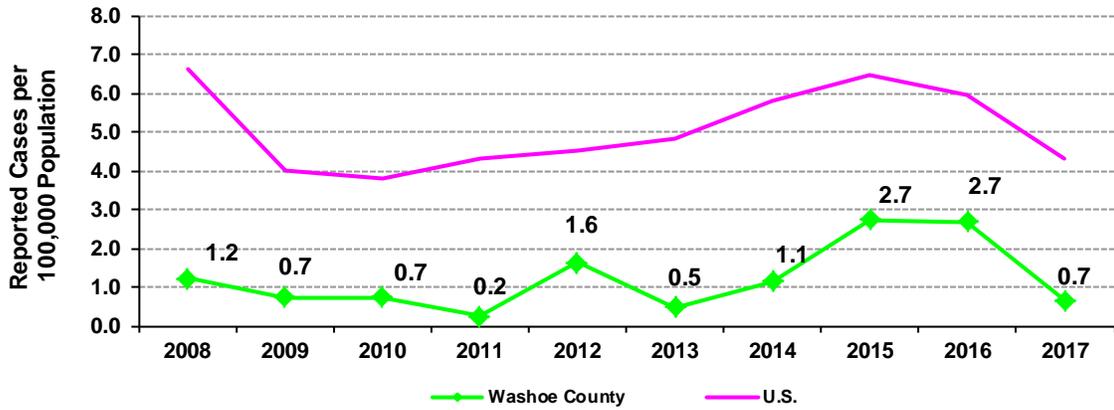
Shigellosis is a bacterial infection that is transmitted from person-to-person through the fecal/oral route. Approximately 18,000 cases of shigellosis are reported in the United States every year. Children, especially toddlers ages 2 to 4 years, are the most likely to get shigellosis. Many cases are related to the spread of illness in child care settings or in families with small children.

### 1. Reported Incidence

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 data. In 2017, the national incidence of confirmed or CIDT positive only shigellosis was 4.3 cases per 100,000 population. The overall rate shows a 3% decrease from the 2014-2016 data. A Healthy People 2020 national health objective has not been established for shigellosis.

Three (3) laboratory-confirmed cases of shigellosis were reported in Washoe County in 2017 for an incidence of 0.7 cases per 100,000 population. The three (3) cases were caused by Group D *Shigella sonnei*.

Figure 1.7 Rates of Reported Cases of Shigellosis, 2008 – 2017

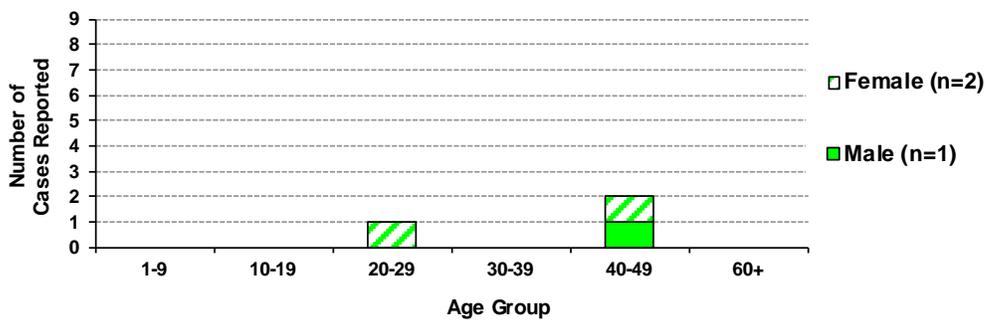


## 2. Population Affected

Three (3) cases of confirmed shigellosis were reported in 2017. The median age of cases was 48 years (range: 27 – 49 years). One case was White non-Hispanic, one was Asian and one unknown race/ethnicity. Two were female. Two cases were hospitalized for 2-3 days. Neither hospitalized case had a fatal outcome. One person had exposure to recreational water.

No cases were associated with a multi-state outbreak.

Figure 1.8 Shigellosis Cases by Age and Gender, Washoe County, 2017



## F. Typhoid Fever

Typhoid fever is caused by *Salmonella typhi* and is transmitted from person-to-person through the fecal/oral route. Two typhoid vaccines are currently available and are recommended for travelers to endemic countries.

## 1. Reported Incidence

The national incidence of reported typhoid fever cases in 2017 was 0.13 cases per 100,000 population. A Healthy People 2020 national health objective for typhoid fever has not been established.

One (1) laboratory-confirmed case of typhoid fever was reported in Washoe County in 2017 for an incidence of 0.22 cases per 100,000 population.

## 2. Population Affected

One (1) case of typhoid fever was reported in Washoe County in 2017. The case was a Hispanic female in the 10-19 year age group. The case was hospitalized for 10 days and recovered. The case most likely acquired the infection while traveling out of the county. She had exposure to recreational water and raw seafood.

## G. *Vibrio* Species

*Vibrio cholerae* consists of more than 200 serogroups. Of these, only serogroups O1 and O139 are associated with the clinical syndrome of cholera and can cause large epidemics. Serogroups O1 and O139 result in an acute bacterial enteric disease characterized in its severe form by sudden onset, profuse painless watery stools, nausea and profuse vomiting early in the course of illness. In most cases infection is asymptomatic or causes mild diarrhea. Asymptomatic carriers can transmit the infection. Cholera is acquired through ingestion of an infective dose of contaminated food or water and through fecal-oral transmission.

*Vibrio vulnificus* and *Vibrio parahaemolyticus* are in the same family of bacteria as those that cause cholera. Both bacteria can cause disease in persons who eat contaminated seafood or have an open wound exposed to seawater. There is no evidence of person-to-person transmission. Both *V. vulnificus* and *V. parahaemolyticus* can cause serious illness and death in persons with pre-existing liver disease or compromised immune systems. *V. vulnificus* and *V. parahaemolyticus* infections are rare, but also underreported. Vibriosis became a reportable condition in the State of Nevada effective in 2011.

## 1. Reported Incidence

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 data. In 2017, the estimated national combined incidence of *Vibrio* species infection was 0.7 cases per 100,000 persons, which was not significantly different from the 2014-2016. The overall rate shows a 54% decrease from the 2014-2016 data. The new Healthy People 2020 national health objective for infection with *Vibrio* species is 0.2 cases per 100,000 population.

There were two (2) cases of reported vibriosis in Washoe County in 2017 for an incidence of 0.44 cases per 100,000 population.

## 2. Population Affected

Two (2) cases of vibriosis were reported in 2017. The cases were White non-Hispanic males. The median age of cases was 38.5 years (range: 33 – 44 years). The cases were not hospitalized. Both cases had exposure to raw seafood. No deaths were reported.

## H. Yersiniosis

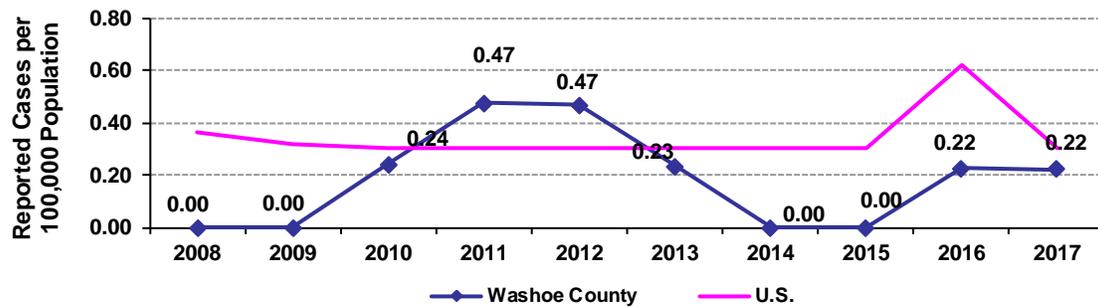
Yersiniosis is a relatively infrequent gastrointestinal disease. Symptoms of diarrhea and abdominal pain are caused by infection with *Yersinia enterocolitica*.

### 1. Reported Incidence

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 data. In 2017, the estimated national incidence of confirmed or CIDT positive yersiniosis was 1.0 cases per 100,000 population. Compare with incidence during 2014-2016, the 2017 increase for significant higher for yersiniosis (166% increase). The Healthy People 2020 national health objective for yersiniosis is 0.3 cases per 100,000 population.

One case of yersiniosis was reported in Washoe County in 2017.

**Figure 1.9 Rates of Reported Cases of Yersiniosis, 2008 – 2017.**



### 2. Population Affected

One case of Yersiniosis was reported in Washoe County in 2017. The case was a male in 65+ years age group. No death was reported.

## II. Parasitic Enteric Diseases

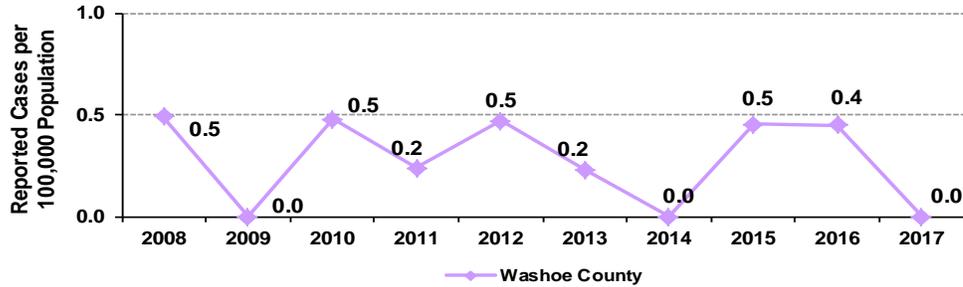
### A. Amebiasis (*Entamoeba histolytica*)

Amebiasis is a diarrheal illness caused by a one-celled parasite, *Entamoeba histolytica*. Amebiasis is most common in people who live in developing countries with poor sanitary conditions. In the United States, amebiasis is most often found in immigrants from developing countries. It is also found in people who have traveled to developing countries and in people who live in institutions that have poor sanitary conditions. Men who have sex with men (MSM) have an increased risk of amebiasis. Amebiasis is not a notifiable disease in the U.S.; therefore, national case data are not available.

### 1. Reported Incidence

No cases of Amebiasis were reported in Washoe County in 2017.

Figure 2.1 Rates of Reported Cases of Amebiasis, Washoe County, 2008 – 2017



## 2. Population Affected

No cases of Amebiasis were reported in Washoe County in 2017.

## B. Cryptosporidiosis

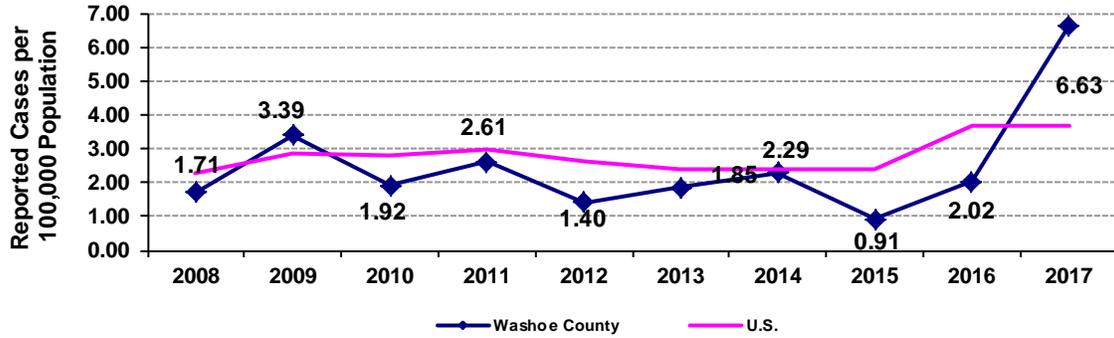
Cryptosporidiosis is a diarrheal disease transmitted via the fecal/oral route and is caused by the parasite, *Cryptosporidium parvum*. It is found in the intestines of humans and animals and is passed in the stool into the environment. The parasite is protected by an outer shell, survives outside the body for long periods of time, and is very resistant to chlorine disinfection. During the past two decades, *Cryptosporidium* has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. *Cryptosporidium* is found in every region of the United States and throughout the world. Men who have sex with men (MSM) have an increased risk of cryptosporidiosis.

### 1. Reported Incidence

*Preliminary Incidence and Trends of Infection with Pathogens Transmitted Commonly Through Food - Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2006-2017* describes surveillance data for 2017 and compares them with 2014-2016 data. In 2017, the national incidence of confirmed cryptosporidiosis was 3.7 cases per 100,000 population. A Healthy People 2020 national health objective has not been established for cryptosporidiosis.

One (1) laboratory-confirmed and twenty-nine (29) probable cases of cryptosporidiosis were reported in Washoe County in 2017, for an incidence of 6.63 cases per 100,000 population, a significant increase compared to 2016. It is important to note that there has been a more widespread use of diagnostic testing such as rapid screening due to the recent licensing of nitazoxanide for the treatment of cryptosporidiosis. Nitazoxanide was licensed by the Food and Drug Administration (FDA) in November 2002 for the treatment of cryptosporidiosis in children aged 1-11 years. In June 2004, nitazoxanide was also licensed for older children and adults.

Figure 2.2 Rates of Reported Cases of Cryptosporidiosis, 2007 – 2016



## 2. Population Affected

The median age of cases was 40 years (range: 1 years – 89 years). There were 18 (60%) female. Twenty-five (25) cases were White, non-Hispanic, three (3) Hispanic, one Black and one (1) was Asian. Two of the cases were in food handlers. Four (4) of the cases were hospitalized for an average of 2.5 days (range between 2 and 5 days) and no deaths were reported.

Figure 2.3 Cryptosporidiosis Cases by Age and Gender, Washoe County, 2017

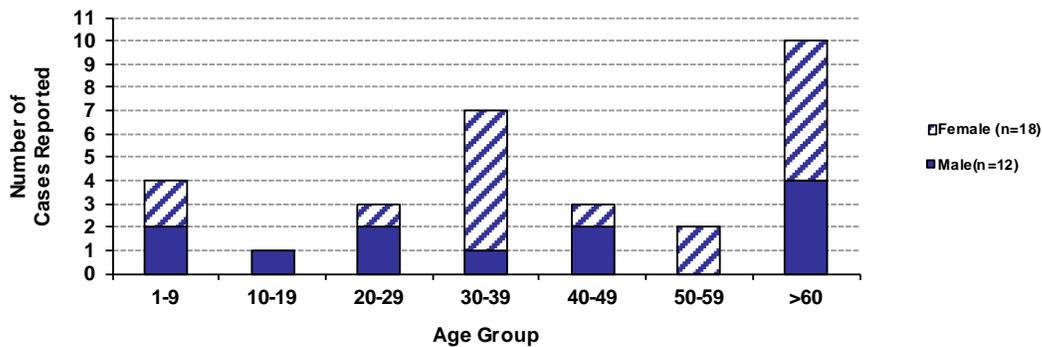


Table 2.1 Reported Risk Factors Among Cryptosporidiosis Cases, Washoe County, 2017

Risk Factor (not mutually exclusive)	Number of Cases	%
Travel (5 international and 11 domestic)	16	53
Recreational water exposure	15	50
Daycare associated	1	3
Contact with ill animals	4	13
Underlying chronic conditions	2	7
Unable to interview (exclusive)	0	0
No known risk factors identified (exclusive)	2	7

No cryptosporidiosis outbreaks were reported in 2017.

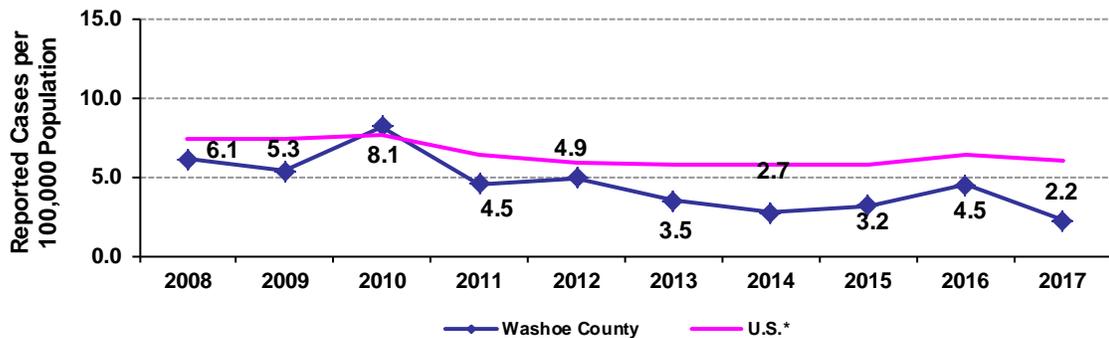
### C. Giardiasis

Giardiasis is a diarrheal illness transmitted via the fecal/oral route and caused by a one-celled parasite, *Giardia lamblia*. *Giardia* lives in the intestines of people and animals. The parasite is passed in the stool of an infected person or animal. It is protected by an outer shell that allows it to survive outside the body and in the environment for long periods of time. *Giardia* is found in every region of the United States and throughout the world. During the past two decades, *Giardia* has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. It is also easily transmitted from person-to-person and is a common cause of diarrhea in child care settings.

#### 1. Reported Incidence

In 2017, the national reported incidence of giardiasis was 5.94 cases per 100,000 population, which was the most current national data. In 2017, 10 cases of giardiasis were reported in Washoe County for an incidence rate of 2.2 cases per 100,000 population. All 10 cases were laboratory confirmed.

Figure 2.4 Rates of Reported Cases\* of Giardiasis, 2008 – 2017

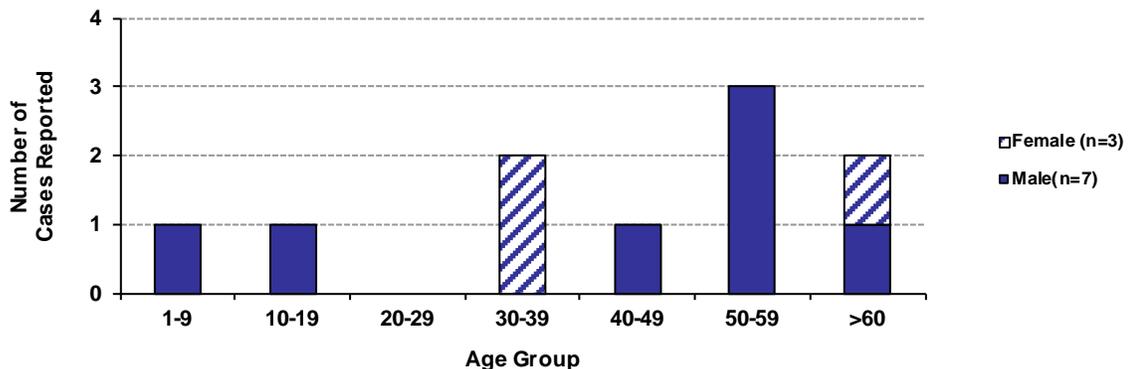


\*Giardiasis was not nationally notifiable until 2002. Effective in 2009, probable cases became reportable in Washoe County.

#### 2. Population Affected

The median age of cases in Washoe County was 46 years (range: 7 years – 64 years). Seven (7) cases (70%) were male. Six (6) cases were White non-Hispanic, two (2) Asian and two (2) Hispanic. One case was hospitalized for 9 days. No deaths were reported.

Figure 2.5 Giardiasis Cases by Age and Gender, Washoe County, 2017



**Table 2.2 Giardiasis Cases by Race and Ethnicity, Washoe County, 2017**

Race/Ethnicity	Number of Cases	Percent of Cases	Cases per 100,000 Population
White/non-Hispanic	6	60	2.1
Hispanic	2	20	1.8
American Indian/Alaska Native	0	0	0.0
Black	0	0	0.0
Asian	2	20	6.4
<b>Total cases</b>	<b>10</b>	<b>100</b>	<b>2.2</b>

**Table 2.3 Reported Risk Factors Among Giardiasis Cases, Washoe County, 2017**

Risk Factor (not mutually exclusive)	Number of Cases	%
Domestic / International Travel (3/2)	5	50
Recreational water exposure	4	40
Drank untreated water	0	0
Animal contact*	0	0
Contact with symptomatic confirmed case	0	0
Day care associated**	0	0
No acknowledged risk (exclusive)	4	40
Unknown risks (unable to interview, exclusive)	0	0
* High risk animal contact such as sick animal, sick puppies, etc.		
** Includes day care attendees, staff, or persons who live with a day care attendee.		

No outbreak of giardiasis was reported in 2017.

### III. Viral Enteric Diseases

#### A. Norovirus

“Norovirus” is the official genus name for the group of viruses previously called “Norwalk-like viruses” (NoV), a member of the viral family *Caliciviridae*. Norovirus infection causes gastrointestinal illness characterized by nausea, abdominal cramps, profuse diarrhea and projectile vomiting.

Noroviruses are human pathogens transmitted primarily through the fecal/oral route, by consumption of fecally contaminated food or water, or by direct person-to-person spread. Airborne and fomite transmission are also likely. Aerosolization of vomitus presumably results in droplets contaminating surfaces or entering the oral/nasal passages and being swallowed.

During January 1, 2016 through December 31, 2016, public health departments reported 841 foodborne disease outbreaks to the Centers for Disease Control and Prevention (CDC). Norovirus was the most reported etiological agent accounting for 39% of confirmed cases. The CDC annual outbreak reports for 2017 were not available as of the date this report was prepared.

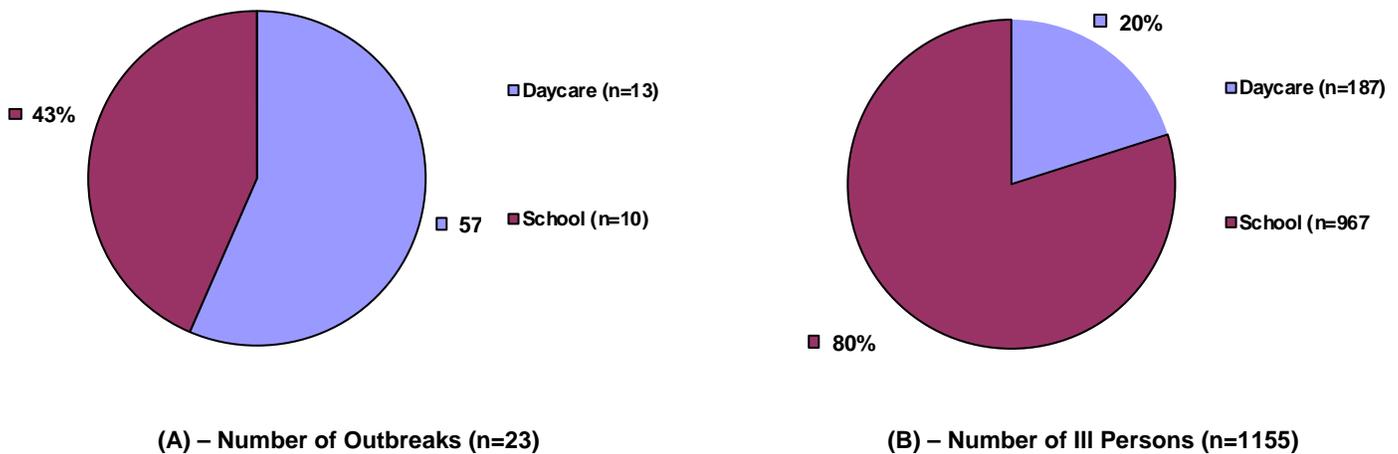
Most foodborne outbreaks of NoV illness are the result of direct contamination of food by a food handler immediately before its consumption. By contrast, NoV outbreaks in group living facilities are usually due to person-to-person, fomite and aerosol transmission. A public vomiting incident (PVI) carries high risk for transmission to other nearby persons. Contaminated raw oysters, fruits, vegetables and water have also caused outbreaks

Cases of NoV are not reportable in Nevada unless they are part of an outbreak. In 2017, NoV was confirmed as the cause of seven (7) outbreaks and suspected as the cause of fifteen (15) other outbreaks in Washoe County. Sapovirus was suspected as the etiology in one (1) gastrointestinal outbreak at an elementary school.

Of the twenty-three (23) total viral gastroenteritis outbreaks reported in Washoe County, 57% (13/23) occurred in a daycare/pre-school setting and 43% (10/23) occurred in a school setting. The median number of reported ill persons per outbreak was 19 (range: 8 - 167 reported ill persons per outbreak). A total of 1,155 persons were reported as ill of which 1,137 met the case definition. Less than 1% (11/1,155) were confirmed by laboratory testing.

Of the 1,155 reported ill persons, 84% (967/1,155) were associated with a school setting, 6% (188/1,155) were in a day care/pre-school setting. The transmission modes were primarily person-to-person.

**Figure 3.1 Reported Norovirus Outbreaks by Facility type, Washoe County, 2017**



#### IV. Surveillance, Prevention and Control of Enteric Diseases

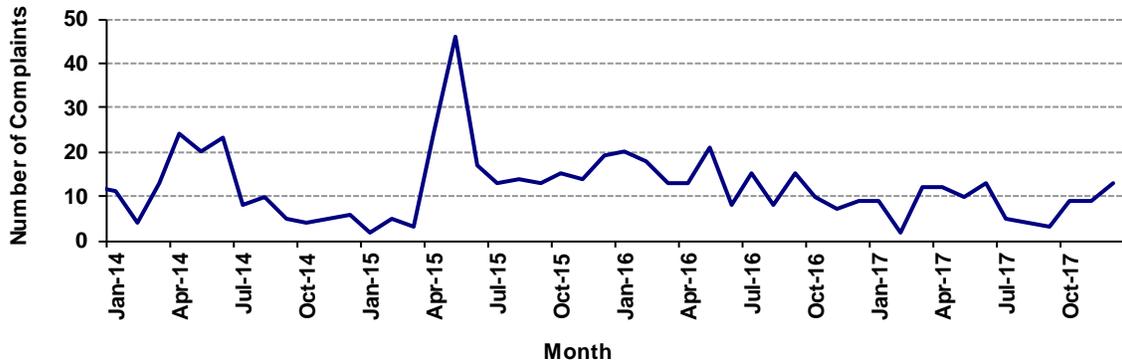
##### A. Investigation of Consumer Complaints

In 2017, the Division of Environmental Health Services (EHS) Food Safety Program received 101 complaints involving 121 individuals reporting a foodborne illness. Foodborne illnesses comprise the various acute syndromes that result from the ingestion of foods contaminated by infection-producing bacteria, parasites and viruses. The Food Safety Program is responsible for surveillance and investigation of foodborne illness complaints in Washoe County. The purpose of these investigations is to identify and halt potential epidemics of foodborne illness.

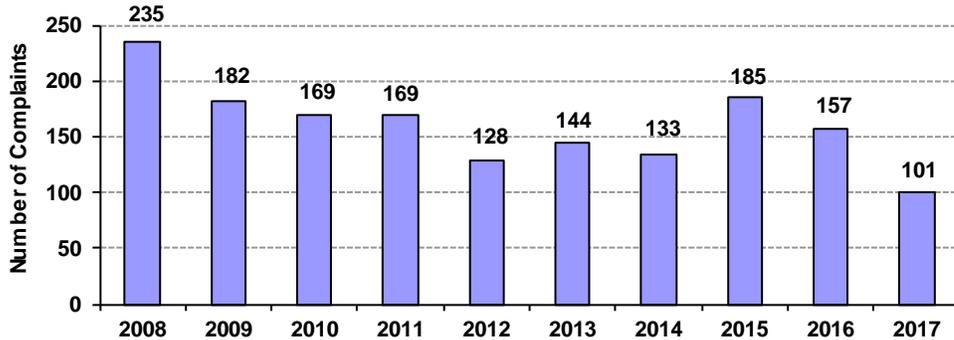
The number of complaints averaged 8 per month and ranged from two (2) in February to thirteen (13) in both June and December. In 2013 through 2017, the number of complaints received per month averaged 12, 11, 10, 13 and 8 respectively. All foodborne illness or food product complaints that involved a product regulated by the Food and Drug Administration (FDA) or the United States Department of Agriculture (USDA) were forwarded to the respective agency.

In addition to investigating foodborne illness complaints, the Food Safety Program is also responsible for responding to and investigating gastrointestinal complaints associated with Schools and Child Care Facilities.

**Figure 4.1 Foodborne Illness Complaints Received by Month, WCHD, 2014 – 2017**



**Figure 4.2 Foodborne Illness Complaints, WCHD, 2008– 2017**



**B. Exclusion of Ill Food Handlers**

Five (5) food service workers were excluded from work in 2017 to prevent transmission of confirmed or suspected diseases through handling food or person-to person contact. All individuals were allowed to return to work after the Washoe County Health District (WCHD) determined they were no longer contagious.

**C. Consumer Alerts and Recalls**

The Food Safety Program also monitored consumer alert and recall notices on the internet. Most of the recalls and alerts did not affect Washoe County residents, as most products were not shipped into the area. If a product was distributed into Washoe County, staff ensured that distributors and/or retail outlets were notified and complied with the recommendations. The total number of consumer alerts/recalls tracked by the food safety program in 2017 was 18.

**D. Outbreaks**

In addition to viral gastroenteritis outbreaks in school and childcare settings there were ten (10) outbreaks of Hand, Foot and Mouth Disease (HFMD) in local childcare settings which accounted for nineteen percent (10/52) of the outbreaks reported in Washoe County in 2017. Other outbreaks associated with school and childcare settings included Respiratory Syncytial Virus (4) Influenza like

Illness (4), Strep Throat (2) and an unknown febrile illness (2). There were five (5) investigations of permitted food establishments related to consumer illness complaints but no outbreaks were associated with any of these facilities.

### **1. Gastrointestinal Outbreak at a Middle School**

On October 25<sup>th</sup>, 2017 notification was received by EHS from the Communicable Disease (CD) program of an outbreak of gastrointestinal (GI) illness at a local Middle School (Middle School A). The initial report indicated there were nine (9) ill students; eight (8) with vomiting and one (1) with diarrhea. On November 1<sup>st</sup>, 2017 EHS staff received notification that the number of reported GI illnesses had ballooned to sixty-five (65), eight (8) of which were school staff. Interviews for ill students and staff were conducted from line lists reported through the CD program. Twenty (20) contacts of ill students and staff were made and seven (7) interviews conducted between November 1<sup>st</sup>, 2017 and November 21<sup>st</sup>, 2017. A total of four (4) stool collection kits were dropped off and one (1) was picked up from a student and submitted to the Nevada State Public Health Lab (NSPHL) for analysis. On November 5<sup>th</sup>, 2017 the result from NSPHL was reported back to EHS as negative for Stool bacteria and Norovirus. On November 21<sup>st</sup>, 2017, the outbreak at Middle School A was declared over by staff from the CD program. In total, there were one-hundred and forty-two (142) students who had reported ill with GI symptoms for an 18% attack rate (142/789). Fourteen (14) staff had reported GI illness for a 19% attack rate (14/74). The cause of the GI illness outbreak was not determined.

### **2. Gastrointestinal Outbreak at an Elementary School in Reno**

On October 25<sup>th</sup>, 2017 notification was received by EHS from the CD program of an outbreak of gastrointestinal (GI) illness at a local Elementary School (Elementary School A) in Reno. The initial report indicated there were ten (10) ill students of which two (2) had vomited at school in a 4<sup>th</sup> grade classroom. On November 2<sup>nd</sup>, 2017 EHS staff received notification that the number of GI illnesses reported for students had increased to fifteen (15) and there was one (1) report of GI illness from a staff member. By November 8<sup>th</sup>, 2017 the number of ill students had increased to thirty-nine (39). Nineteen (19) contacts of ill students and staff were made and nine (9) interviews conducted between November 2<sup>nd</sup>, 2017 and December 14<sup>th</sup>, 2017. A total of six (6) stool collection kits were dropped off and four (4) were picked up from students and submitted to the NSPHL for analysis. On November 18<sup>th</sup>, 2017 a positive result for Sapovirus was reported to EHS from NSPHL from a student specimen from Elementary School A.

By November 29<sup>th</sup>, 2017 the outbreak had increased to ninety-one (91) total students and three (3) staff. On December 6<sup>th</sup>, 2017 EHS conducted an epidemiological investigation at Elementary School A. During the investigation it was determined that Elementary School A had 3 lunch periods and staff indicated that there was not enough time to sanitize the tables in between lunches in the cafeteria. The school principal was notified and EHS required as per investigation to increase the time of vacancy for the cafeteria to 25 minutes in between the lunches so that all tables could be sanitized in between. Recommendations were also made on the EHS report to continue to monitor for illness and to sanitize all high touch areas with 1,000ppm bleach solution each day.

On December 22<sup>nd</sup>, 2017 Winter Break had started for Elementary School A and the case was closed. In total, there were one-hundred and thirty-three (133) students who had reported ill with GI symptoms for a 24% attack rate (133/561). Four (4) staff had reported GI illness for a 5% attack rate (4/75). The suspected etiology for the outbreak was Sapovirus.

## HEPATITIS

“Hepatitis” is a general term for inflammatory conditions of the liver. It is characterized by jaundice, hepatomegaly, anorexia, abdominal and gastric discomfort, abnormal liver function, clay-colored stools and dark urine. It may be mild and brief, or severe, fulminate and life threatening. Hepatitis may be caused by: bacterial or viral infection, parasitic infestation, alcohol and/or drug abuse, chemical or biological toxins or transfusion of incompatible blood. This report will focus only on viral forms of hepatitis.

### I. Hepatitis A Virus (HAV) Infection

#### A. Surveillance Case Definition (2012 CDC case definition)

##### Clinical Description

An acute illness with a discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) or aspartate aminotransferase (AST) levels.

##### Laboratory Criteria for Diagnosis

Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive

##### Case Classification

###### Confirmed

- A case that meets the clinical case definition and is laboratory confirmed, **OR**
- A case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms)

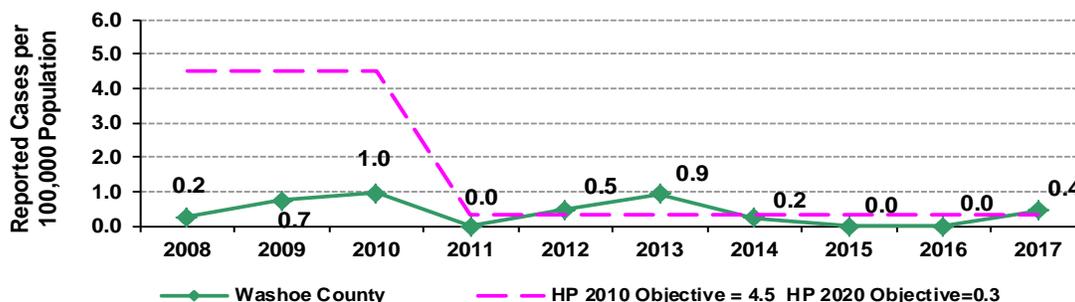
#### B. Epidemiology

HAV is transmitted from person-to-person via the fecal/oral route. Historically, children have had the highest rates of HAV infection. They are often asymptomatic, and are a primary source of acute infection to household members and contacts in child care facilities. As of July 1, 2002, Nevada Administrative Code Chapters 392.105 and 394.190 requires all children entering a Nevada school (public or private) for the first time to be immunized against HAV. HAV can produce jaundice or a flu-like syndrome in adults. There is no chronic form of HAV but there is a relapsing form with a prolonged course (that can last for up to 6 months).

##### 1. Reported Incidence

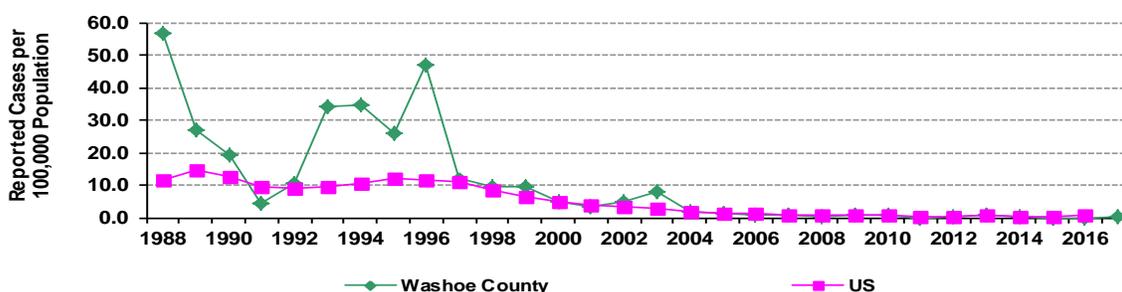
Two (2) laboratory-confirmed cases of acute hepatitis A were reported in 2017 for an incidence rate of 0.4 cases per 100,000 population. The Healthy People 2020 national health objective for acute HAV is 0.3 cases per 100,000 population. In 2016, the national incidence rate of acute hepatitis A was 0.6 cases per 100,000 population, which was the most current national data.

Figure 1.1 Rates of Reported Acute Hepatitis A Cases, Washoe County, 2008-2017



HAV infection follows a cyclic pattern. In the United States, nationwide increases in incidence were historically seen every 10-15 years. Washoe County has observed peaks in 1985, 1988 and 1996.

Figure 1.2 Rates of Reported Acute Hepatitis A Cases, Washoe County, 1988 – 2017



## 2. Population Affected

Two (2) cases of acute hepatitis A were reported in 2017. Both cases were non-Hispanic females. One case was White and one case was Black. One case was in the 40-49 year age group and one case was in the 50-59 year age group. Both cases were hospitalized.

## C. Prevention and Control

### 1. Post-exposure Prophylaxis

Both cases were interviewed and exposed contacts were identified. A total of eight (8) contacts to cases were identified.

Table 1.1 Disposition of HAV contacts, Washoe County, 2017 (n=8).

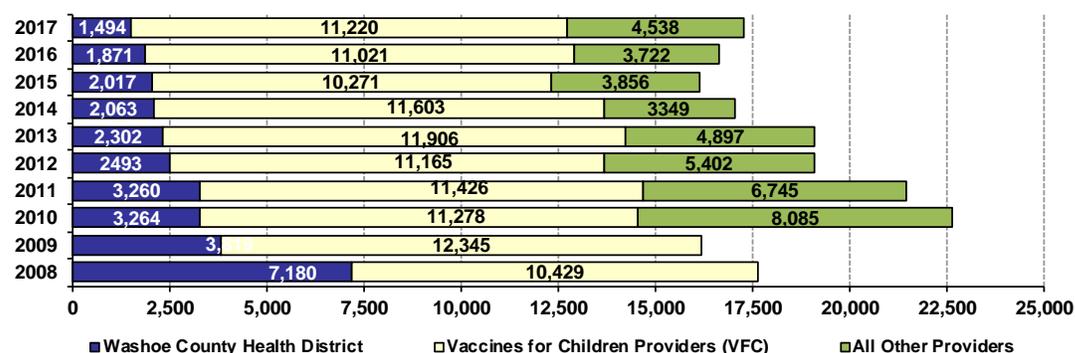
Disposition	Total	Percent
IG recommended and received*	1	13
IG recommended but contact non-compliant	1	13
Immune	4	50
Beyond the timeframe for effective PEP	0	0
Vaccine recommended and received*	0	0
Vaccine recommended but contact non-compliant	2	25
<b>Total</b>	<b>8</b>	<b>100</b>
Contact Index (number of contacts per case) = 4		

No outbreaks of hepatitis A were reported in 2017.

## 2. Routine Hepatitis A Vaccination

HAV vaccine first became available in 1995. Since 2002, HAV vaccination has been required for all students entering the Washoe County School District or any private educational setting in Washoe County.

Figure 1.4 Total Doses of HAV Vaccine Administered, Stratified by Provider, 2008 – 2017



## II. Hepatitis B Virus (HBV) Infection

### A. Surveillance Case Definitions

#### 1. Acute HBV Infection (2012 CDC case definition)

##### Clinical Description

An acute illness with a discrete onset of any sign or symptom\* consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) levels >100 IU/L.

\*A documented negative hepatitis B surface antigen (HBsAg) laboratory test result within 6 months prior to a positive test (either HBsAg, hepatitis B "e" antigen (HBeAg), or hepatitis B virus nucleic acid testing (HBV NAT) including genotype) result does not require an acute clinical presentation to meet the surveillance case definition.

##### Laboratory Criteria for Diagnosis

- HBsAg positive, AND
- Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive (if done)

##### Case Classification

###### Confirmed

A case that meets the clinical case definition, is laboratory confirmed, and is not known to have chronic hepatitis B.

## 2. Chronic Hepatitis B (2012 CDC case definition)

### Clinical Description

No symptoms are required. Persons with chronic hepatitis B virus (HBV) infection may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.

### Laboratory Criteria for Diagnosis

- Immunoglobulin M (IgM) antibodies to hepatitis B core antigen (IgM anti-HBc) negative AND a positive result on one of the following tests: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), or nucleic acid test for hepatitis B virus DNA (including qualitative, quantitative and genotype testing), OR
- HBsAg positive or nucleic acid test for HBV DNA positive (including qualitative, quantitative and genotype testing) or HBeAg positive two times at least 6 months apart (Any combination of these tests performed 6 months apart is acceptable)

### Case Classification

#### Probable

A person with a single HBsAg positive or HBV DNA positive (including qualitative, quantitative and genotype testing) or HBeAg positive lab result and does not meet the case definition for acute hepatitis B.

#### Confirmed

A person who meets either of the above laboratory criteria for diagnosis.

#### Comment(s)

Multiple laboratory tests indicative of chronic HBV infection may be performed simultaneously on the same patient specimen as part of a "hepatitis panel." Testing performed in this manner may lead to seemingly discordant results, e.g., HBsAg-negative AND HBV DNA-positive. For the purposes of this case definition, any positive result among the three laboratory tests mentioned above is acceptable, regardless of other testing results. Negative HBeAg results and HBV DNA levels below positive cutoff level do not confirm the absence of HBV infection.

## B. Epidemiology

Hepatitis B virus (HBV) is transmitted from person-to-person through activities that involve percutaneous or mucosal contact with infectious blood or body fluids. Six to ten percent of people over the age of 5 with acute HBV infection will develop chronic HBV infection, while 90% of infants infected with HBV will remain chronically infected. An estimated 850,000 – 2.2 million persons in the U.S have chronic HBV infection, and are a reservoir for transmission of HBV. Household, sexual and needle-sharing contacts of persons with chronic HBV infection should be vaccinated. Chronic HBV infection may be asymptomatic. There may be no evidence of liver disease or there may be a spectrum of disease ranging from asymptomatic to cirrhosis or liver cancer

## 1. Acute Hepatitis B

### a. Reported Incidence

Five (5) laboratory-confirmed cases of acute hepatitis B were reported in Washoe County in 2017 for an incidence rate of 1.1 cases per 100,000 population. The incidence rate was 1.1 cases per 100,000 population among individuals 19 years of age and older in 2017. The Healthy People 2010 national health objective for acute HBV infection used to be divided into specific age groups; however, the HP 2020 objective for acute HBV infection is now 1.5 cases per 100,000 in adults aged 19 years and older. In 2016, the national incidence rate of acute hepatitis B was 1.0 case per 100,000 population, which was the most current data.

Figure 2.1 Rates of Reported Cases of Acute Hepatitis B, Washoe County, 2008 – 2017



### b. Population Affected

In 2017, five (5) cases of acute hepatitis B were reported. One case was in each of the following age groups: 20-29, 30-39, 40-49, 50-59, and 60-69 years. Four were male and one was female. Cases were identified as White (3), Black (1), and Native American/Alaskan Native (1). Four cases were non-Hispanic and one was Hispanic. All five cases were hospitalized. No deaths were reported.

Figure 2.2 Reported Cases of Acute Hepatitis B by Age and Gender, Washoe County, 2017 (n=5).

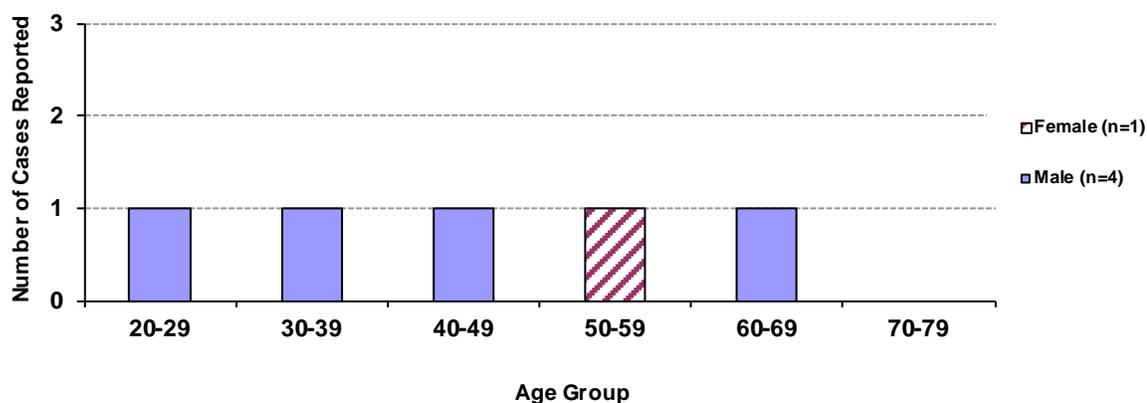


Figure 2.3 Reported Cases of Acute Hepatitis B by Race/Ethnicity, Washoe County, 2017

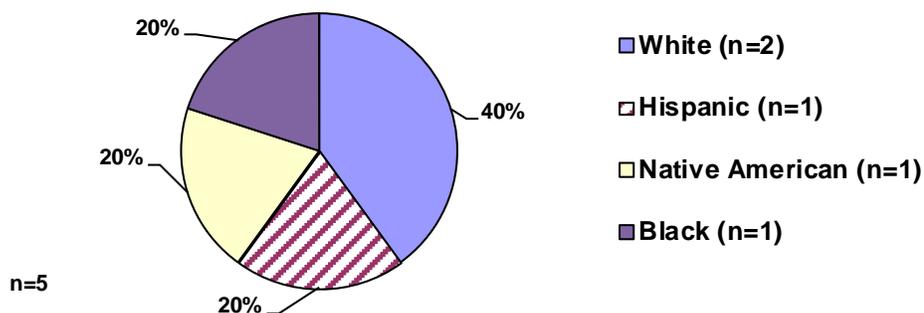


Table 2.1 Reported Risk Factors among Acute Hepatitis B Cases, Washoe County, 2017

Risk Factor (not mutually exclusive)	Number of Cases	%
No history of HBV vaccine	5	100
Ever treated for a sexually transmitted disease	2	40
Injected drugs not prescribed by a doctor	0	0
Dental work or oral surgery	0	0
Incarcerated for longer than 24 hours	0	0
Male with sexual contact with 2-5 female partners	2	40
Female with sexual contact with 1 male partner	1	20
Male with sexual contact with 1 female partner	0	0
MSM	1	20
Used street drugs but did not inject	0	0
Hospitalized	0	0
Surgery	0	0
Incarcerated for longer than 6 months	0	0
Tattoo	1	20
IV infusions and/or injections in outpatient setting	0	0
Blood exposure (not health care related, includes sharing needles)	0	0
Sexual contact of a person with confirmed acute or chronic HBV infection	0	0
Denied any risk factors	1	20
Unknown*	0	0

\* Unable to locate for an interview

## 2. Chronic Hepatitis B

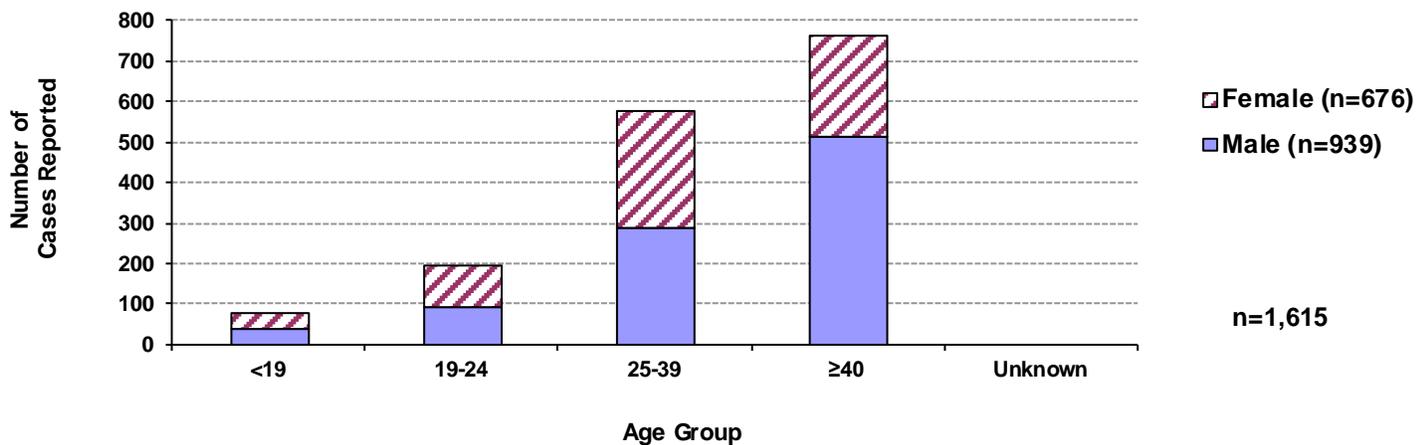
### a. Reported Incidence

From 1990-2017, 1,615 unique (non-duplicate) cases of chronic HBV infection have been reported in Washoe County. Of the 65 cases reported in 2017, none had been previously reported. Twenty-nine (29) of the 65 newly reported chronic HBV cases (45%) were female.

Seven (7) pregnant women with chronic HBV infection were reported in 2017. Three (3) cases (38%) were newly reported. One case was transferred to another state and one case moved out of the country. Three (3) of the 7 women (43%) delivered in 2017. Two (2) women (29%) had not given birth as of December 31, 2017.

### b. Population Affected

Figure 2.5 Chronic HBV Cases by Age at Time of Diagnosis and Gender, Washoe County, 1990-2017



Persons born in HBV-endemic areas such as Southeast Asia, Africa, the Amazon Basin in South America, the Pacific Islands and the Middle East are at higher risk of acquiring HBV infection at birth. Up to 90% of infants infected at birth will develop chronic HBV infection.

Figure 2.6 Chronic HBV Cases by Race/Ethnicity, Washoe County, 1990-2017

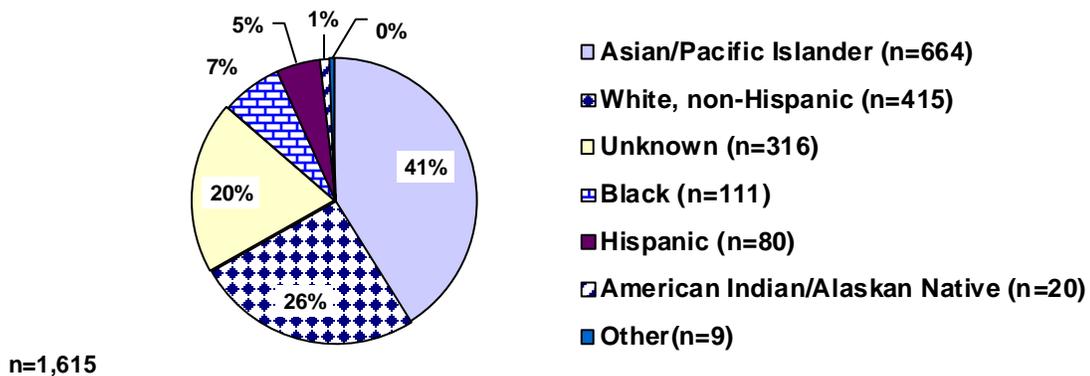
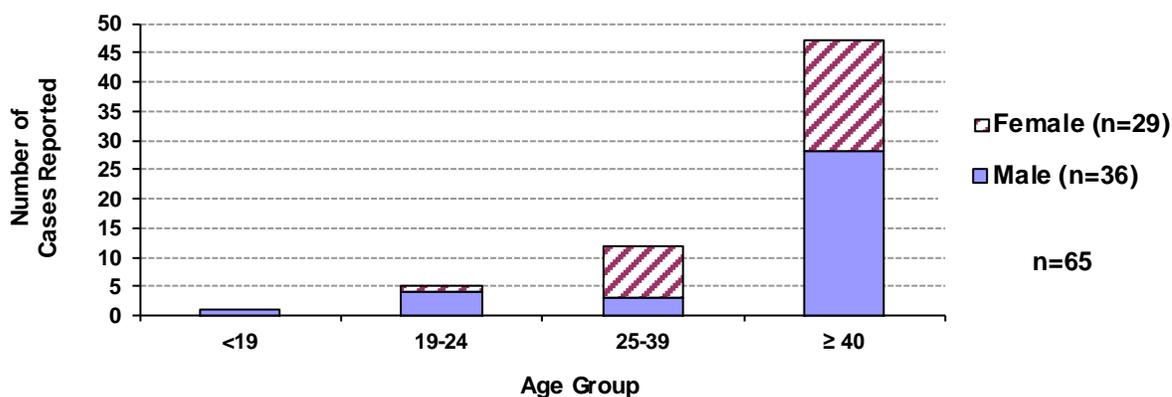
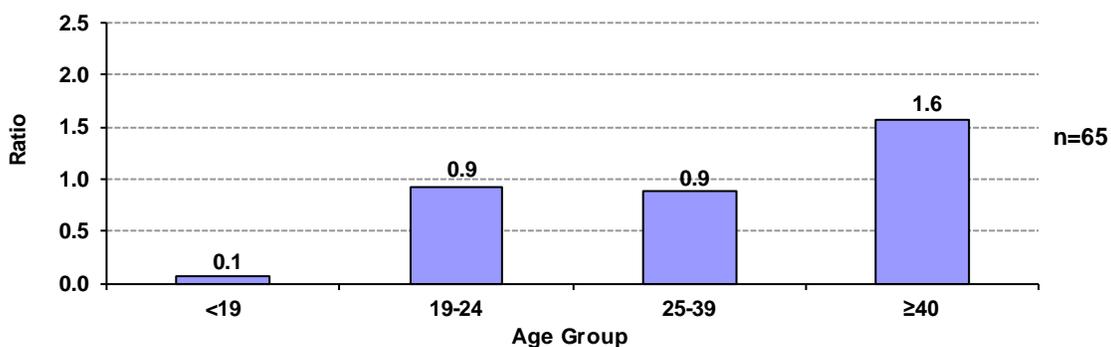


Figure 2.7 Newly Reported Chronic HBV Cases by Age and Gender, Washoe County, 2017



In 2017, one case was reported in the <19 year age group. The case had been part of the WCHD’s Perinatal Hepatitis B Prevention Program. The infant had received both HBIG and hepatitis B vaccine within 12 hours of birth. Hepatitis B vaccine doses #2 and #3 had been completed on schedule. At 5 months of age the infant developed fulminant liver failure secondary to hepatitis B infection requiring a liver transplant.

Figure 2.8 Age-Specific Ratio\* of Newly Reported Chronic HBV Cases, Washoe County, 2017



\*Ratios were calculated by: 
$$\frac{\% \text{ of cases in age group}}{\% \text{ of overall population in age group}}$$

The age-specific ratio provides an easy way to see if a particular age group is being more impacted by a disease than would be expected based on the number of individuals in that age group. Figure 2.8 demonstrates that the 40 years and older age group is more heavily impacted.

In 2015, due to reduced program personnel, active surveillance for non-prenatal chronic hepatitis B was discontinued. The system only documents data available on the laboratory report. Therefore, a large proportion of newly reported cases are missing race/ethnicity information (Figure 2.9)

Figure 2.9 Newly Reported Chronic HBV Cases by Race/Ethnicity, Washoe County, 2017

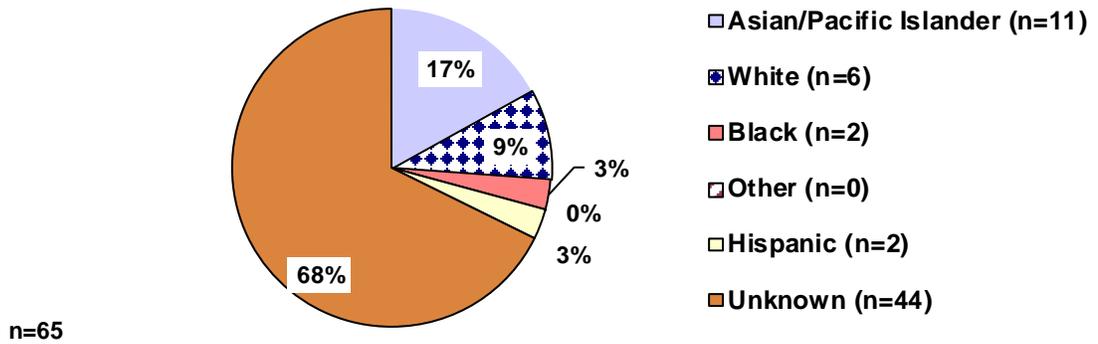
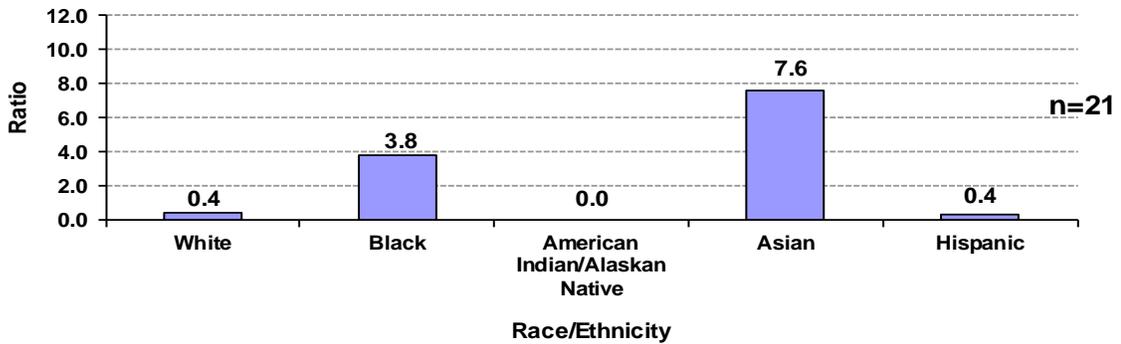


Figure 2.10 Race/Ethnicity-Specific Ratio\* of Newly Reported Chronic HBV Cases, Washoe County, 2017



(Forty four cases with unknown or other race/ethnicity)

\*Ratios were calculated by: 
$$\frac{\% \text{ of cases in race/ethnicity group}}{\% \text{ of overall population in race/ethnicity group}}$$

The race/ethnicity-specific ratio provides an easy way to see if a particular race/ethnicity group is being more impacted by a disease than would be expected based on the number of individuals in that group. Figure 2.10 demonstrates that the Asian and Black populations are more heavily impacted.

Figure 2.11 Pregnant Women with Chronic HBV by Race/Ethnicity, Washoe County, 2017

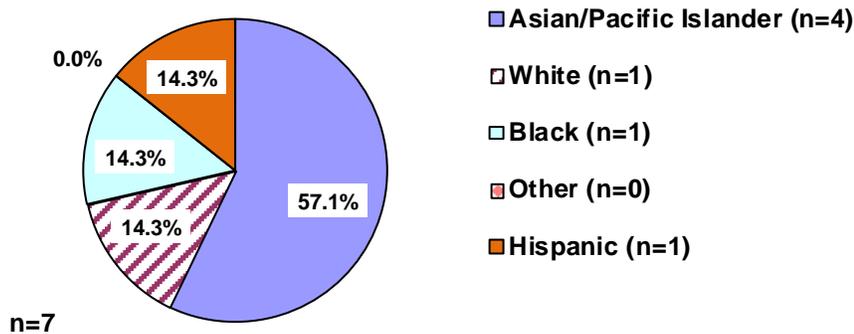
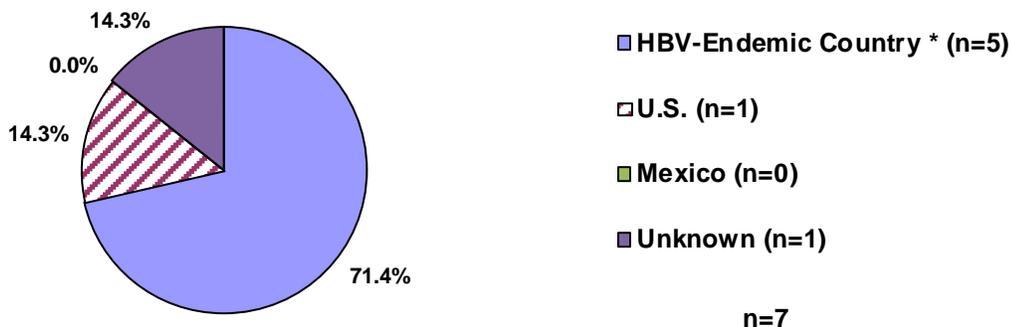


Figure 2.12 Pregnant Women with Chronic HBV by Birth Country, Washoe County, 2017



\* Countries from Southeast Asia, Africa, the Amazon Basin in South America, the Pacific Islands, and the Middle East.

## B. Prevention and Control

Beginning in 2014, due to restricted program resources, testing and/or vaccinations have only been provided to household and sexual contacts of perinatal HBV cases and acute HBV cases.

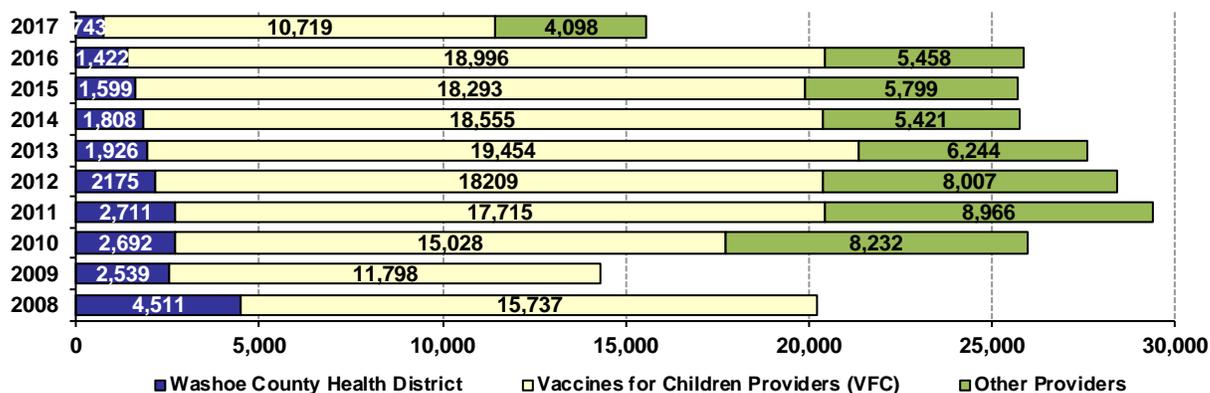
### 1. Hepatitis B Immune Globulin (HBIG) for Postexposure Prophylaxis

No sexual contacts of an acute hepatitis B case received HBIG in 2017.

### 2. Routine Hepatitis B Vaccination

In Washoe County, HBV vaccine has been given routinely to infants since 1993. In 1997, an adolescent HBV immunization initiative began to close the gap among middle school children. Nevada Administrative Code (NAC) 392.105 and 394.190 requires all children entering a Nevada school (public or private) for the first time to be immunized against HBV.

Figure 2.13 Doses of HBV Vaccine Given, Stratified by Provider, 2008 – 2017



### 3. Screening and Vaccination of Contacts to Chronic HBV Infection

The Perinatal Hepatitis B Prevention Program (PHBPP) identifies pregnant women with HBV infection. HBIG and HBV vaccine are provided to newborns within 12 hours of birth. Seroscreening is

completed at the end of the HBV vaccination series. Household and sexual contacts are offered seroscreening and if necessary HBV vaccine. Between 1992 and 2013, the program expanded to include the household and sexual contacts of *all* persons with HBV infection. The expanded surveillance was discontinued due to restricted program resources. However, the statistics for 1992-2013 in this section (3) will be kept in this annual summary to maintain the integrity of such surveillance even though there are no updates for 2014 and subsequent years.

Between 1990-2013, the PHBPP identified 1,372 household and sexual contacts of people with chronic HBV infection. Of the 1,372 contacts, 708 (52%) completed seroscreening; results were available for 705 and missing for three (3). Of 705 with results, forty-six (7%) already had chronic HBV infection; 341 (48%) were already immune; and 318 (45%) were susceptible. The PHBPP referred all susceptible contacts to the WCHD Immunization Program or to their health care providers to complete the three-dose series of HBV vaccine. One hundred thirty eight (138) of 318 susceptible contacts (43%) with seroscreened results completed the hepatitis B vaccine series between 1990 and 2013\*.

**Table 2.2 Immune Status of Household and Sexual Contacts of Chronic HBV Cases, Washoe County, 1990-2013.**

# Seroscreened	Results				Susceptible Contacts** Who Completed 3-dose HBV
	Chronic HBV	Immune	Susceptible	Total*	
708	46	341	318	705	138
% of total	6.5	48.4	45.1	100	43

\* Remaining 3 missing results

*\*The number of susceptible contacts from previous years included both those that were seroscreened and were proven to be susceptible, as well as, those that were not seroscreened but subsequently received the 3 dose HBV vaccination series. Starting this year, 2013, only those that were seroscreened are included in the data.*

In 2013, 51 household and sexual contacts of chronic HBV cases were identified; 14 (27%) were seroscreened. Six (6) of the ten (10) susceptible contacts (60%) started the HBV vaccine series.

**Table 2.3 Household and Sexual Contacts (Identified in 2013) of Chronic HBV Cases, Washoe County, 2013.**

Total Identified	# Seroscreened	Results			
		Chronic HBV	Immune	Susceptible	Total
51	14	0	4	10	14
% of Total	27	0	29	71	100

#### 4. Infants Born to HBsAg-Positive Women

Nine (9) infants were born to women with chronic HBV infection in 2017. All infants (100%) received HBIG and HBV vaccine within 12 hours of birth, as recommended. In 2017, births to women with chronic HBV infection accounted for 0.20% of the 5,961 births (internal unpublished data) that occurred in Washoe County.

Seven (7) infants completed post-vaccination seroscreening in 2017. Six (6) infants were born in 2016 and one (1) was born in 2017.

Seven (7) of 7 infants who were post-vaccination tested in 2017 and who were positive for anti-HBs and negative for HBsAg, received perinatal intervention with HBIG and HBV vaccine.

**Table 2.4 Post-Vaccination Testing of Infants Born to HBsAg-Positive Women, Washoe County, 2017**

Total Sero- screened	Test Results		HBIG Within	Hep B Dose 1 Within
	HBsAg negative	anti-HBs positive	12 Hrs. of Birth	12 Hrs. of Birth
7	7	7	7	7
% of total	100	100	100	100

### III. Hepatitis C

#### A. Surveillance

##### 1. Surveillance Case Definitions

###### a. Acute Hepatitis C (2016 CDC Case Definition)

###### Clinical Criteria

An illness with discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), AND

(a) jaundice, OR

(b) a peak elevated serum alanine aminotransferase (ALT) level >200 IU/L during the period of acute illness.

###### Laboratory Criteria for Diagnosis

- A positive test for antibodies to hepatitis C virus (anti-HCV)
- Hepatitis C virus detection test:
  - Nucleic acid test (NAT) for HCV RNA positive (including qualitative, quantitative or genotype testing)
  - A positive test indicating presence of hepatitis C viral antigen(s) (HCV antigen)\*

\*When and if a test for HCV antigen(s) is approved by FDA and available.

#### Case Classification

##### Confirmed

- A case that meets clinical criteria and has a positive hepatitis C virus detection test (HCV NAT or HCV antigen), **OR**
- A documented negative HCV antibody, HCV antigen or NAT laboratory test result followed within 12 months by a positive result of any of these tests (test conversion).

##### Probable

- A case that meets clinical criteria and has a positive anti-HCV antibody test, but has no reports of a positive HCV NAT or positive HCV antigen tests, **AND**
- Does not have test conversion within 12 months or has no report of test conversion.

## **b. Chronic Hepatitis C (2016 CDC case definition)**

### **Clinical Criteria**

No available evidence of clinical and relevant laboratory information indicative of acute infection. Most hepatitis C virus (HCV)-infected persons are asymptomatic; however, many have chronic liver disease, which can range from mild to severe.

### **Laboratory Criteria for Diagnosis**

- A positive test for antibodies to hepatitis C virus (anti-HCV)
- Hepatitis C virus detection test:
  - Nucleic acid test (NAT) for HCV RNA positive (including qualitative, quantitative or genotype testing)
  - A positive test indicating presence of hepatitis C viral antigen(s) (HCV antigen)\*
    - \*When and if a test for HCV antigen(s) is approved by FDA and available.

### **Case Classification**

#### **Confirmed**

- A case that does not meet clinical criteria or has no report of clinical criteria, **AND**
- Does not have test conversion within 12 months or has no report of test conversion, **AND**
- Has a positive HCV NAT or HCV antigen test.

#### **Probable**

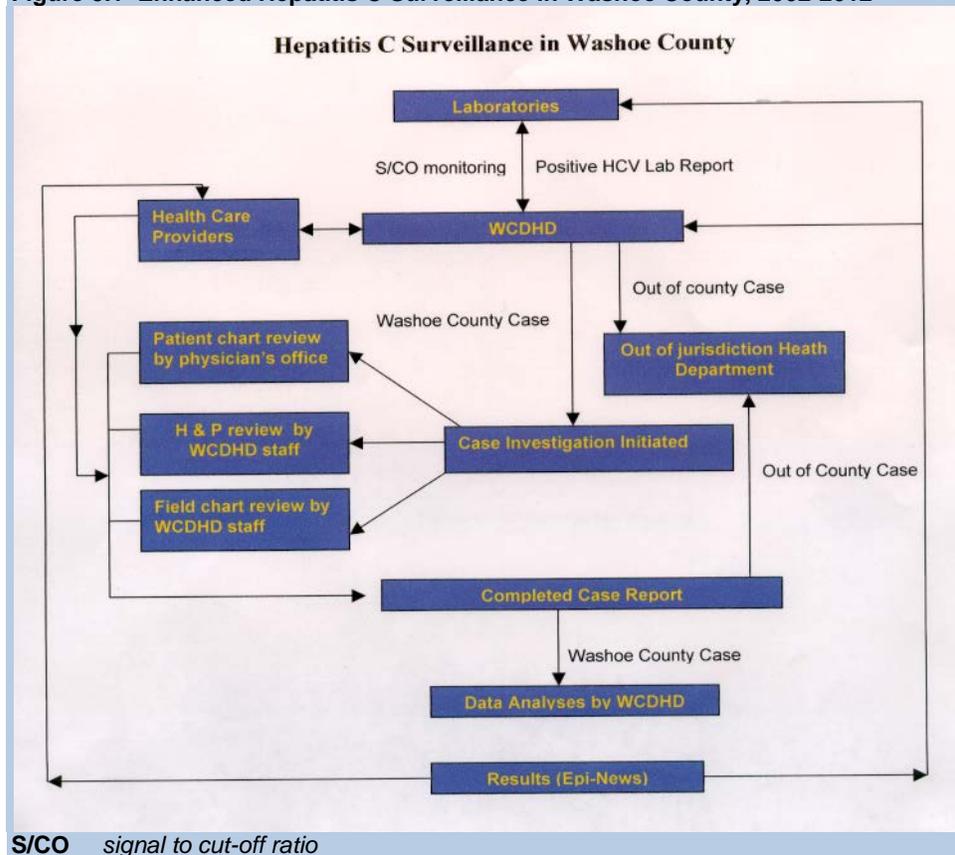
- A case that does not meet clinical criteria or has no report of clinical criteria, **AND**
- Does not have test conversion within 12 months or has no report of test conversion, **AND**
- Has a positive anti-HCV antibody test, but no report of a positive HCV NAT or positive HCV antigen test.

## **2. Methods**

Between May 1, 2002 and December 31, 2012, the Communicable Disease Control Program conducted enhanced surveillance for HCV infection in order to characterize the infected population in Washoe County. The objectives of this surveillance were to:

- Identify newly reported cases,
- Estimate the burden of HCV infection in the community,
- Characterize risk factors of infected persons, and
- Identify infected persons who can be counseled and referred for medical follow-up and immunization against HAV and HBV.

Figure 3.1 illustrates the process of enhanced HCV surveillance in Washoe County between 2002-2012. Beginning in 2013, hepatitis C surveillance was restricted to the laboratory test registry and chart review was discontinued.

**Figure 3.1 Enhanced Hepatitis C Surveillance in Washoe County, 2002-2012**

## B. Epidemiology

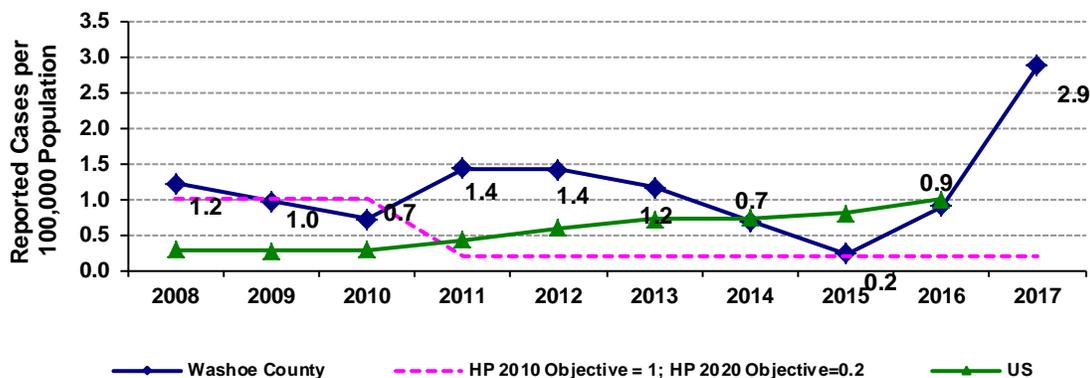
Chronic liver disease was the 9<sup>th</sup> leading cause of death in Washoe County and Nevada in 2017 . Population-based studies indicate that 40% of chronic liver disease is HCV-related. Hepatitis C virus (HCV) infection is the most common chronic blood-borne infection in the United States. This virus usually is transmitted primarily through large or repeated percutaneous exposures to blood – for example, through sharing of equipment between injection drug users. Approximately 75% - 85% of persons with acute HCV infection will develop chronic HCV infection. An estimated 3.5 million persons in the U.S have chronic HCV infection. Most HCV-infected people are asymptomatic and may not be aware of their infection. They are a source of HCV to others and are at risk for chronic liver disease.

### 1. Acute Hepatitis C

#### a. Reported Incidence

In 2017, thirteen (13) cases of laboratory-confirmed acute HCV infection were reported in Washoe County for a rate of 2.9 cases per 100,000 population. This rate is more than triple the rate of 2016. While the exact causes for this increase are unknown, possible contributing factors could include enhanced surveillance and case finding activities and increasing rates of sexually transmitted diseases. The Healthy People 2020 national health objective is 0.2 acute cases per 100,000 population. In 2016, the national incidence rate of acute hepatitis C was 0.9 cases per 100,000 population, the most current national data.

**Figure 3.2 Rate of Reported Cases of Acute Hepatitis C, Washoe County, 2008–2017**



**b. Population Affected**

In 2017, 13 cases of acute hepatitis C were reported. There were ten males and three females. Ten cases identified as white, non-Hispanic. The remaining three cases identified as Native American/Alaskan Native, Black, and Hispanic, respectively. Seven cases were hospitalized for their illness. No deaths were reported. Six cases provided a complete exposure history. All six had at least one risk factor for disease. The most frequently reported risk factors included contact to a confirmed or suspected case of hepatitis C (3), injection with drugs not prescribed by a doctor (3), incarceration (2), and treatment for a sexually transmitted disease (2).

**2. Hepatitis C Infection – Past or Present**

**a. Case Reports**

WCHD received a total of 12,747 positive HCV test results from laboratories between May 1, 2002 and December 31, 2017. Of the 12,747 lab reports, 9,675 (76%) were Washoe County residents, which corresponded with a prevalence of 2.14% in Washoe County. Of 9,675 cases, 648 (6.7%) were newly reported in 2017.

**Table 3.1 Hepatitis C Cases by Case Classification, Washoe County, May 2002 – December 2017 (Lab data only).**

Case Classification	No. Cases	%
Acute Hepatitis C	69	0.7
Confirmed HCV Infection, Past or Present	7,531	77.8
Probable HCV Infection, Past or Present	470	4.9
Unable to be Classified	870	9.0
Did Not Meet Case Definition	735	7.6
<b>Total</b>	<b>9,675</b>	<b>100.0</b>

The following statistics from section b through section d were the result of enhanced surveillance from May 2002 through December 2012, which included chart review for risk factors and reasons for testing for those cases reported from hospitals and high volume providers. Such chart review was discontinued beginning in 2013 because the epidemiological profile from 2002 through 2012 had not demonstrated any significant changes and personnel resources were restricted. However, these

statistics will be kept in this annual summary to maintain the integrity of such surveillance even though there are no updates for 2013 and subsequent years.

For 4,299 (65%) of the 6,633 lab results on Washoe County residents reported between May 2002 and December 2012, the patient's health care provider submitted a completed case report during the same period. Of the 4,299 case reports received, 293 (6.8%) could not be classified based on CDC's case definition and 181 (4.2%) did not meet the case definition. Therefore, the following statistics in section b through d reflect only the 4,118 cases with complete information.

## b. Reported Reasons for HCV Testing

Forty-one (41%) of the cases were identified through follow-up testing on a previous marker of hepatitis or evaluation of elevated liver enzymes. Nearly twenty-two percent (22%) of cases were identified through passive screening, including asymptomatic persons with or without risk factors, blood or organ donors, and pregnant women.

**Table 3.2 Reported Hepatitis C Cases by Reasons for Testing, Washoe County, May 2002 – December 2012.**

Reasons for Testing	No. Cases*	%
Follow-up testing for previous marker of hepatitis	1,031	25.0
Evaluation of elevated liver enzyme	642	15.6
Screening of asymptomatic patient with risk factors	552	13.4
Symptoms of acute hepatitis	132	3.2
Prenatal screening	79	1.9
Blood/organ donor screening	87	2.1
Screening of asymptomatic patient without risk factors	41	1.0
Other reasons	292	7.1
Unknown	858	20.8
Missing	404	9.8
<b>Total</b>	<b>4,118</b>	<b>100.0</b>

\* Excludes those cases who did not meet case definition (4,299-181=4,118)

## c. Clinical Conditions among Reported Cases

Eight percent (8.5%) of cases were found to have cirrhosis and liver cancer. A significant proportion of cases had unknown status for cirrhosis and liver cancer. Better reporting from health care providers is needed to identify cases with these complications of HCV infection. Using cross-matched analysis between hepatitis C and registered liver cancer, an additional 59 cases were identified through the cancer registry system. Of 319 registered liver cancer individuals, 104 (32.6%) were found in the hepatitis C surveillance system.

**Table 3.3 Reported Hepatitis C Cases by Clinical Data, Washoe County, May 2002 – December 2012.**

Clinical Data	Yes		No		Unknown	
	No.	%	No.	%	No.	%
Cirrhosis	303	7.4	1,313	31.9	2,502	60.8
Liver Cancer	45	1.1	1,432	34.8	2,641	64.1

**d. Reported Hepatitis C Cases by Behavioral Risk Factors**

Approximately 31% of cases acknowledged they had injected drugs not prescribed by a physician, and 5% received a blood transfusion prior to 1992. Thirty-three percent (33%, 1191/3647) of cases reported current alcohol use – indicating a need for better education of HCV patients by health care providers. Overall, 45% (1838/4118) of cases had one or more risk factors, 30% (1291/4118) of cases denied risk factors and 25% (1061/4118) had unknown risks. Twelve percent (12%, 1219/4118) of cases had no health insurance. Behavioral risk factor data was obtained via chart review rather than through patient interview.

**Table 3.4 Reported Hepatitis C Cases by Patient Risk Behaviors, Washoe County, May 2002– December 2012.**

Risk Behavior (not mutually exclusive)	Number of Cases	%
Injectable Drug Use	1302	31.1
Other risks	498	11.9
Blood transfusion	211	5.0
Multiple sex partners	191	4.6
Contact to person with hepatitis	144	3.4
Occupational	63	1.5
Hemodialysis	11	0.3
Receipt of clotting factor before 1988	3	0.1

**e. Reported Hepatitis C Cases by Hepatitis A and B Markers**

If persons with chronic HCV infection contract HAV or HBV, they are at increased risk for life-threatening fulminant hepatitis. To protect susceptible HCV-infected patients, HAV and HBV vaccinations are strongly recommended.

A significant proportion of cases had unknown status for immunity to HAV and HBV.

**Table 3.5 Reported Hepatitis C Cases by Hepatitis A and B Markers, Washoe County, May 2002 – December 2017 (N=8940, lab data only).**

Marker	Positive		Negative		Unknown	
	No.	%	No.	%	No.	%
Antibody to HAV, total (anti-HAV)	655	7.3	361	4.0	7,920	88.6
Hepatitis B Surface Antibody (anti-HBs)	504	5.6	639	7.1	7,790	87.1
Hepatitis B Surface Antigen (HBsAg)	97	1.1	3,196	35.7	5,611	62.8
Hepatitis B Core Antibody, total (anti-HBc)	512	5.7	370	4.1	8,054	90.1

One time co-infection evaluation performed in 2013 using cross-matching analysis between hepatitis C and hepatitis B surveillance systems showed an additional 13 cases who also had reported hepatitis B infection during the time period May 1, 2002-December 2012; however, these 13 reports were not captured in the hepatitis C surveillance system because no concurrent laboratory tests for hepatitis B and C had been ordered.

**f. Reported Hepatitis C Cases by Genotype**

Genotype refers to the genetic make-up of an organism or a virus. There are at least 7 distinct HCV genotypes and more than 67 subtypes that have been identified. Genotype 1 is the most common in the United States. It is necessary to do viral genotyping when managing a person with chronic

hepatitis C as it is helpful in making recommendations regarding treatment. Knowing the genotype can help predict the likelihood of treatment success and, in many cases, determine the duration of treatment.<sup>1</sup>

The goal of treatment is sustained virologic response (SVR), which is the continued absence of detectable HCV RNA at least 12 weeks after completion of therapy. SVR is a marker for a cure of HCV infection. Since the introduction of highly effective HCV protease inhibitor therapies in 2011, treatment options for hepatitis C have been rapidly progressing and new drugs continue to become available. Current treatment options include Daclatasvir, Elbasvir-Grazoprevir, Glecaprevir-Pibrentasvir, Ledipasvir-Sofosbuvir, Ombitasvir-Paritaprevir-Ritonavir, Ombitasvir-Paritaprevir-Ritonavir and Dasabuvir, Peginterferon alfa-2a, Peginterferon alfa-2b, Ribavirin, Simeprevir, Sofosbuvir, Sofosbuvir-Velpatasvir, and Sofosbuvir-Velpatasvir-Voxilaprevir.<sup>2</sup> Recommendations for hepatitis C treatment and management have been developed by the Infectious Diseases Society of America (IDSA) and American Association for the Study of Liver Diseases (AASLD), in collaboration with the International Antiviral Society–USA (IAS–USA). These recommendations can be accessed at <http://www.hcvguidelines.org/>.

Of 8,940 lab-confirmed case reports, 2,584 (29%) contained documented genotypes, which likely indicated that a relatively small proportion of persons with HCV infection were actually in therapy. Of 2,584 cases with a documented genotype, 1,766 (68%) had genotype 1; 363 (14%) had genotype 2; and 406 (16%) had genotype 3; and 49 (2%) had 2 or more genotypes or other genotypes. It is important to note that superinfection (more than one genotype of HCV) is possible if risk behaviors (e.g., intravenous drug use) for HCV infection continue, but it is believed to be very uncommon.

#### **g. Reported Hepatitis C Cases by Mortality**

Of 8,940 cases, at least 460 (5%) expired. Of these 460 expired cases, Hepatitis C was the primary cause of death in 74 cases (16%) and the secondary cause of death in 354 cases (77%).

#### **h. Population Affected**

WCHD Surveillance data 2002-2017 indicate:

- 64% of cases are in the 40-59 year age group among 8,903 cases with known age and 70% of cases were born between 1945 and 1965 (baby boomers).
- 65% of cases are male among 8,863 cases with known gender.
- 32% of the case reports (3,251 cases) were missing information on race/ethnicity.
- 82% of cases are White, non-Hispanic among 6,021 cases with known race/ethnicity.
- African Americans are disproportionately affected by chronic HCV infection. They have the highest ratio of proportion of cases to proportion of the population.

The proportion of the cases aged 30 and under increased. A special analysis was done. The proportion was increased from below 8% prior to 2012 to 12.5% in 2014 and 15.1% in 2017. See Figure 3.3.

<sup>1</sup> <https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm>

<sup>2</sup> <https://www.hepatitisc.uw.edu/page/treatment/drugs>.

Figure 3.3 Reported Hepatitis C among Persons Aged ≤ 30 Years, Washoe County, 2004-2017

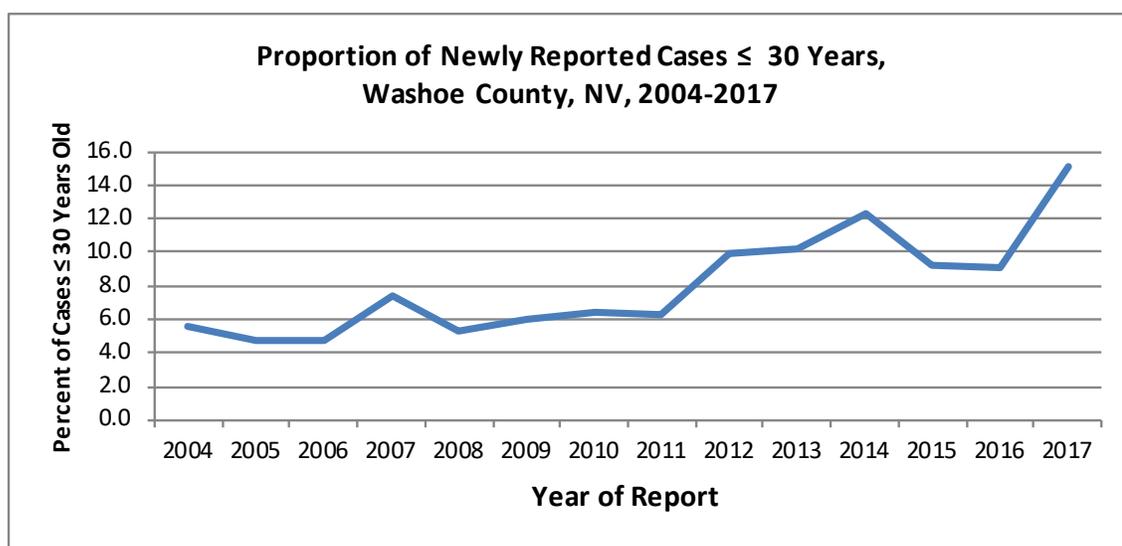


Table 3.6 Reported Cases of Hepatitis C by Age, Gender, Race and Ethnicity, Washoe County, May 2002 – December 2017

Demographic Characteristics		No. Cases	%	% population	Ratio*
Age Group	<20	58	0.7	26.0	0.0
	20-29	537	6.0	13.9	0.4
	30-39	984	11.1	13.8	0.8
	40-49	2,463	27.7	11.9	2.3
	50-59	3,238	36.4	12.9	2.8
	>=60	1,623	18.2	21.4	0.9
	Unknown				
	<b>Total</b>	<b>8,903</b>	100.0	100.0	
Gender	Male	5,751	64.9	50.3	1.3
	Female	3,112	35.1	49.7	0.7
	<b>Total</b>	<b>8,863</b>	100.0	100.0	
Race/Ethnicity	American Indian/Alaska Native, non-Hispanic	137	2.3	1.6	1.4
	Asian/Pacific Islander, non-Hispanic	70	1.2	6.9	0.2
	African American, non-Hispanic	449	7.5	2.5	3.0
	White, non-Hispanic	4,962	82.4	64.1	1.3
	Hispanic	403	6.7	24.9	0.3
	<b>Total</b>	<b>6,021</b>	100.0	100.0	

\*Ratios were calculated by: 
$$\frac{\% \text{ of demographic group with condition}}{\% \text{ of overall population comprised by this demographic group}}$$

### 3. Prevention and Control

There is no vaccine against HCV, no funding for screening high-risk persons, and no funding for vaccinating persons with chronic HCV against HAV and HBV, as well as no funding for treatment.

Prevention and control of HCV are limited to education and the collection, analysis and dissemination of data:

- HCV surveillance began on May 1, 2002. During the surveillance period between May 1, 2002 – December 31, 2007, more than one-hundred-thirty (130) health care provider offices and laboratories participated. Due to restricted resources, no additional healthcare provider offices were recruited for the surveillance during 2008-2016.
- Fourteen (14) issues of *Epi News* were written and distributed to local health care providers during 2002-2017. These issues covered general information on HCV testing recommended actions and reviewed the HCV surveillance project and results.
- A one-time survey was sent to 73 ordering health care providers, and 25 (34%) were returned. Of the 25 returned, 16 received the *Epi News*; 15 of the 16 who receive the *Epi News* said the information on HCV surveillance was useful; 6 of the 25 did not receive the *Epi News* and all 6 requested to be added to the distribution list.
- 1,500 CDC brochures on HCV prevention and HCV testing were distributed through Community Clinic (formerly Washoe Medical Center Clinic).
- A HCV section was added to the Washoe County Health District's website. There were 13,679 visits to this web page between May 2005 and December 2014. (Tracking of visits to this website began in May 2005). Due to restricted resources within the CD Program, no additional efforts to update this website were made after 2014. The statistics of web visits for 2015 and 2016 was not available due to a web management system change.

## OTHER REPORTABLE COMMUNICABLE DISEASES

### I. Respiratory Syncytial Virus (RSV)

#### A. Epidemiology

##### 1. Population Affected

Respiratory syncytial virus (RSV) is the most common cause of bronchiolitis and pneumonia among infants and children. Most children will have serologic evidence of RSV infection by 2 years of age. RSV also causes repeated infections throughout life, usually associated with moderate to severe cold-like symptoms. Severe lower respiratory tract disease may occur at any age, especially among the elderly or among those with compromised cardiac, pulmonary or immune systems.

In temperate climates, RSV infections usually occur during annual community outbreaks, and often last four to six months during the late fall, winter or early spring months. The timing and severity of outbreaks in a community vary from year to year.

##### 2. Reported Incidence

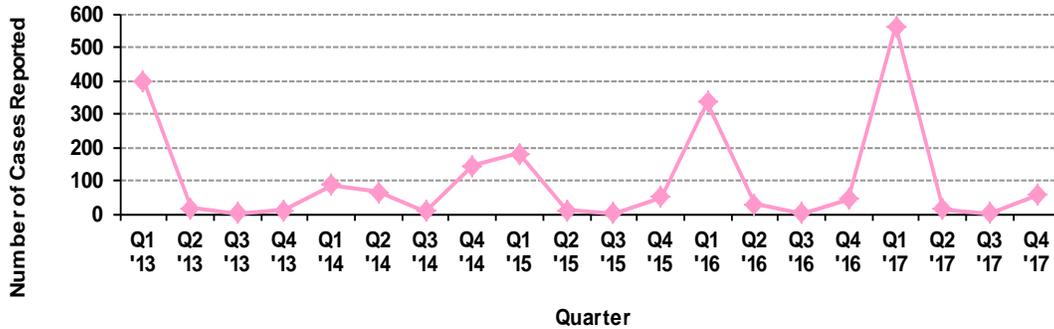
Six hundred thirty five (635) laboratory-confirmed cases of RSV were reported in Washoe County in 2017. Of the 635 cases, 514 (81%) were in children  $\leq$  2 years of age, which corresponds to an incidence of 3,111 cases per 100,000 children  $\leq$  2 years of age (population for this age group was 16,532 in 2017). The increase of the incidence rate is likely correlated with high incidence of flu.

Figure 2.1 Rate of Reported Cases of RSV in Children  $\leq$  2 Years of Age, Washoe County, 2008-2017



\*Effective in 2008, data on age for lab-confirmed RSV cases was collected.

Figure 2.2 Reported RSV Cases By Quarter, Washoe County, 2013 – 2017



## B. Prevention and Control

There is no vaccine currently available for RSV. Proper hygiene and environmental cleaning, especially in child care settings, can be effective in reducing transmission.

## II. Viral Meningitis

### A. Epidemiology

Viral meningitis is caused by infection with one of several types of viruses. About 90% of cases are caused by non-polio enteroviruses (e.g., coxsackievirus and echovirus). Enteroviruses are typically spread person-to-person through the fecal-oral route, respiratory droplets and fomites. Herpesvirus and the mumps virus can also cause meningitis. Clinicians rarely identify which virus causes meningitis. It is a diagnosis of exclusion and is most likely under-reported.

The increased number of cases reported in 2002 through 2004 may be an artifact caused by the highly publicized arrival of West Nile Virus in Nevada. In all cases of viral meningitis the diagnosis is supported by a compatible clinical illness and laboratory tests that rule out possible bacterial etiologies.

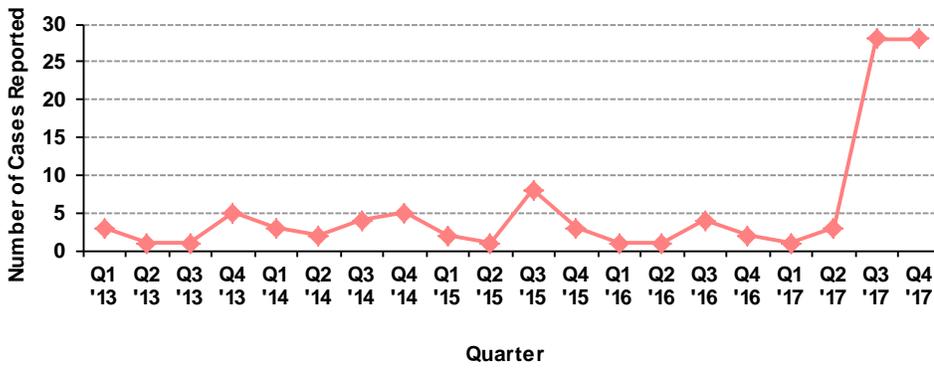
### 1. Reported Incidence

Sixty (60) laboratory-confirmed cases of viral meningitis were reported in Washoe County in 2017 for a reported incidence of 13.3 cases per 100,000 population. Fifty-nine (59) cases were associated with a community-wide outbreak in Washoe County caused by Echovirus 9. (The full report of outbreak will be provided upon receipt of request by email to [epicenter@washoecounty.us](mailto:epicenter@washoecounty.us)).

Figure 3.1 Rates of Reported Cases of Viral Meningitis, Washoe County, 2008-2017



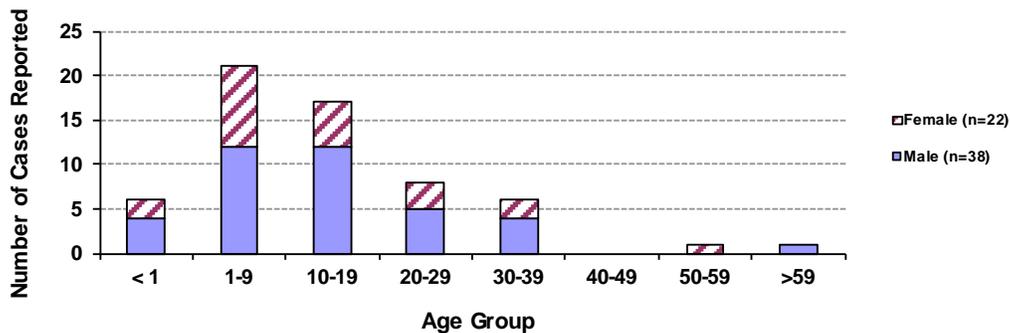
Figure 3.2 Reported Viral Meningitis Cases By Quarter, Washoe County, 2013-2017



## 2. Population Affected

The median age of cases in Washoe County was 11 years (range: <1 - 81 years). Thirty eight (38) cases (63%) were male.

Figure 3.3 Viral Meningitis Cases by Age and Gender, Washoe County, 2017 (n=60).



Thirty (30) cases were White, non-Hispanic, twenty three (23) Hispanic, two (2) Black, two (2) Native American and 2 unknown races.

## B. Prevention and Control

No specific prevention or control measures are available for non-polio enteroviruses. Adherence to good hygienic practices, such as frequent and thorough hand washing (especially after diaper changes and before eating or preparing food), disinfection of contaminated surfaces by household cleaners (e.g., diluted bleach solution), and avoidance of shared utensils and drinking containers, is recommended to help interrupt transmission.

## III. Hansen's Disease (Leprosy)

### A. Epidemiology

Hansen's disease is a chronic bacterial disease of the skin, peripheral nerves and upper airway caused by *Mycobacterium leprae*.

#### 1. Reported Incidence

No cases of Hansen's disease were reported in Washoe County in 2017. From 1994 through 2017 only five (5) cases of Hansen's disease have been reported in Washoe County. One case was reported in 2003, one in 2005, one in 2007, one in 2009, and one in 2012.

#### 2. Population Affected

Worldwide, countries that reported more than 1,000 new cases of Hansen's disease to World Health Organization (WHO) between 2011 and 2015 are:

- Africa: Democratic Republic of Congo, Ethiopia, Madagascar, Mozambique, Nigeria, United Republic of Tanzania
- Asia: Bangladesh, India, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka
- South America: Brazil

Newly recognized cases in the U.S. are few and are usually diagnosed in immigrants or refugees who acquired the disease in their native countries. In 2017, a total of 94 cases were reported in the U.S. Due to the large immigrant population in some states the disease is endemic in California, Florida, Hawaii, and Texas. These four states accounted for 64% (60 cases) of 94 reported cases.

There have been dramatic decreases in the global disease burden: from 5.2 million in 1985 to 805,000 in 1995 to 753,000 at the end of 1999 and 216,108 new cases registered in 2016.<sup>1</sup> Most adults around the world, however, may face no risk at all of becoming infected with Hansen's disease. That is because evidence shows that 95% of all adults are naturally (genetically) unable to get the disease, even if they are exposed to the bacteria that causes it.<sup>2</sup>

## B. Prevention and Control

Prevention and control of new cases depends on early recognition and treatment with multidrug therapy. Clinical and laboratory evidence suggest that, in most cases, infectiousness is lost within one day of appropriate treatment. Isolation, quarantine and restrictions on employment and school attendance are not warranted.

<sup>1</sup> <http://www.who.int/en/news-room/fact-sheets/detail/leprosy>

<sup>2</sup> <http://www.cdc.gov/leprosy/exposure/index.html>

## SEXUALLY TRANSMITTED DISEASES

### I. *Chlamydia*

#### A. Epidemiology

*Chlamydia trachomatis* is the most frequently reported infectious disease in the United States. Pelvic inflammatory disease (PID) caused by *Chlamydia* is a major cause of infertility, ectopic pregnancy, and chronic pelvic pain. *Chlamydia* is transmitted through vaginal, anal, and oral sex. Pregnant women with *Chlamydia* can transmit the infection to their infants during delivery, causing neonatal ophthalmia and pneumonia.

#### 1. Reported Incidence

In 2017, *Chlamydia* infection was the most commonly reported sexually transmitted disease (STD) in Washoe County with an incidence rate of 553 cases per 100,000 population. The 2016 national reported incidence rate was 497.3 cases per 100,000 population, which was the most current national data. The Healthy People 2020 national health objective for proportion of positive tests is as follows:

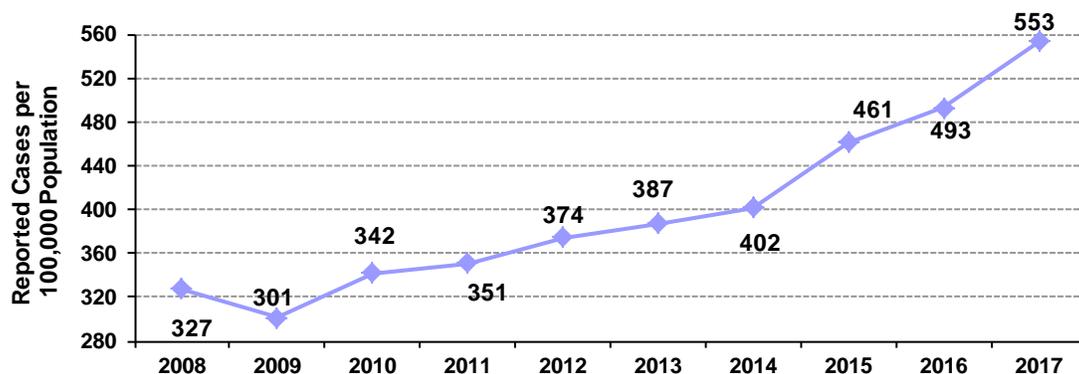
- ◆ Females aged 15-24 years attending family planning clinics 6.7 %

Note: The Healthy People 2010 health objective for the following categories have been removed from the HP 2020 health objectives.

- ◆ Females aged 15-24 years attending STD clinics 3.0 %
- ◆ Males aged 15-24 years attending STD clinics 3.0 %

An overall steady increase of reported *Chlamydia* infections has been observed since 1996. This increase may be the result of an expansion of *Chlamydia* screening, the use of increasingly sensitive diagnostic tests, improvement in case reporting from providers and laboratories, and/or a real increase in the incidence of *Chlamydia* infection. Due to national increases in the incidence of primary and secondary syphilis and gonorrhea in recent years, a real increase in the incidence of *Chlamydia* is most likely.

Figure 1.1 Rates of Reported *Chlamydia* Cases, Washoe County, 2008– 2017.



**Table 1.1 Reported Cases of *Chlamydia*, Washoe County, 2008 – 2017.**

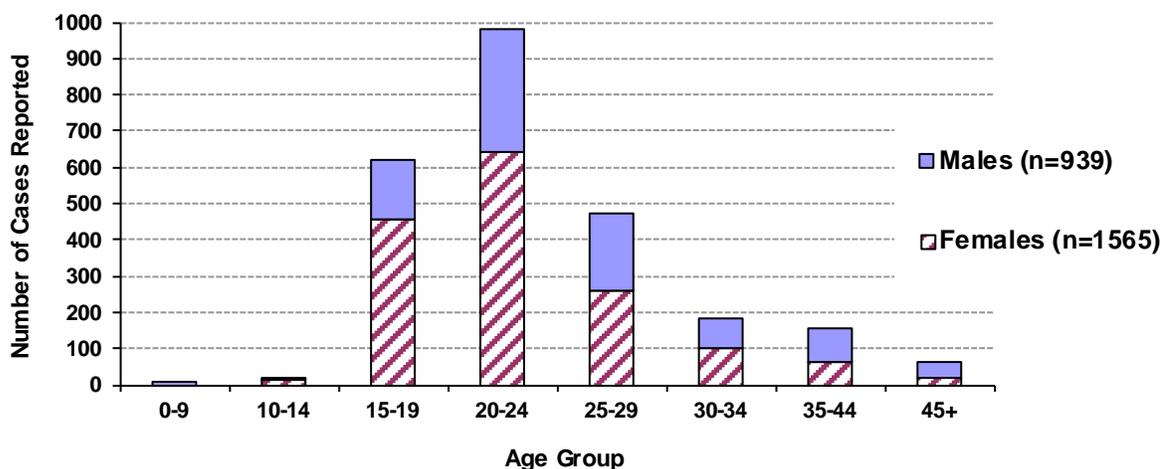
	2008	2009	2010	2011	2012	2013	2014	2015*	2016*	2017*
<b>Chlamydia</b>	1332	1,237	1,418	1,467	1,589	1,668	1,744	2,033	2,200	2,504
Chlamydia PID	8	6	8	11	12	7	11			
<b>Total</b>	<b>1,340</b>	<b>1,243</b>	<b>1,426</b>	<b>1,478</b>	<b>1,601</b>	<b>1,675</b>	<b>1,755</b>	<b>2,033</b>	<b>2,200</b>	<b>2,504</b>

\*PID numbers were not collected separately since 2015

## 2. Population Affected

Of the 2,504 *Chlamydia* cases reported in 2017, 1,604 (64.01%) occurred in persons 15-24 years of age; and 1,565 (62.5%) occurred in females.

**Figure 1.2 Reported Cases of *Chlamydia* by Age and Gender, Washoe County, 2017.**



Black and Hispanic cases accounted for 9% and 28% of total *Chlamydia* cases, respectively. Blacks comprised 2.5 % and Hispanics 24.8% of Washoe County’s population in 2017.

**Figure 1.3 Rate of Reported Cases of *Chlamydia* by Race/Ethnicity, Washoe County, 2017.**

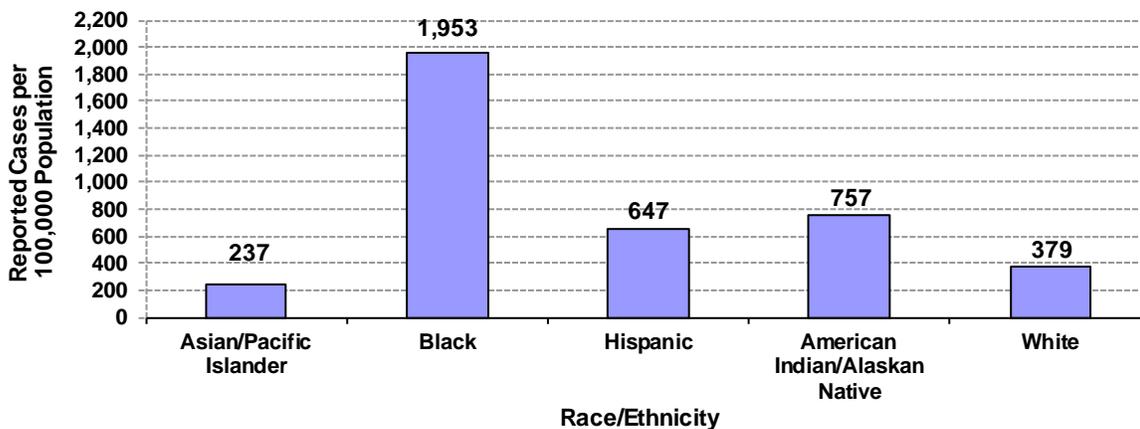
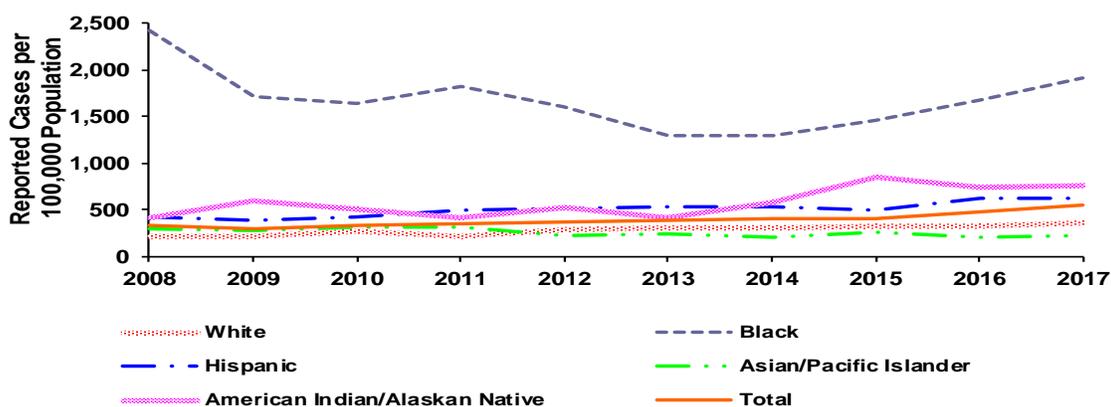


Figure 1.4 Rates of Reported Cases of *Chlamydia* by Race/Ethnicity, Washoe County, 2008-2017.

Chlamydia rates among females aged 15 to 44 years was 1,711.3 cases per 100,000 females in 2017 in comparison to 1,561.7 cases per 100,000 females in 15-44 year age group in 2016, a 9.6% increase.

## B. Prevention and Control

To increase efficient use of resources, reduce duplication of services provided in the community, serve those at highest risk of STD infection and meet federal and regional testing recommendations, the Sexual Health Program has continued the following guidelines:

- Provide STD (Chlamydia, gonorrhea, syphilis, and HIV) testing at sites where a specific target population would be known to congregate and where a higher positivity rate has occurred during previous testing
- Cease testing at off-site locations that duplicate services already available to the target population
- Provide technical assistance to build the capacity of other, established agencies that provide STD testing
- Continue STD testing and screening per CDC recommendations

### 1. Contact Follow-Up

Washoe County has continued to experience an increase of reportable cases of STDs annually. Disease investigation efforts have been prioritized based on CDC recommendations, risk behaviors, burden of disease and available resources. While all reportable cases are investigated through provider and laboratory reports, partner services (contact investigation) is only provided for the following populations:

- People under the age of 25
- Pregnant females
- HIV positive individuals
- Men who have sex with men (MSM)
- Blacks

Individuals that fall outside of the noted populations and have a reported STD are contacted by WCHD to ensure that they were properly treated and to assess if their partners meet any of the above criteria. If the partners do not meet the above criteria, then the individual is instructed to inform their partners of the disease exposure. Providers are also encouraged to properly treat their patients and related contacts.

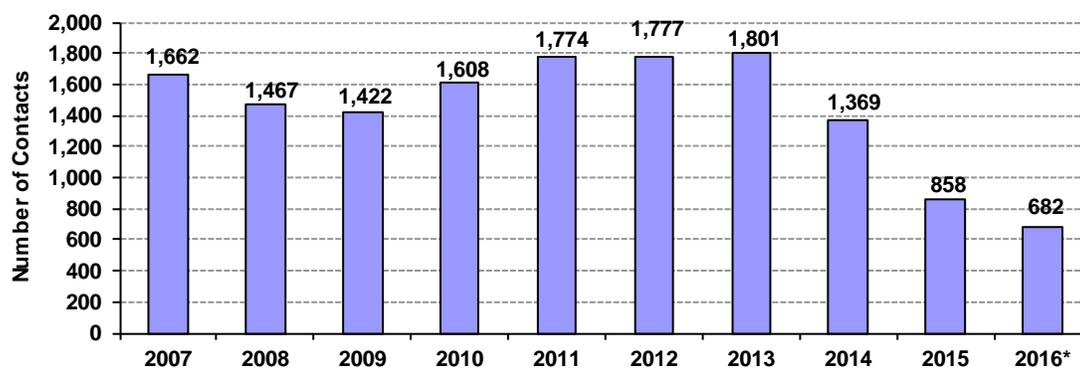
Partner Services outcomes are unavailable for 2017 due to database and data collection changes.

The data for Table 1.2 and Figures 1.6 and 1.7 are not available for 2017 due to the programmatic changes.

**Table 1.2 Disposition of Contacts to *Chlamydia* Cases, Washoe County, 2016.**

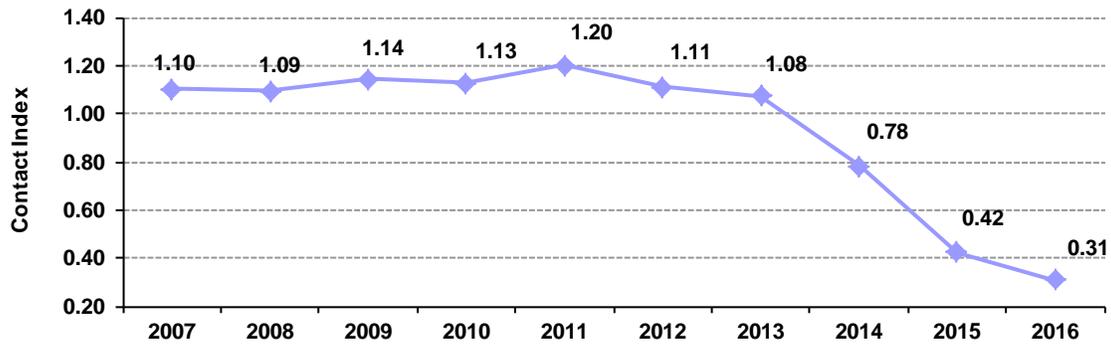
	Total	Percent
<b>New Contacts Examined</b>		
Preventive Epi. Treatment	136	39.0
Refused Preventive Treatment	2	0.6
Infected - Brought to Treatment	201	57.6
Infected - Not Treated	1	0.3
Not Infected	9	2.6
<b>Total</b>	<b>349</b>	<b>51.2</b>
<b>New Contacts No Exam</b>		
Insufficient Information to Begin Investigati	104	45.6
Unable to Locate	49	21.5
Located -Refused Examination	37	16.2
Out of Jurisdiction	27	11.8
Other	11	4.8
<b>Total</b>	<b>228</b>	<b>33.4</b>
<b>Previous Treatment</b>		
Previous Treatment for this Infection	105	15.4
<b>Total</b>	<b>682</b>	<b>100</b>

**Figure 1.6 Number of Contacts to *Chlamydia* Cases Identified, Washoe County, 2007-2016.**



\*The number of contacts decreased during 2015-2016, in part, because investigation was limited to priority populations.

Figure 1.7 *Chlamydia* Contact Index\* Washoe County, 2007–2016.



\*Contact Index = Number of contacts identified per case. The significant reduction of CI value in 2015 was due to the changes of partner service (contact investigation) based on CDC’s recommendation by the STD Program.

## II. Gonorrhea

### A. Epidemiology

Gonorrhea, caused by *Neisseria gonorrhoeae*, is second only to *Chlamydia* infections in the number of cases reported to the CDC. It is transmitted through sexual contact (vaginal, oral, or anal) and can also be transmitted from mother to child during birth. In both men and women, untreated infection can cause infertility.

#### 1. Reported Incidence

In Washoe County, 742 laboratory-confirmed cases of gonorrhea were reported in 2017 for an incidence rate of 164 cases per 100,000 population, the highest incidence ever during the past two decades. The 2016 national reported incidence was 145.8 cases per 100,000 population, which was the most current national data. The Healthy People 2010 national health objective is 19 cases per 100,000 population. The new Healthy People 2020 national health objectives to reduce gonorrhea rates are as follows:

- Females aged 15 to 44 years: 306 new cases per 100,000 population
- Males aged 15 to 44 years: 391 new cases per 100,000 population

Figure 2.1 Rates of Reported Cases of Gonorrhea, Washoe County, 2008–2017.

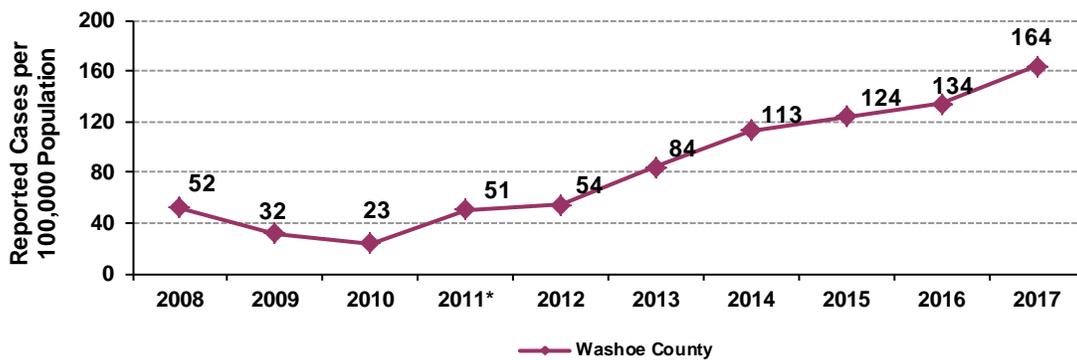
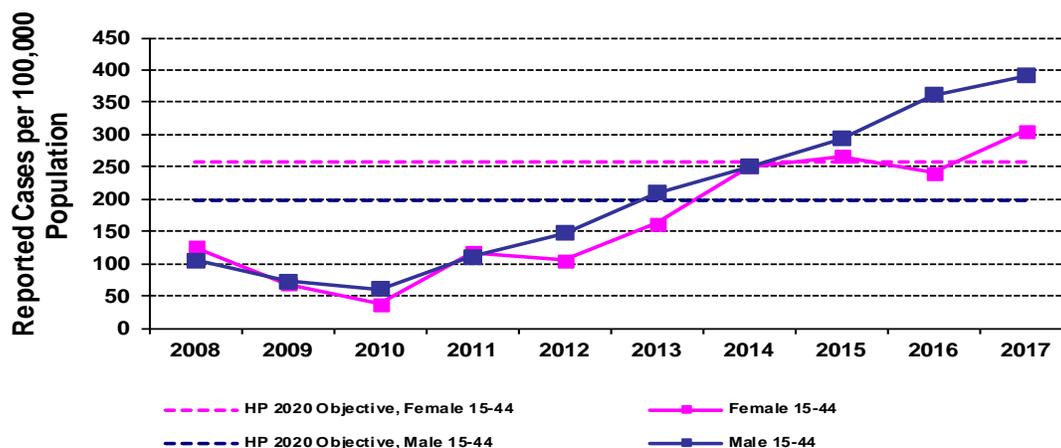


Figure 2.2 Rates of Reported Cases of Gonorrhea among Population Aged 15-44 Years, Washoe County, 2008 – 2017.



The increased incidence of gonorrhea in recent three years was concurrent with the increased incidence of syphilis, which is also consistent with the national trend.

Table 2.1 Cases of Gonorrhea, Washoe County, 2008– 2017.

	2008	2009	2010	2011	2012	2013	2014	2015*	2016*	2017*
<b>Gonorrhea</b>	207	130	96	211	229	359	483	547	598	742
Gonococcal PID	6	1	2	2	4	5	9			
<b>Total</b>	<b>213</b>	<b>131</b>	<b>98</b>	<b>213</b>	<b>233</b>	<b>364</b>	<b>492</b>	<b>547</b>	<b>598</b>	<b>742</b>

\*PID numbers are not collected separately since 2015.

## 2. Population Affected

The incidence of gonorrhea is highest in high-density urban areas among persons under 34 years of age who have multiple sex partners and engage in unprotected sexual intercourse. Increases in gonorrhea prevalence have been noted recently among men who have sex with men.

Of the 742 cases reported in 2017, 242 (32.5%) were persons aged 15-24 and 262 (35.3%) were persons aged 25-34; and 443 (59.7%) were males.

Figure 2.3 Reported Cases of Gonorrhea by Age and Gender, Washoe County, 2017.

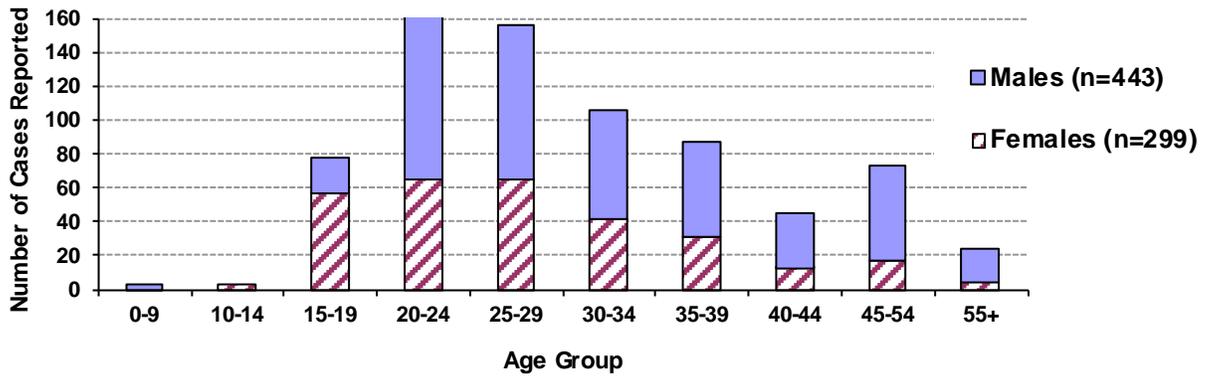


Figure 2.4 Reported Cases of Gonorrhea by Race/Ethnicity, Washoe County, 2017.

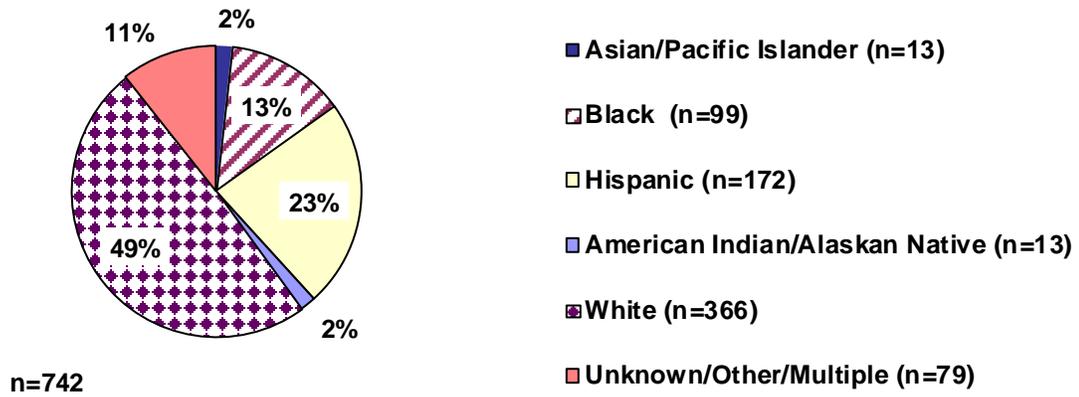


Figure 2.5 Rate of Incidence by Race/Ethnicity per 100,000 population of Gonorrhea Washoe County, 2017.

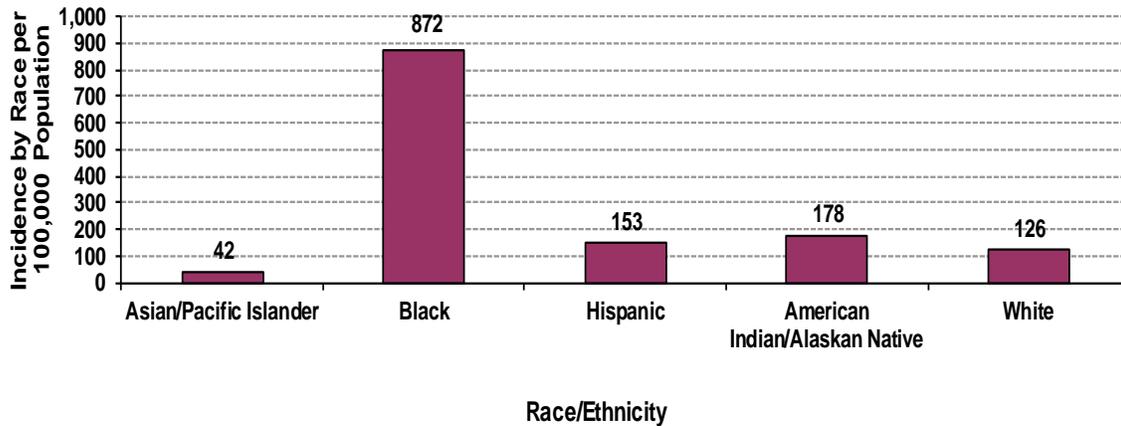
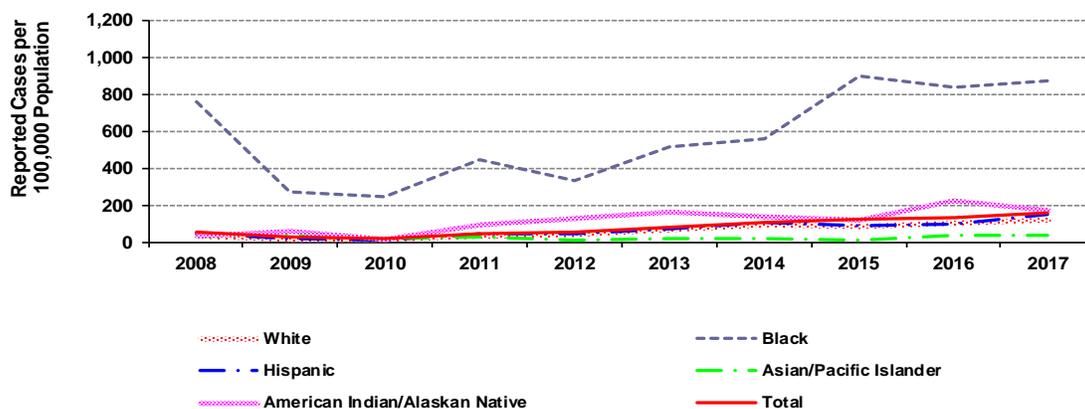


Figure 2.6 Rates of Reported Gonorrhea Cases by Race/Ethnicity, Washoe County, 2008-2017.



**B. Prevention and Control**

**1. Contact Follow-Up**

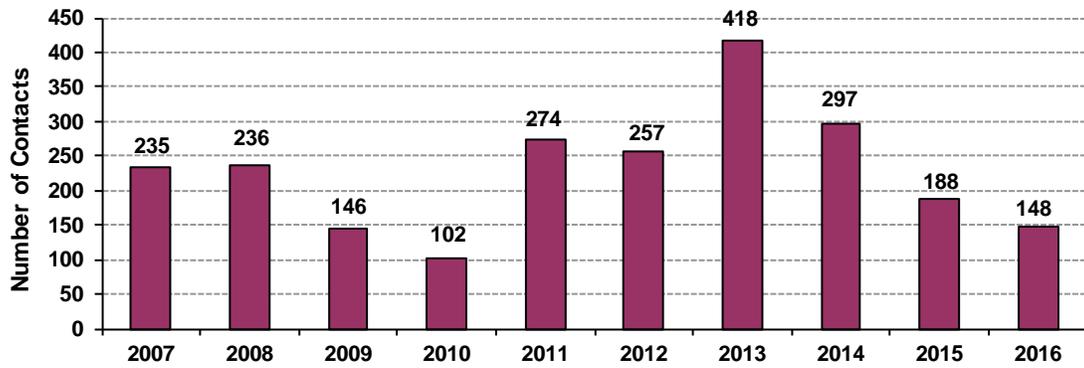
Washoe County has continued to experience an increase of reportable cases of STDs annually. Disease investigation efforts have been prioritized based on CDC recommendations, risk behaviors, burden of disease and available resources. During 2016, all reportable cases are investigated through provider and laboratory reports, partner services (contact investigation) was limited. In 2017, all gonorrhea cases were investigated for partners due to surveillance of potential drug resistance that has been experienced nationally. Partner Services outcomes are unavailable for 2017 due to database and data collection changes.

The data for Table 2.2 and Figures 2.7 and 2.8 are not available for 2017 due to the programmatic changes.

**Table 2.2 Disposition of Contacts to Gonorrhea Cases, Washoe County, 2016.**

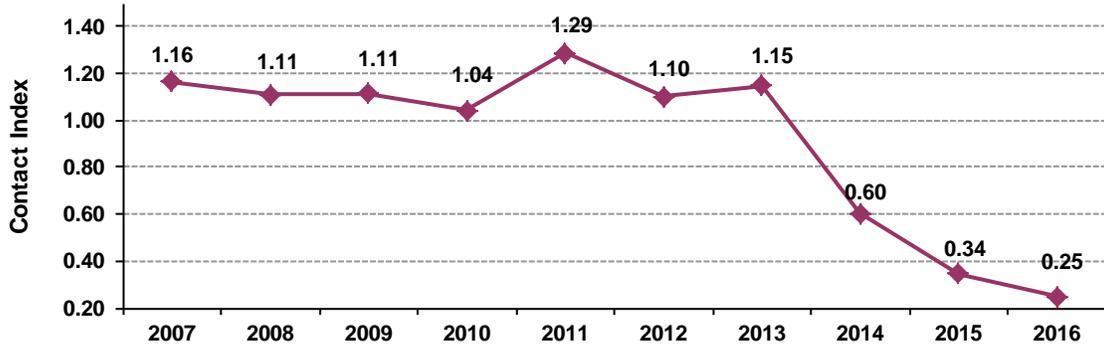
Disposition	Total	Percent
<b>New Contacts Examined</b>		
Preventive Epi. Treatment	27	43.5
Refused Preventive Treatment	0	0.0
Infected - Brought to Treatment	28	45.2
Infected - Not Treated	0	0.0
Not Infected	7	11.3
<b>Total</b>	<b>62</b>	<b>41.9</b>
<b>New Contacts No Exam</b>		
Insufficient Information to Begin Investigation	28	44.4
Unable to Locate	21	33.3
Located -Refused Examination	10	15.9
Out of Jurisdiction	4	6.3
Other	0	0.0
<b>Total</b>	<b>63</b>	<b>42.6</b>
Previous Treatment for this Infection	23	15.5
<b>Total</b>	<b>148</b>	<b>100</b>

**Figure 2.7 Number of Contacts to Gonorrhea Cases, Washoe County, 2007 – 2016.**



\*The number of contacts decreased during 2015-2016, in part, because investigation was limited to priority populations

Figure 2.8 Gonorrhea Contact Index\*, Washoe County, 2007 – 2016.



\*Contact Index = Number of contacts per case. The significant reduction of CI value in 2015 was due to the changes of partner service (contact investigation) based on CDC's recommendation by the STD Program.

### III. Syphilis

#### A. Epidemiology

Syphilis is a complex STD caused by the bacterium *Treponema pallidum*. The “primary” stage of syphilis is typically marked by the appearance of a single chancre that is usually firm, round, small and painless. The chancre may last 3-6 weeks, and heals on its own. The presence of a chancre greatly facilitates HIV transmission.

If adequate treatment is not administered, the infection progresses to the “secondary” stage marked by the appearance of a rough, red or reddish-brown rash on the trunk and extremities which, unlike most other kinds of rashes, may involve the palms of the hands and soles of the feet. Patchy hair loss or alopecia is sometimes exhibited. Syphilis is contagious during the primary and secondary stages.

Untreated syphilis progresses to a latent stage that is defined as having serological proof of infection without signs or symptoms of disease. In early latent syphilis (one year or less from time of infection) the disease may still be contagious. Late latent syphilis (infection for greater than one year) is not contagious but may progress to tertiary syphilis. Beginning in 2012, staff initiated reporting of early latent syphilis

cases separate from the latent syphilis classification which includes late latent and unknown duration. This change is due to the complexity of diagnosing early latent cases and the possibility of early latent syphilis cases being contagious.

Tertiary syphilis is slowly progressive and may affect any organ. The more severe manifestations of tertiary syphilis include neurological and cardiovascular complications. Gumma lesions may also develop on the skin or mucous membranes.

Syphilis is easy to cure, especially when diagnosed and treated in its early stages (within the first year). Secondary and tertiary stages can also be cured, however damage that has already occurred may not be reversed. All stages of syphilis are treated with penicillin.

Neurosyphilis is an infection of the brain or spinal cord that can occur during any stage of syphilis. Some of the symptoms include weakness, difficulty walking, confusion, vision loss/issues and hearing problems. Further testing including a lumbar puncture is recommended as soon as possible to diagnose; thereby decreasing complications.

Congenital syphilis is caused by the syphilis bacterium passing from an infected mother to her infant during fetal development or birth. It is a severe, disabling and often life-threatening condition for the infant.

## 1. Reported Incidence

In 2017, 57 cases of primary (24 cases) and secondary syphilis (33 cases) were reported in Washoe County for an incidence of 12.6 cases per 100,000 population, a 70% increase compared to the 2016 data. Among females, the incidence rate was 7.1 cases per 100,000 population. The incidence was 18.0 cases per 100,000 population among males, a 43% increase from 12.6 cases per 100,000 males in 2016. Although reported incidence in 2015 decreased in comparison to the incidence rate reported in 2013 and 2014, it was significantly greater than what had been reported in earlier years. The 2017 rate was nearly 13 times the rate reported 10 years prior in 2008. On a national level, the number of primary and secondary syphilis cases has increased 76% since 2013 with a national incidence of P&S syphilis rate of 9.5 cases per 100,000 population. From 2016 to 2017, the national rate increased 10.5%. The reported national rate was 2.3 cases per 100,000 population among females, and 16.9 cases per 100,000 population among males. The Healthy People 2020 national health objective is 1.4 new cases per 100,000 population among females and 6.8 new cases per 100,000 population among males. The reported incidence in Washoe County in 2017 was far higher than HP 2020 objectives.

Figure 3.1 Rate of Reported Cases of Primary and Secondary Syphilis, Washoe County, 2008– 2017\*.

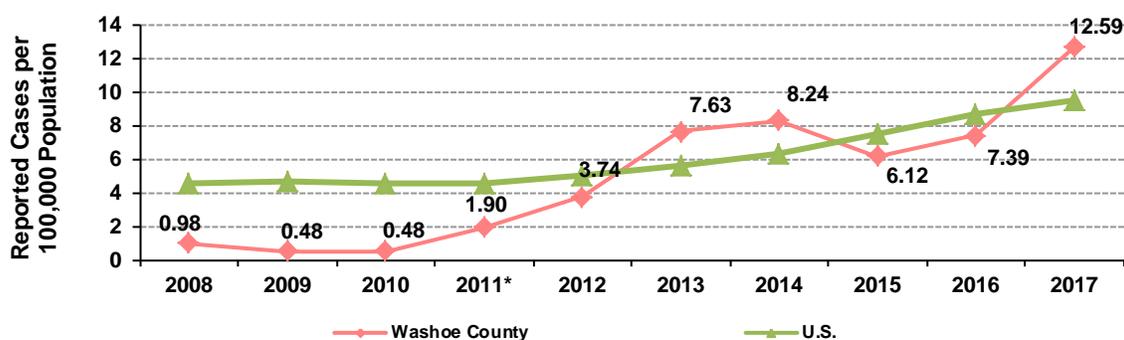


Table 3.1 Reported Cases of Syphilis, Washoe County, 2008 – 2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Syphilis</b>										
Primary	2	1	0	2	7	19	20	15	15	24
Secondary	2	1	2	6	9	14	16	12	18	33
Early Latent	2	2	4	3	5	12	16	26	33	40
Late Latent	16	21	10	12	15	26	25	31	30	39
Neuro*	0	0	1	5	2	1	1	0	1	3
Congenital	0	0	0	0	0	0	1	2	1	2
<b>Total</b>	<b>22</b>	<b>25</b>	<b>17</b>	<b>28</b>	<b>38</b>	<b>72</b>	<b>79</b>	<b>86</b>	<b>98</b>	<b>141</b>

\* Neuro syphilis cases are also counted in the respective stage of their diagnosis (primary, secondary, early latent, late latent).

## 2. Population Affected

Of the 57 cases of primary and secondary syphilis reported in 2017, 42 (73.7%) were males. Thirty five (35) (61%) were White, non-Hispanic and ten (10) (17.5%) were Hispanic. The majority of primary and secondary stage cases, 70%, were under the age of 40 with a range of a 16– 39 years. Eighteen (18) cases (32%) were also positive for HIV. Thirty three (33) cases (58%) were reported to be MSM (men who have sex with men) or bisexual, 23 (40%) were reported to be heterosexual and one case had unknown sexual risk. The incidence rate by gender in 2017 was far above HP 2020 Healthy People objectives.

Figure 3.2 Reported Cases of Primary and Secondary Syphilis by Age and Gender, Washoe County, 2017.

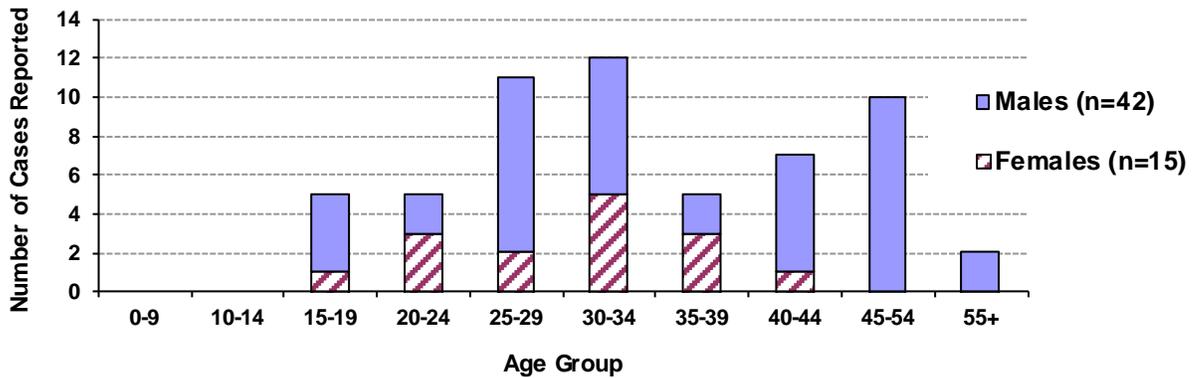


Figure 3.3 Reported Cases of Primary and Secondary Syphilis by Race/Ethnicity, Washoe County, 2017.

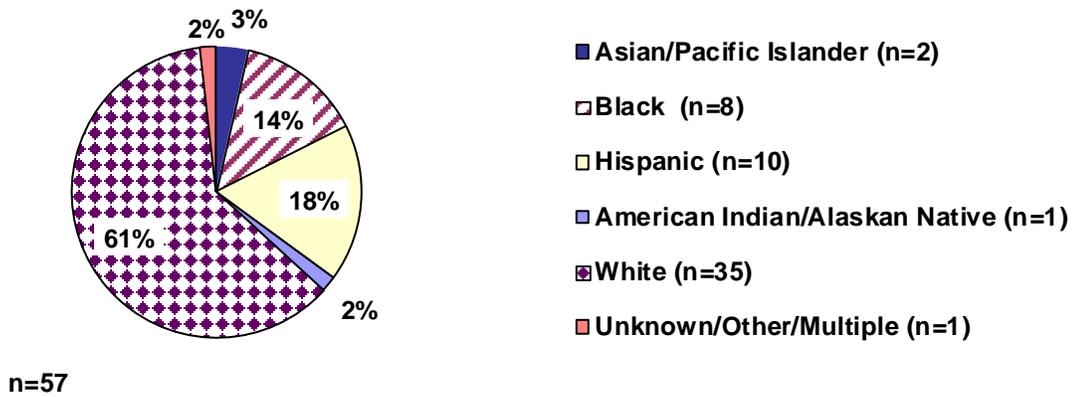
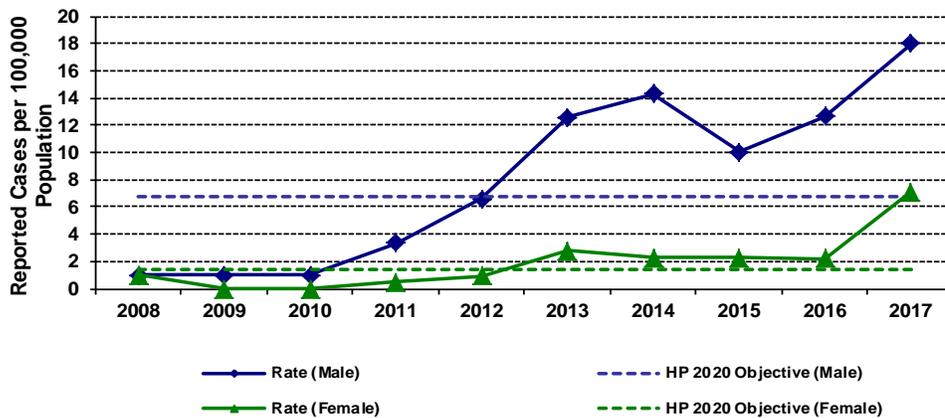


Figure 3.4 Rate of Reported Cases of Primary and Secondary Syphilis by Gender, Washoe County, 2008 – 2017.



Forty (40) cases of early latent syphilis were reported in 2017. Thirty-three (33) were males and seven (7) were female. Eighteen (17) were White, non-Hispanic, fourteen (14) were Hispanic, one (1) was American Indian/Alaskan Native and six (6) were Black. Most cases (65%) occurred in the 16-39 year age range. Early latent syphilis case risk factors were reported as (24) men having sex with other men

(MSM) or bisexual, thirteen (13) heterosexual, and one (1) unknown. Fourteen (14) or 38% of early latent syphilis cases were co-infected with HIV.

Figure 3.4 Reported Early Latent Syphilis by Age and Gender, Washoe County, 2017.

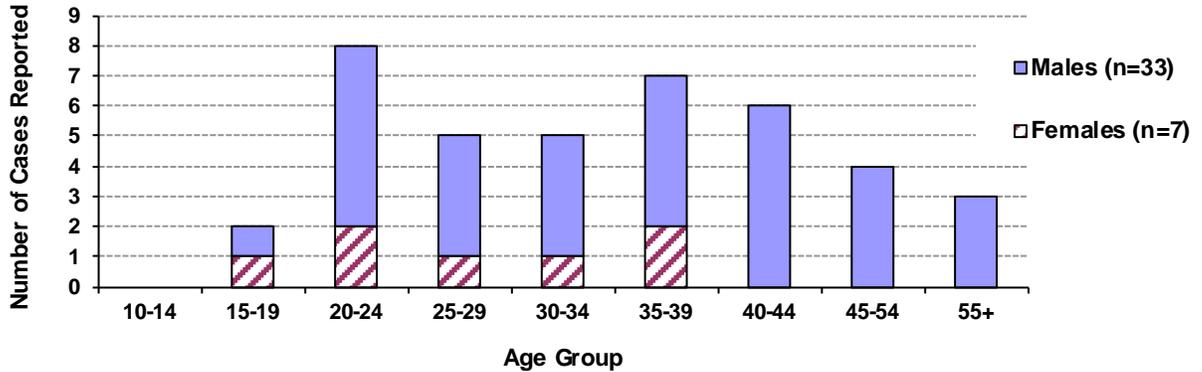
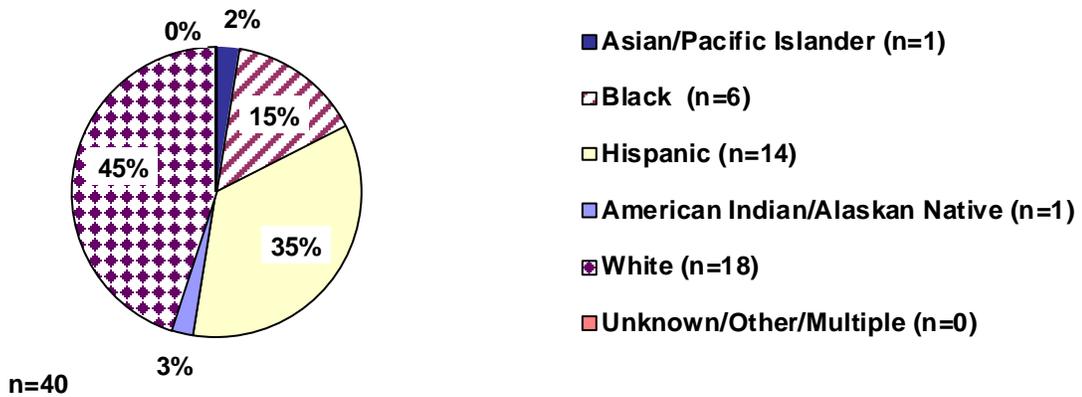


Figure 3.5 Reported Cases of Early Latent Syphilis by Race/Ethnicity, Washoe County, 2017.



Investigation of case clusters and other early syphilis cases was challenging due to transiency, anonymous partners, multiple partners and lack of cooperation from index cases. Advances in social media and networking have impacted traditional disease investigation methods as anonymity of the partner is easier to maintain, leaving little or no method or information to contact a partner.

**B. Prevention and Control**

**1. Contact Follow-Up**

The Disease Intervention Specialists interviewed syphilis cases to identify sexual contacts for treatment intervention. . Partner Services outcomes are unavailable for 2017 due to database and data collection changes. The data for Table 3.2 and Figures 3.3 and 3.4 are not available for 2017 due to the programmatic changes.

Table 3.2 Disposition of Contacts to Syphilis Cases, (All Stages), Washoe County, 2016.

Disposition	Total	Percent
<b>New Contacts Examined</b>		
Preventive Epi. Treatment	10	28.6
Refused Preventive Treatment	0	0.0
Infected - Brought to Treatment	10	28.6
Infected - Not Treated	0	0.0
Not infected	15	42.9
<b>Total</b>	<b>35</b>	<b>49.3</b>
<b>New Contact No Exam</b>		
Insufficient Information to Begin Investigation	9	30.0
Out of Jurisdiction	3	10.0
Refused exam	5	16.7
Unable to locate	13	43.3
Other	0	0.0
<b>Total</b>	<b>30</b>	<b>42.3</b>
Previously treated for this infection	6	8.5
<b>Total</b>	<b>71</b>	<b>100</b>

Figure 3.3 Number of Contacts to Syphilis Cases (All Stages), Washoe County, 2007– 2016.

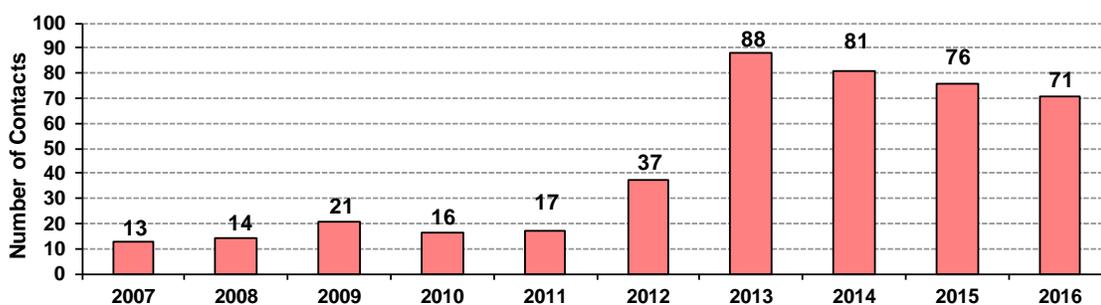
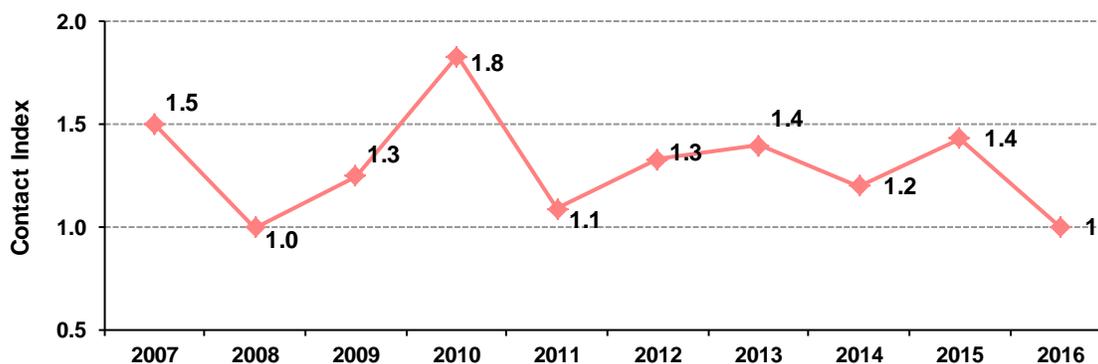


Figure 3.4 Syphilis Contact Index\*, Washoe County, 2007 – 2016.



\*Contact Index = Number of contacts identified per case for primary, secondary, and early latent syphilis.

(Please note that the numbers reported in Section I through Section III are slightly different with the numbers in WCHD's weekly CD report. This is because investigations continue after the initial weekly report is published.)

## IV. Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS)

### A. Epidemiology

Infection with the Human Immunodeficiency Virus (HIV) leads to the development of Acquired Immune Deficiency Syndrome (AIDS). If HIV-infected persons contract an opportunistic infection, or their CD4+ T-lymphocyte count falls below 200 u/L, they meet the surveillance case definition for AIDS.

#### 1. HIV Infection

##### a. Reported Incidence

Since 1983, a total of 1,571 cases of HIV infection have been reported in Washoe County. This number represents an unduplicated count of all persons who have been reported as either: 1) a case of HIV infection without AIDS, or 2) a case of HIV infection with AIDS – depending on their health status at the time the HIV infection is first reported. The statistics presented in this report are based on these parameters for “HIV infection.”

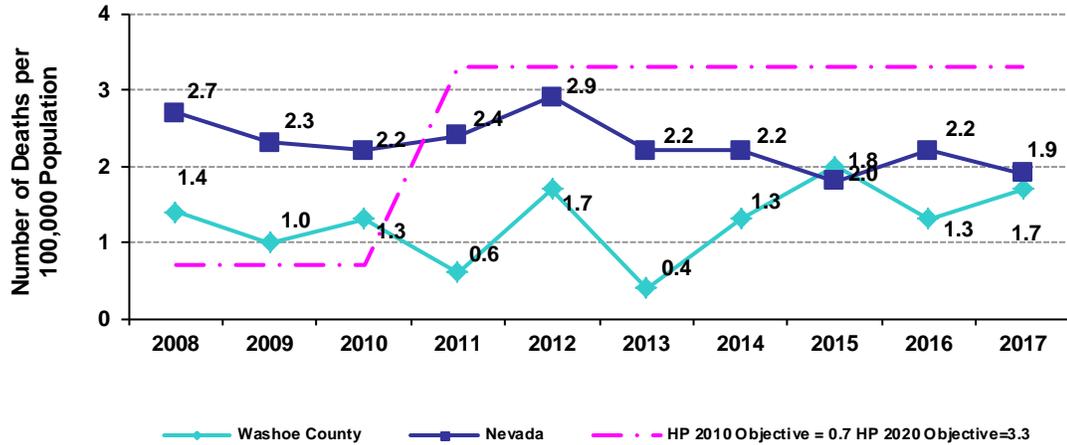
In 2017, 22 cases of HIV infection (without progression to AIDS) and 5 cases of HIV infection with progression to AIDS were reported in Washoe County. The total number of new cases of HIV infection for 2017 was 27 including HIV infections that progress to AIDS. The incidence of HIV infection in Washoe County was 6.0 cases per 100,000 population. The incidence rate trend during 2013-2016 was consistent with the rate trend for P&S syphilis. This is not the case for 2017. Although the incidence was decreased in 2017 in comparison to 2016, the overall increased incidence of HIV in recent years may be associated with advances in social media and networking that has impacted traditional disease investigation methods as anonymity of the partner is easier to maintain, leaving little or no method to contact a partner. In 2016, the national incidence rate for HIV diagnoses was 12.3 cases per 100,000 population, which was the most current national data.

Figure 4.1 Rate of Reported Cases of HIV Infection, Washoe County, 2008-2017.



The Healthy People 2020 national health objective for deaths due to HIV infection is 3.3 deaths per 100,000 population. The age-adjusted death rate in Washoe County was 1.7 per 100,000 population in 2017, which met the HP 2020 objective.

Figure 4.2 Age-adjusted Death Rate Due to HIV Infection, Washoe County, 2008-2017.



Source: Nevada Division of Public and Behavioral Health (June 2017).

**b. Population Affected**

The HIV/AIDS epidemic nationally is growing most rapidly among minority populations. Although in 2017, the highest number of reported cases of HIV infection in Washoe County was in White persons; the number of reported cases among Blacks yielded rates that were significantly higher than that of Whites.

Figure 4.3 Reported Cases of HIV Infection by Age and Gender, Washoe County, 2017.

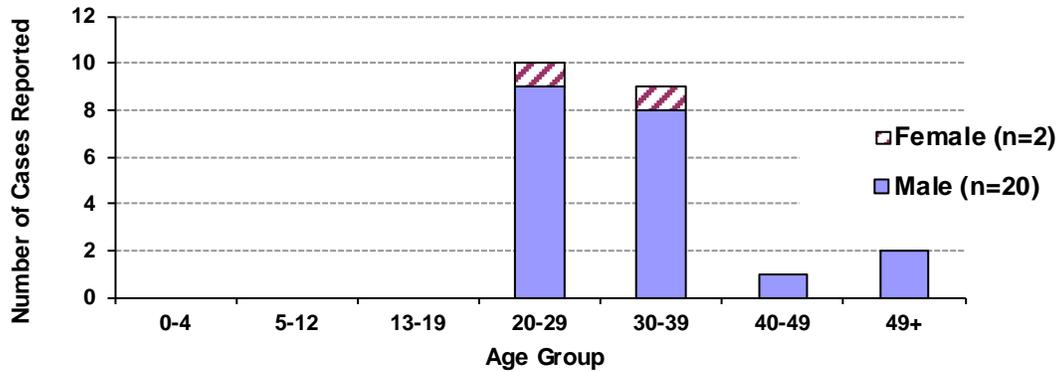


Figure 4.4 Reported Cases of HIV Infection by Race/Ethnicity, Washoe County, 2017.

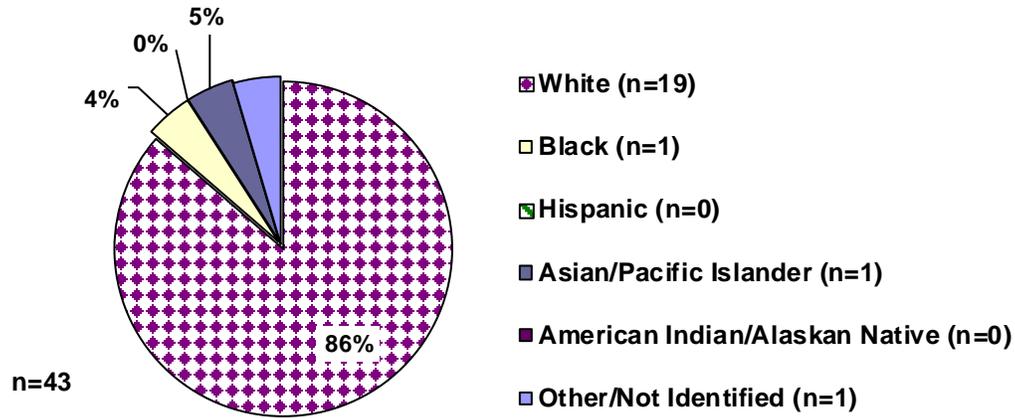


Figure 4.5 Rate of Reported Cases of HIV Infection by Race/Ethnicity, Washoe County, 2017.

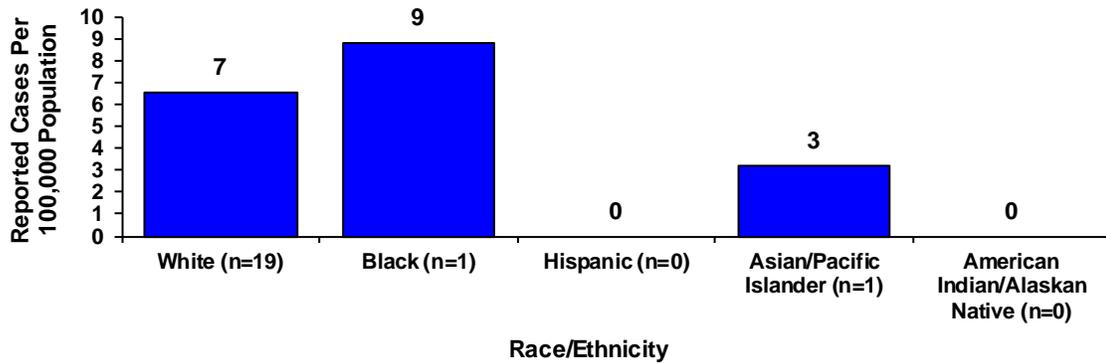
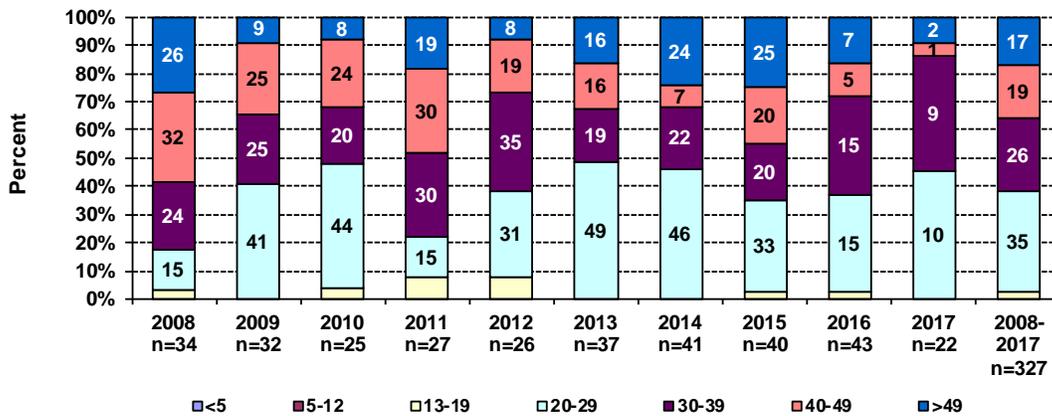
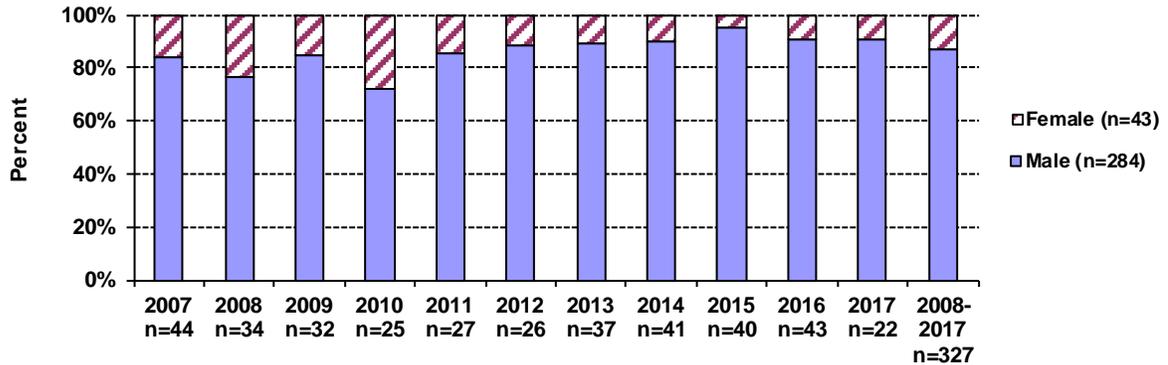


Figure 4.6 Reported Cases of HIV Infection by Age Group Represented as Percent of Total Cases, Washoe County, 2008-2017.

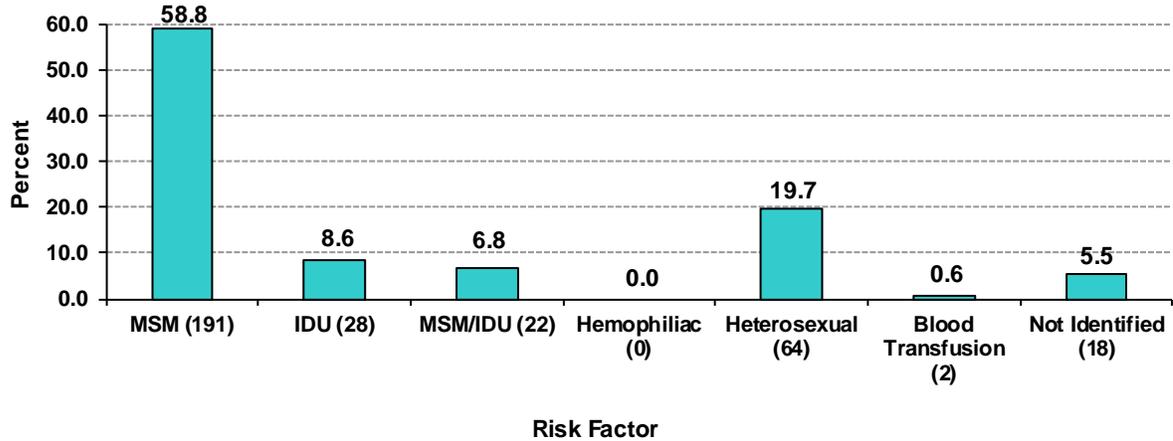


**Figure 4.7 Reported Cases of HIV Infection by Gender Represented as Percent of Total Cases, Washoe County, 2008-2017.**



The risk factors most commonly reported among those with HIV infection are: men who have sex with men (MSM), persons who report heterosexual contact only, and injection drug users (IDU), as well as a MSM/IDU. Non-identified risks refers to cases in which the risk factor is still being investigated or if the client’s self-identified risk does not meet the definition allowed by federal guidelines.

**Figure 4.8 Reported Cases of HIV Infection by Exposure Category Represented as Percent of Total Cases, Washoe County, 2008-2017.**



**2. AIDS**

**a. Reported Incidence**

Since 1983, 1,009 cases of AIDS have been reported in Washoe County. In 2017, 14 new cases of AIDS were reported for an incidence of 3.1 cases per 100,000 population. A “new case of AIDS” includes persons who were reported as a case of HIV infection during 2017 and had already progressed to AIDS (9 cases); and persons who were HIV infected in a year prior to progressing to AIDS diagnosis and progressed to AIDS during 2017 (4 cases).

The Healthy People 2020 national health objective for AIDS is 13.0 new cases per 100,000 population among adolescents and adults. Effective in 2009, the national incidence of reported AIDS was not available, instead, only the incidence of HIV diagnosis was available.

Figure 4.9 Rate of Reported Cases of AIDS, Washoe County, 2008-2017.

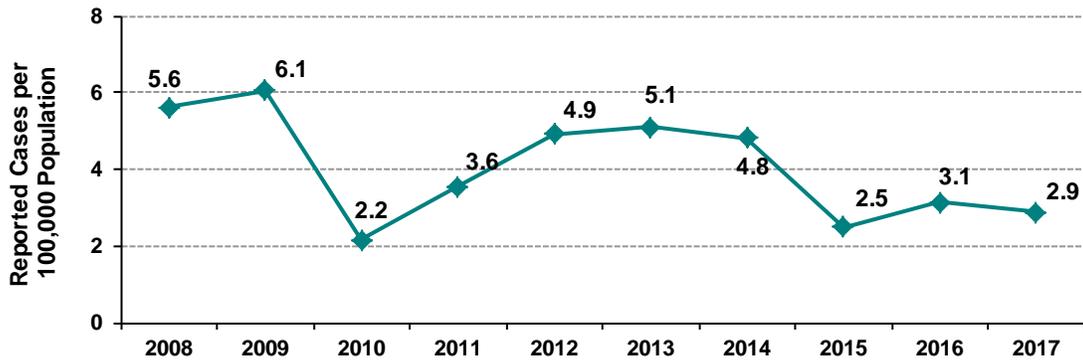
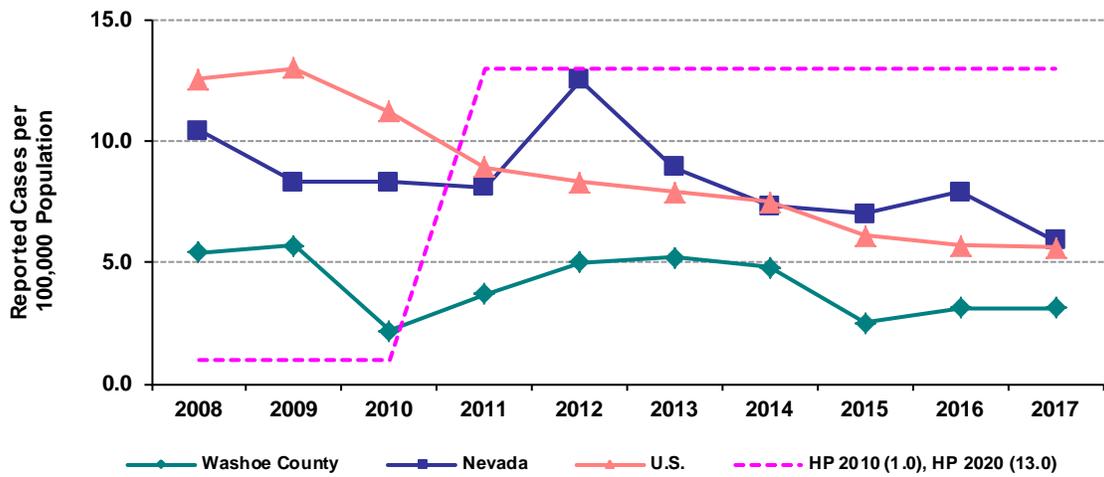


Figure 4.10 Rate of Reported Cases of AIDS, Washoe County, Nevada and U.S., 2008-2017.



**b. Population Affected**

In Washoe County, the highest number of reported AIDS cases was among White persons in 2017.

Figure 4.11 Reported Cases of AIDS by Age and Gender, Washoe County, 2017.

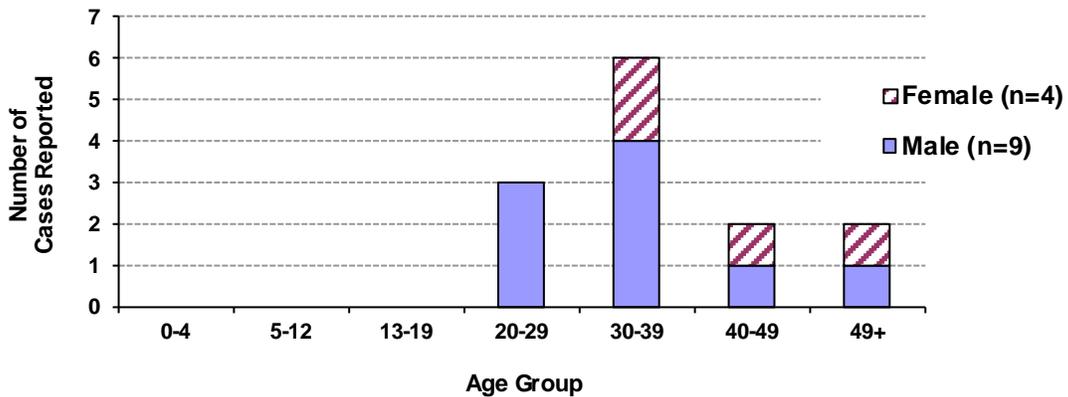


Figure 4.12 Reported Cases of AIDS by Race/Ethnicity, Washoe County, 2017.

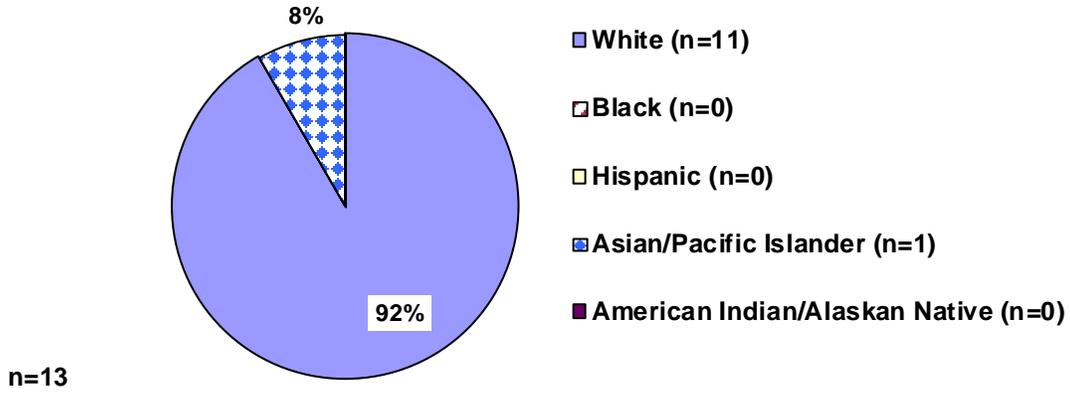


Figure 4.13 Rate of Reported Cases of AIDS by Race/Ethnicity, Washoe County, 2017.

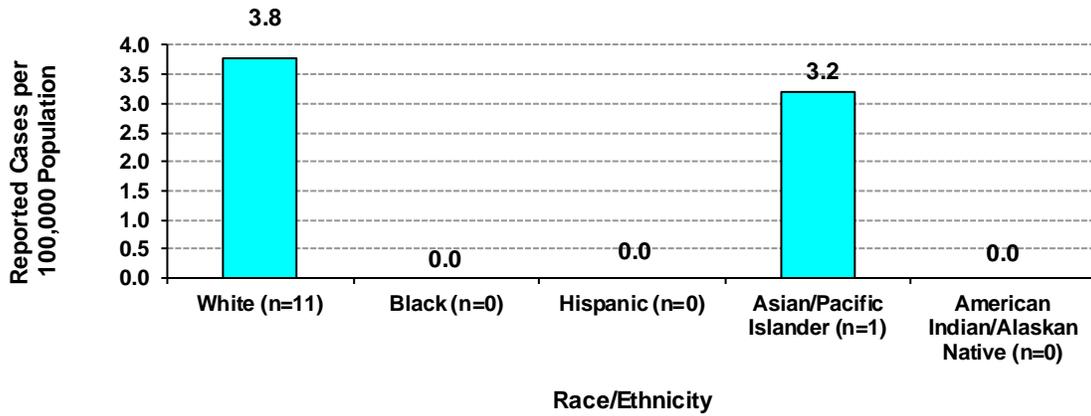


Figure 4.14 Reported Cases of AIDS by Age Group Represented as Percent of Total Cases, Washoe County, 2008-2017.

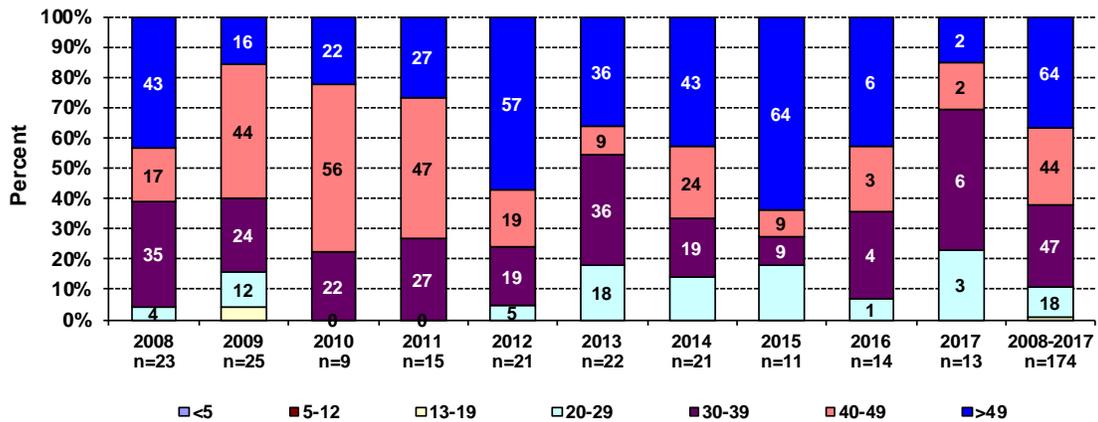


Figure 4.15 Reported Cases of AIDS by Gender Represented as Percent of Total Cases, Washoe County, 2008-2017.

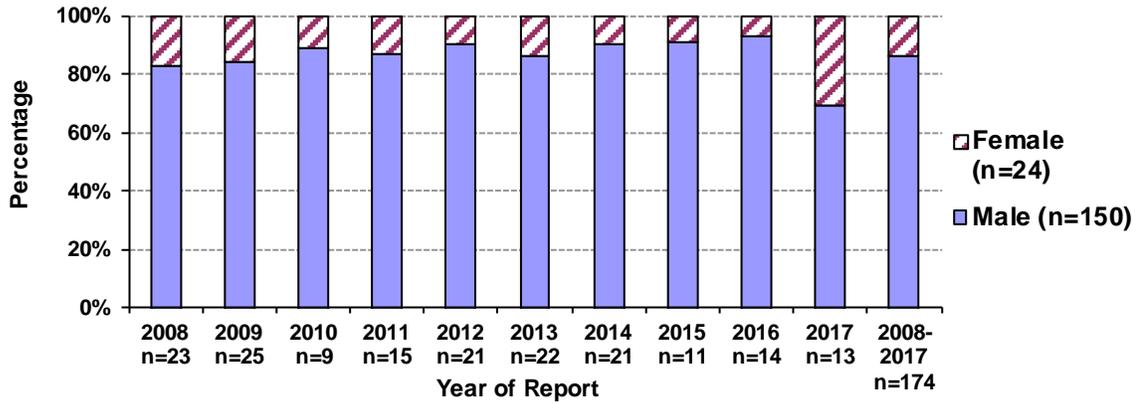
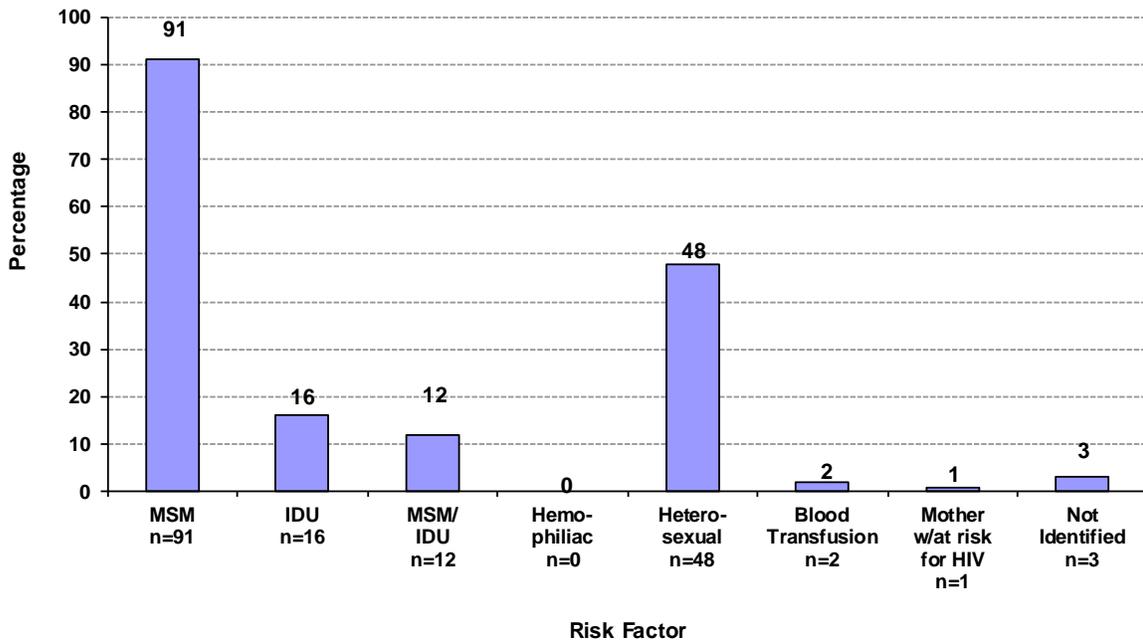


Figure 4.16 Reported Cases of AIDS by Exposure Category Represented as Percent of Total Cases, Washoe County, 2008-2017.

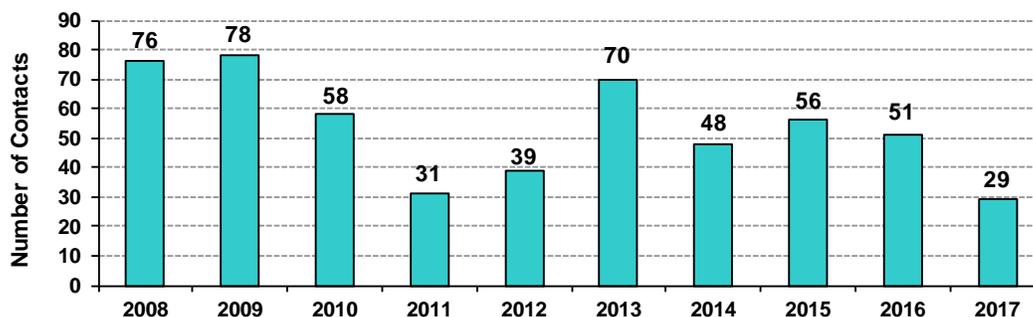


**B. Prevention and Control**

The Disease Intervention Specialists interviewed cases of HIV infection and AIDS to identify sexual and percutaneous contacts for testing and treatment intervention. Of the 35 HIV and AIDS cases reported, a total of 29 contacts were identified. The following table shows the results of these investigations.

**Table 4.1 Contacts to HIV/AIDS Cases, HIV Test Results, Washoe County, 2017 (n=29).**

Contacts Identified in 2016	Total	Cumulative %
Negative Result Male	6	21%
Positive Result Male	2	7%
Not yet tested/Investigation ongoing/Refused testing Male	6	21%
Male Contacts who are <b>already</b> HIV positive	9	31%
<b>Total Male</b>	<b>22</b>	<b>76%</b>
Negative Result Female	5	17%
Positive Result Female	0	0%
Not yet tested/Investigation ongoing/Refused testing Female	2	7%
Female Contacts who are <b>already</b> HIV positive	0	0%
<b>Total Female</b>	<b>7</b>	<b>24%</b>
<b>Total Contacts who refused Testing/Unable to locate</b>	<b>8</b>	<b>28%</b>
<b>Total Contacts who were Positive</b>	<b>7</b>	<b>24%</b>
<b>Total Contacts</b>	<b>29</b>	<b>100%</b>

**Figure 4.17 Number of Contacts to HIV/AIDS Cases Identified, Washoe County, 2008-2017.****Figure 4.18 HIV/AIDS Contact Index\*, Washoe County, 2008 – 2017\*\*.**

\*Contact Index = Number of contacts per case

The WCHD offers confidential HIV counseling and testing in its clinics and at various sites in the community. Of the 2,208 tests provided in 2017 by WCHD, three (3) were positive for a positivity rate of 0.14%. Between 1998 and 2017, the overall rate of positive HIV tests performed by WCHD has been less than 1%, at 0.53% (293/55,220).

In 2003, WCHD adopted the Centers for Disease Control and Prevention (CDC) recommendations for HIV testing in low prevalence settings (i.e., settings with a <1% HIV positivity rate). As a result, the WCHD moved from universal HIV testing (testing all those who request it) to targeted testing (testing those individuals who meet a predetermined set of risk criteria). Beginning in 2005 and continuing to the

present, an internal workgroup of WCHD, as well as a community testing task force, reviews positivity data, risk factors per testing site, and funding/resource availability to evaluate the efficacy of testing individuals identified to be at greatest risk of HIV infection. Direction from the National HIV/AIDS Strategy as well as emphasis on High Impact HIV prevention activities further directs testing efforts. Testing locations and targeted populations change based on the groups' recommendations. In 2017, populations that were targeted for HIV testing include:

- Men who have sex with men;
- Injection drug users;
- Partners of men who have sex with men;
- Partners of injection drug users;
- Those who present with an opportunistic infection;
- Contacts of HIV positive individuals;
- Sexual assault victims;
- Clients with a confirmed, concurrent STD;
- Pregnant women; and
- Those who specifically ask for an HIV test.

Clinicians exercise their professional judgment and recommend an HIV test for individuals in the ineligible categories, if the presence of other risk behaviors suggests an increased risk for HIV.

**Figure 4.19 HIV Positivity Rates, WCHD HIV Testing, Washoe County, 2008-2017.**

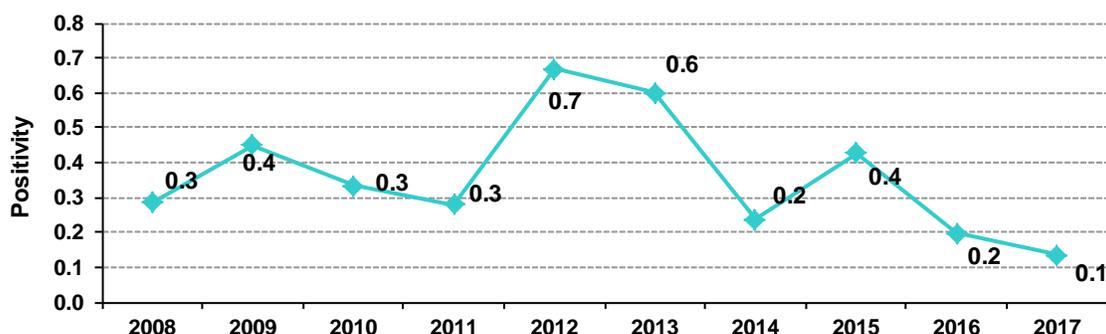


Figure 4.19 shows the overall reduction in HIV positivity in the targeted screened population from 2008 through 2017. This result is likely associated with the implementation of evidence-based interventions in the community beginning in 2002 and continuing through 2015. From 2002 through 2015, WCHD provided oversight of evidence-based prevention interventions in the community. In 2016, the focus moved from behavioral interventions to testing of specific target populations, established by the Northern Nevada HIV Prevention Planning Group with direction from CDC. Identifying people living with HIV (PLWH) through testing, linking PLWH and retaining them in HIV care is the current strategy. Advances in social media and networking have impacted traditional disease investigation methods. Anonymity of the partner is easier to maintain, leaving little or no method and information to contact a partner. Additionally, other community providers have increased their capacity to provide HIV tests. Cumulatively, these have had an impact on WCHD's HIV testing

Diagnostic methods maintained the same sensitivity and specificity during the same time period.

Table 4.2 demonstrates the results of HIV tests stratified by the type of testing site. Sites include the WCHD Sexual Health Clinic, TB and family planning clinics, jail and juvenile detention, and community-based testing provided by WCHD. Of the 2,208 tests provided 1,202 (54%) were rapid HIV tests, which provide results in less than 30 minutes.

These data do not include test results from Northern Nevada HOPES, a federally qualified health center that provides a significant number of HIV tests, or private medical providers in Washoe County. Therefore the rates in Table 4.2 are not applicable to the results of all HIV tests performed in Washoe County.

**Table 4.2 Results of HIV Tests by WCHD Testing Site, Washoe County, 2017.**

Site Type	No. Tested	No. Positive	Positivity (%)
STD	867	1	0.12
TB	6	0	0.00
Prison/Jail	574	1	0.17
Family Planning	22	0	0.00
Other*	739	1	0.14
<b>Total</b>	<b>2,208</b>	<b>3</b>	<b>0.14</b>

\*Other sites refer to community based (offsite) testing provided by WCHD, i.e., routine offsite testing sites, special events, and other outreach events.

## TUBERCULOSIS

### I. Epidemiology

#### A. Tuberculosis

##### 1. Reported Incidence

Seventeen (17) cases of tuberculosis (TB) were reported in Washoe County in 2017 for an incidence rate of 3.8 cases per 100,000 population. This increase represents the variability of TB cases from year to year. The average number of cases in Washoe County over the past 10 years has been ten (10) cases. The national incidence of TB in 2017 was 2.8 cases per 100,000 population, a slight decrease from 2016 when it was 2.9 cases per 100,000. The Healthy People 2020 national health objective for the annual incidence of TB is 1 new case per 100,000 population. The National TB Program Objectives and Performance Targets for 2020 are:

- ◆ less than 0.4 cases per 100,000 of US born persons (1.0 US rate in 2017),
- ◆ less than 1.5 cases per 100,000 for US born non-Hispanic blacks (2.8 US rate in 2017),
- ◆ less than 11.1 cases per 100,000 for foreign born persons (14.6 US rate in 2017), and
- ◆ 0.3 cases per 100,000 for children younger than 5 years of age (1.1 US rate in 2016, 2017 is not available).

These objectives cannot be applied to local data as the specific denominators are not available at the local level.

Figure 1.1 Rates of Reported Cases of TB, Washoe County, 2008-2017.

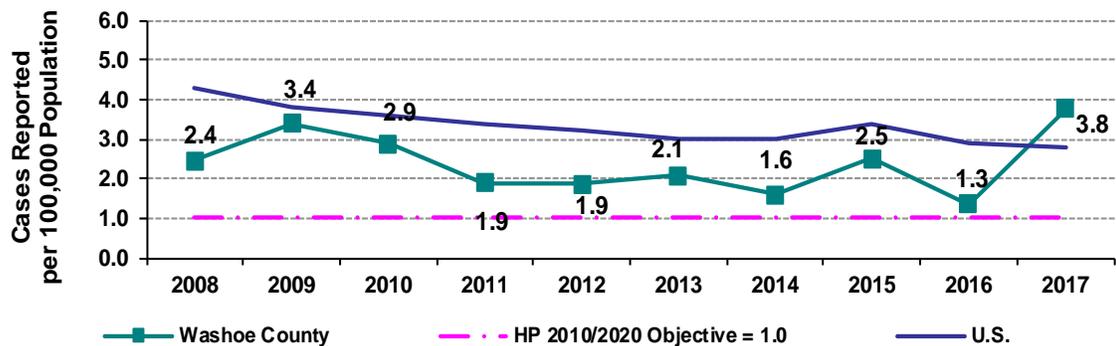
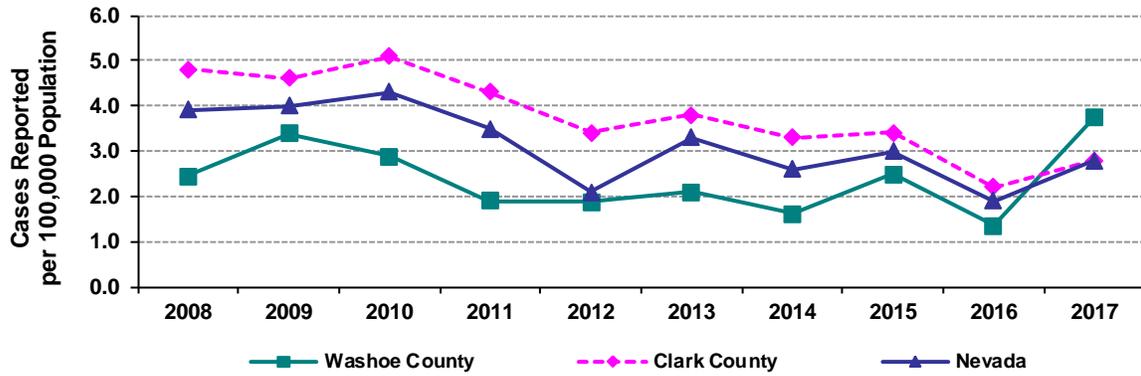


Figure 1.2 Rates of Reported Cases of TB by County, Nevada, 2008-2017



## 2. Population Affected

In 2017, Washoe County treated nine (9) males and - eight (8) females for active TB. The median age of male cases was 44years (range: 25 years – 73 years); the median age of female cases was 39 (range 21 years – 81 years).

Figure 1.3 Reported Cases of TB by Age and Gender, Washoe County, 2017



Figure 1.4 Reported Cases of TB by Gender, Washoe County, 2008-2017

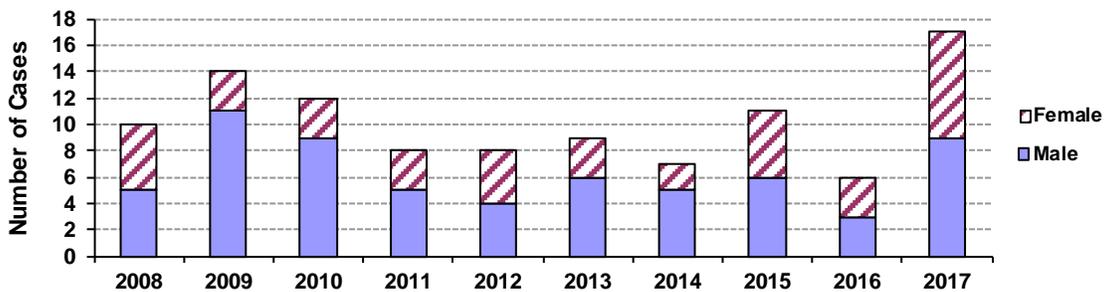
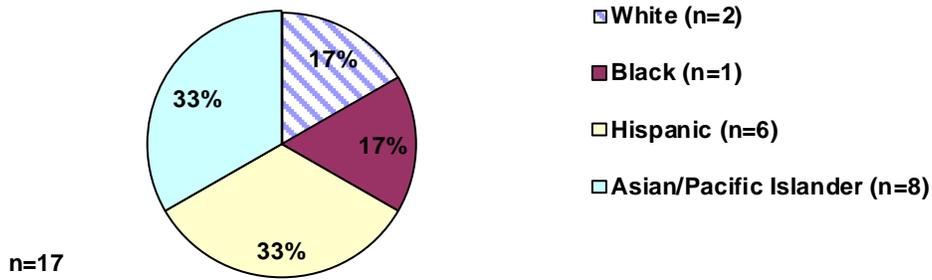


Figure 1.5 Reported Cases of TB by Race/Ethnicity, Washoe County, 2017



In 2017, fifteen (88%) of the reported TB cases in Washoe County were born in foreign countries where TB is endemic.

Figure 1.6 Proportions of Reported Cases of TB by Birth Country, Washoe County, 2017

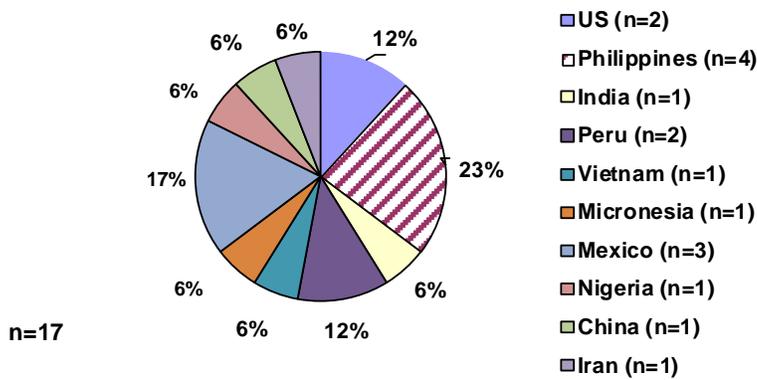
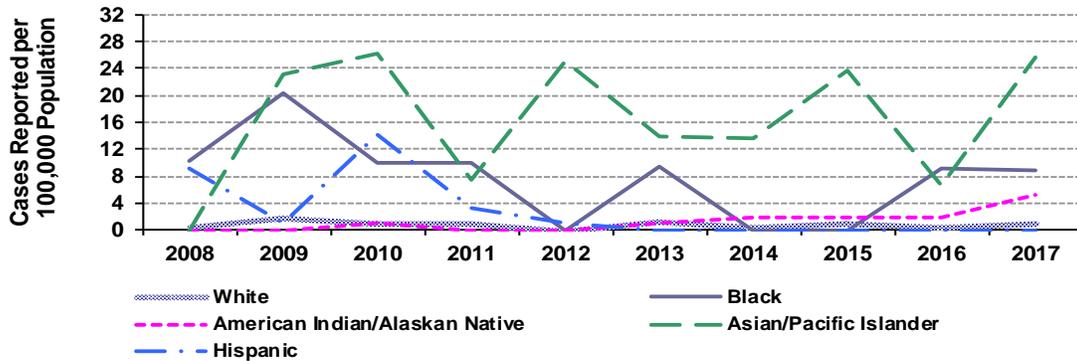


Figure 1.7 Rates of Reported Cases of TB by Race/Ethnicity, Washoe County, 2008-2017



### 3. Drug Resistant TB

No cases of multi-drug resistant TB (MDR-TB) were reported or treated in Washoe County in 2017. There was two cases of mono-resistance one to Isoniazid, the other to Pyrazinamide.

### 4. TB and HIV Co-infection

All cases of TB diagnosed in Washoe County for 2017 were screened for HIV. There was no cases co-infected with HIV.

## B. Latent Tuberculosis Infection (LTBI)

### 1. Estimated Prevalence

The definition of “latent tuberculosis infection” is infection with *Mycobacterium tuberculosis*, without any disease process due to the infection. It is not possible to determine exactly how many persons become infected with *M. tuberculosis* each year. However, based on population and the average number of active TB cases over the past 5 years, it can be estimated that there are 13,000 – 21,000 persons living with LTBI in Washoe County. A new law passed in September 2015 requires healthcare providers to report any child under the age of five (5) years that tests positive for latent tuberculosis infection. In 2018, it is anticipated, that a law will be passed that will require providers to report all persons who test positive for tuberculosis infection. Additionally, the National Tuberculosis Controller’s Association and Society for Epidemiology in Tuberculosis in connection with the Center for Disease Control and Prevention are studying the feasibility of mandatory national reporting.

There were two children under 5years of age diagnosed with LTBI in 2017. One had newly arrived to the United States from an endemic country. The other was a contact to an active case of TB on an international air flight. Both children received a full 9 month course of treatment for LTBI.

In 2017, the Washoe County Tuberculosis Program received 175 voluntary reports from providers of persons who tested positive for TB infection.

### 2. Population Affected

The Washoe County Health District (WCHD) Tuberculosis Prevention and Control Program (TBPCP) tests Washoe County residents at highest risk for TB infection, including close contacts to TB cases, newly arrived immigrants, and foreign-born persons from countries where TB is endemic. The TBPCP partners with the homeless shelters for evaluation of shelter residents who present with TB symptoms.

A total of 177 people were evaluated by the WCHD TBPCP using either Quantiferon TB Gold - In Tube (130) or Tuberculin Skin Test (47).

**Table 1.1 Tuberculosis Screening Tests (TST and QFT), TBPCP, 2008-2017**

Year	Total # of Persons Tested	# Positive	Percent Positive
2008	355	218	61.4
2009	235	134	57.0
2010	215	184	85.6
2011	116	70	60.3
2012	151	88	58.3
2013	271	106	39.1
2014	133	73	54.9
2015	141	77	54.6
2016	86	34	39.5
2017	177	30	16.9

## II. Prevention and Control

### A. Tuberculosis

#### 1. Cases

Twenty-three (23) cases of TB were treated by the TBPCP in 2017. These include the seventeen (17) cases reported in 2017 and four (4) cases reported in 2016 that completed their treatment in 2017, in addition to two cases diagnosed in other states that moved to Washoe County.

Of the seventeen (17) cases of TB diagnosed in 2017, nine (9) have completed a full course of curative treatment and eight (8) remain on treatment in Washoe County with anticipated completion dates in 2018.

Of the six (6) cases diagnosed with TB in Washoe County in 2016, all six (6) completed a full course of curative treatment within 12 months.

The Healthy People 2020 national health objective for completing a course of curative treatment for TB within 12 months is 93%. WCHD TB Program met this goal for 2016.

#### 2. Contacts

When a person with TB is identified, a case-contact investigation is initiated to identify individuals who may have become infected through close and prolonged association with the person sick with TB. Contacts are counted in the same year the index case is reported, regardless of when the contact is actually tested or evaluated. Example: Contacts of an index case reported in 2017 but not tested until 2018 are counted with 2017 data.

In 2017, the TBPCP conducted eleven case-contact investigations associated with cases diagnosed in Washoe County. One case that moved to Washoe County from another state had two contacts that completed their evaluation in Washoe County.

There were forty-four (44) contacts to smear and culture positive cases identified, forty-two (42) completed an evaluation for TB infection utilizing either the Tuberculin Skin Test (TST) or the QuantiFeron-TB Gold In-tube (QFT-GIT) test. Two refused the second round of testing. Eight (8) of the 42 contacts tested positive. Three were conversions and for the other five, it was not possible to

determine if the infection was due to transmission or remote infection. One of the 2017 cases genotypes matched a case diagnosed and treated in 2016, the two cases were roommates.

There were forty-five (45) contacts to smear negative and culture positive cases identified. -All but one, have been completely evaluated. One refused to be evaluated. Of these forty-four contacts evaluated, seven were positive. One was known to have been treated for active TB disease in the past, two others had been previously treated for LTBI, all most likely had been previously infected.

An additional seven (7) people were evaluated as contacts to clinically diagnosed, smear and culture negative cases. Three tested positive; this most likely represents prior infection.

**Table 2.1 Evaluated Contacts to TB Cases, Washoe County 2008-2017**

Year	# of Contacts Tested	# Positive	%Positive	# Diagnosed with TB	%Diagnosed with TB
2008	115	18	16	1	0.9
2009	214	59	28	0	0.0
2010	151	42	28	3	2.0
2011	54	14	26	0	0.0
2012	178	18	10	1	0.6
2013	365	18	5	1	0.3
2014	35	5	14	0	0.0
2015	56	4	7	0	0.0
2016	14	4	29	1	7.1
2017	93	19	20	0	0.0

## B. Latent Tuberculosis Infection (LTBI)

### 1. Treatment of LTBI

Persons with latent TB infection have a 10% risk of developing active TB disease during their lifetime. The risk is greatest within two years after infection occurs. Persons with certain medical conditions (e.g. diabetes, HIV infection, treatment with TNF alpha antagonists, organ transplants, silicosis, 10% below ideal body weight, hemodialysis patients, etc.) are at an increased risk of developing active TB during their lifetime. Additionally, infants and children under 5 years of age have an increased risk of developing TB disease. Treating LTBI infection can significantly reduce a person's risk of ever developing TB disease.

The Healthy People 2020 national objectives for LTBI therapy are:

1) For individuals diagnosed with latent TB infection (LTBI) who are contacts to sputum AFB smear-positive TB cases, increase the proportion who start treatment to 91%. One of two persons (50%) started in Washoe County.

2) For individuals diagnosed with LTBI who are contacts to sputum AFB smear-positive TB cases and who have started treatment for LTBI, increase the proportion who complete treatment to 81%. One contact completed in Washoe County (100%).

3) For immigrants diagnosed with latent TB infection who had an abnormal chest x ray read overseas for whom treatment is recommended increase the proportion who start treatment to 93%. Ten of 11 immigrants started treatment (91%)

4) And for those immigrants who start treatment increase the proportion who complete treatment to 83%. Eight of ten immigrants completed treatment (80%).

In 2016, seven (7) contacts were identified to persons with AFB smear positive TB, two (2) of the contacts tested positive. One started and completed treatment, the other moved and treatment status is unknown. HP 2020 objective 1 and 2 = 50%.

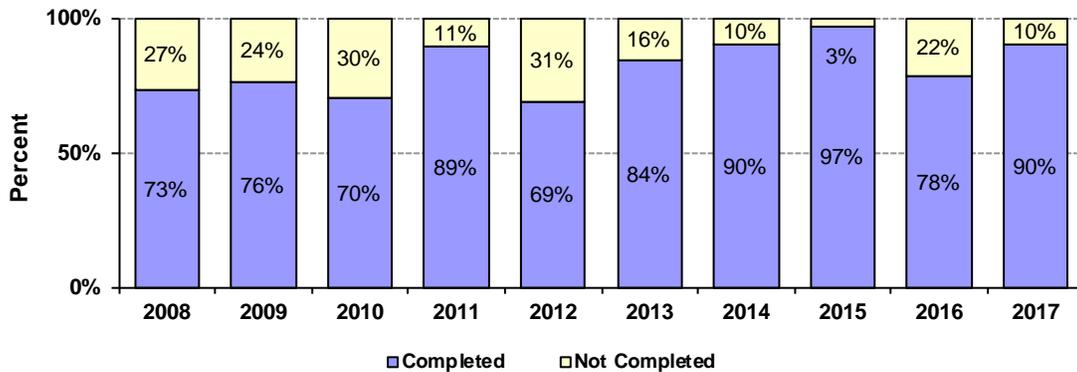
In 2016, six additional contacts were identified to persons with AFB smear negative culture positive TB. Only two completed their evaluation. One had been previously treated for TB disease. The other tested negative.

In 2016 there were eleven (11) immigrants diagnosed with LTBI, who had an abnormal chest x-ray and positive QFT. Ten (10) started treated and eight (8) completed treatment. Two chose to stop treatment and one did not start treatment due to moving to another state.

An estimated total of fifty two (520 (includes 10 immigrants) persons diagnosed with LTBI, who were not contacts to TB cases, started treatment for LTBI on 2016 and complete an adequate courses. Nine (9) people discontinued treatment due to lost to follow up (3), medication intolerance/drug reaction (3), client choice (1) , not LTBI (1), and died (1).

The overall completion rate for treatment of LTBI among all persons who started treatment in 2016 was (54/42) 78% completed.

**Figure 2.1 Completion Rate for Treatment of LTBI, TBPCP, 2008-2017**



Preliminary numbers for 2017: Thirty one people who were not contacts to active TB started LTBI treatment. Of those nineteen have completed and nine are expected to complete their treatment in 2018. Three have discontinued treatment due to choice (1), medication intolerance (2).

Sixteen people who were contacts to active TB started LTBI treatment, ten have completed, five are still in treatment and are expected to complete full treatment, one was lost to follow up and treatment outcome is unknown.

## VACCINE PREVENTABLE DISEASES

In 2017, an assessment of vaccination coverage showed that 77.4% of children aged 19-35 months had received age-appropriate vaccinations at the time of their visiting clinics or healthcare providers located in Washoe County (Data source: Nevada Division of Public and Behavioral Health, March 2018)<sup>1</sup>. This is higher than the 2016 national coverage at 70.7% . The Healthy People 2020 national health objective for vaccine coverage among children aged 19-35 months is 80%. The vaccines include: DTaP (4 doses), polio (3 doses), MMR (1 dose), Hib (3 doses), hepatitis B (3 doses), varicella (1 dose), and PCV (4 doses). These are highly effective vaccines against diphtheria, tetanus, pertussis, polio, measles, mumps, rubella, *Haemophilus influenzae* type b (Hib) disease, hepatitis B, chickenpox, and invasive pneumococcal disease.

The WCHD works closely with the Washoe County School District, Immunize Nevada - Nevada's statewide immunization coalition, private health care providers and child care providers to raise immunization rates and reduce vaccine-preventable diseases. There are highly effective vaccines against the previously described diseases as well as influenza and rotavirus.

Vaccination against these diseases has reduced reported cases to record-low levels. No cases of diphtheria, measles, polio, or rubella have been reported in Washoe County in the last decade. Sporadic cases of mumps are occasionally reported. One case of tetanus was reported in 2017.

**Table A Summary of Laboratory-Confirmed Cases of Vaccine Preventable Diseases (VPD), Washoe County, 2008 – 2017\***

VPD	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Diphtheria	0	0	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	0	0	0	0
Mumps	0	0	2	1	1	3	4	2	3	2
Polio	0	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0	0
Tetanus	0	1	0	0	0	0	0	0	0	1

\*Varicella is not a reportable disease in Nevada.

The WCHD and the Vaccines For Children (VFC) providers administer the vast majority of childhood vaccines in Washoe County.

<sup>1</sup> The correct coverage rate for previous years should be 75.9% (2014), 74.5% (2013), 73.6% (2012), 71.2% (2011) (Data source: Nevada Division of Public and Behavioral Health, April 2015)

**Table B Vaccine-Specific Doses Administered, Washoe County, 2017.**

Vaccine	WCHD	VFC Providers	All Other Providers	Total
DTaP, DT	210	4,986	1,132	6,328
DTaP-HepB-IPV	308	7,813	2,914	11,035
DTaP-IPV/Hib	247	4,100	29	4,376
DTaP-IPV	294	3,742	912	4,948
Td,Tdap	967	14,449	16,483	31,899
IPV	323	1,528	218	2,069
MMR	992	3,939	2,235	7,166
MMRV	0	5,579	943	6,522
Varicella	1,187	3,820	1,588	6,595
<b>Total</b>	<b>4,528</b>	<b>49,956</b>	<b>26,454</b>	<b>80,938</b>

## I. Invasive *Haemophilus influenzae* type b (Hib)

### A. Epidemiology

Since the licensure of conjugate Hib vaccines for children in 1987, and for infants in 1990, rates of invasive Hib disease among children < 5 years of age have declined by more than 95% in the United States. Rates for adults have remained stable.

#### 1. Reported Incidence

No laboratory-confirmed cases of invasive Hib disease were reported in Washoe County in 2017. No single case was reported between 2008 and 2017. The 2015 national incidence rate for children was 0.14 cases per 100,000 population among children less than 5 year of age, which was the most current national data. The Healthy People 2020 national health objective is 0.27 cases per 100,000 population in children < 5 years of age.

#### 2. Population Affected

No laboratory-confirmed cases of invasive Hib disease were reported in Washoe County in 2017. Seven (7) cases of invasive *Haemophilus influenzae*, non type b, were reported in 2017. The median age was 69 years old (Range: 52 years and 91 years). Four cases (4) were male, three (3) were White, non-Hispanic, one (1) Black and one (1) Hispanic. No death was reported.

### B. Prevention and Control

*Haemophilus influenzae* type b (Hib) vaccine is an inactivated vaccine indicated for active vaccination against *Haemophilus influenzae* type b. There are three monovalent conjugate Hib vaccines, ActHib® (PRP-T), Hibrix® (PRP-T), and PedvaxHib® (PRP-OMP) and one combination conjugate Hib vaccines Pentacel® (DTaP-IPV/Hib) licensed for use in the United States.

The routine recommendations for the Hib vaccines include the following:

ActHib® (PRP-T) (Initial U.S. Approval: 1993) and Hibrix® (PRP-T) (Initial U.S. Approval: 2009)

- ◆ Children 6 weeks-4 years of age
- ◆ 4 dose series
- ◆ Administered at 2, 4, 6, and 12-15 months of age

PedvaxHib® (PRP-OMP) (Initial U.S. Approval: 1989)

- ◆ Children 6 weeks-4 years of age
- ◆ 3 dose series
- ◆ Administered at 2, 4, and 12-15 months of age

Pentacel® (DTaP-IPV/Hib) (Initial U.S. Approval: 2008)

- ◆ Children 6 weeks-4 years of age
- ◆ 4 dose series
- ◆ Administered at 2, 4, 6, and 12-15 months of age

**Table 1.1 Doses of Hib-Containing Vaccine Administered, Washoe County, 2017.**

Vaccine	WCDHD	VFC Providers	All Other Providers	Total
Hib	319	10,613	3,327	14,259
Hib-Hep B	0	1	1	2
DTaP-IPV/Hib	247	4,100	29	4,376
<b>Total</b>	<b>566</b>	<b>14,714</b>	<b>3,357</b>	<b>18,637</b>

## II. Invasive Meningococcal Disease

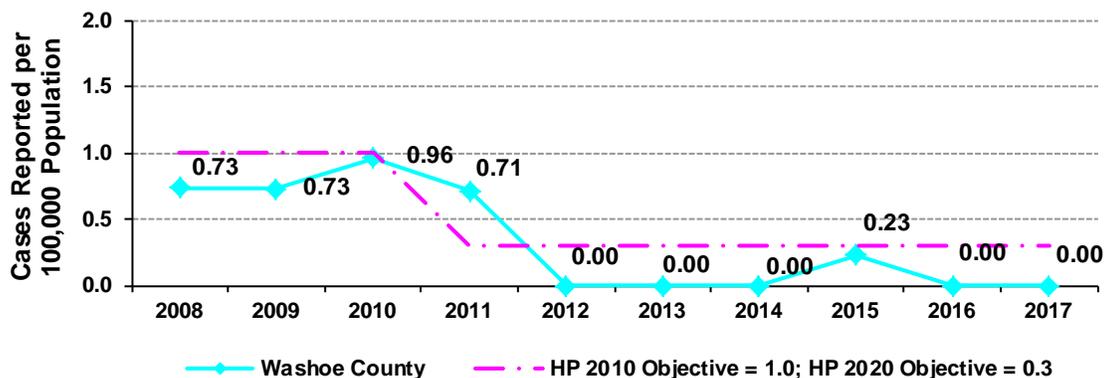
### A. Epidemiology

Meningococcal disease is an acute serious illness caused by the bacteria *Neisseria meningitidis*. It is a leading cause of bacterial meningitis and sepsis in the United States. Even with appropriate antibiotic therapy the case fatality rate of meningococcal disease is 10% to 15%. Up to 20% of survivors have permanent health problems including hearing loss, neurological damage or loss of a limb. Anyone can get meningococcal diseases, but rates of disease are highest in children younger than 1 year old, young adults, those 10 through 23 years old have highest rates of meningococcal disease.

#### 1. Reported Incidence

No laboratory-confirmed cases of invasive meningococcal disease were reported in Washoe County in 2017. The 2016 national incidence rate was 0.12 cases per 100,000 population, which was the most current national data. The Healthy People 2020 national health objective for meningococcal disease is 0.3 cases per 100,000 population. Three fatalities due to invasive meningococcal disease have been reported in Washoe County. These occurred one at a time in 2002, 2010, and 2011.

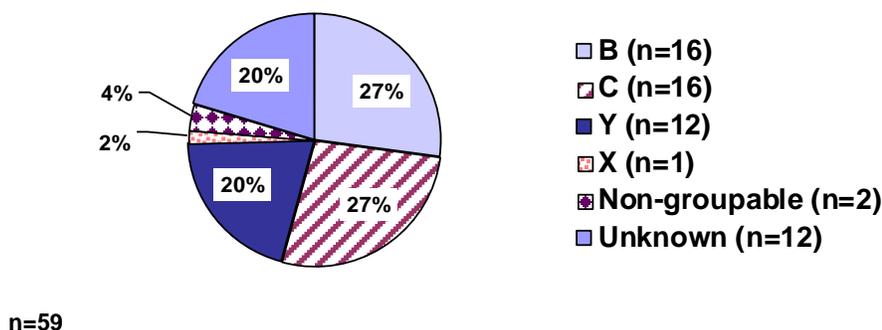
Figure 2.1 Rate of Reported Cases of Invasive Meningococcal Disease, Washoe County, 2008 – 2017.



In the United States, most cases (95% – 97%) of invasive meningococcal disease are sporadic; however, since 1991, the frequency of localized outbreaks has increased. Most of these outbreaks have been caused by serogroup C. Serogroup B accounts for one-third of U.S. cases. The current quadrivalent meningococcal vaccine protects against serogroups A, C, Y and W-135. In 2016, coverage with meningococcal conjugate vaccine ( $\geq 1$  dose) increased to 82.2 % among adolescents aged 13-17 years in the U.S. from 81.3% in 2015.<sup>2</sup> National data for 2017 was not available at the time of report preparation.

Nationally, from 2013 to November 2017, outbreaks of serogroup B meningococcal disease occurred on 20 college campuses. Two deaths were reported from the University of Wisconsin-Madison and the University of Oregon. Several students suffered neurological effects such as memory loss and difficulty concentrating. One student had both feet amputated.

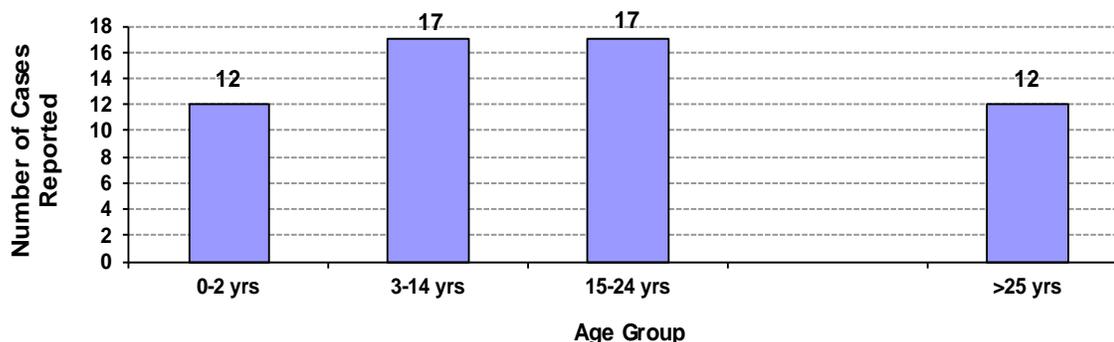
Figure 2.2 Meningococcal Serogroups, Washoe County, 1995-2017



<sup>2</sup> [https://www.cdc.gov/mmwr/volumes/66/wr/mm6633a2.htm#T1\\_down](https://www.cdc.gov/mmwr/volumes/66/wr/mm6633a2.htm#T1_down)

## 2. Population Affected

Figure 2.3 Invasive Meningococcal Disease Cases by Age, Washoe County, 1995 – 2017 (n=59).



### B. Prevention and Control

Meningococcal quadrivalent vaccine is an inactivated vaccine indicated for the active vaccination against meningococcal disease caused by the serogroups A, C, Y and W-135. In 1974, the first meningococcal quadrivalent polysaccharide vaccine, Menomune® was licensed for use in the United States but is no longer available.

Currently there are two quadrivalent conjugated meningococcal vaccines, Menactra® (MenACWY-D), and Menveo® (MenACWY-CRM) indicated for the active vaccination against serogroups A, C, Y and W-135 licensed for use in the United States.

The routine recommendations for quadrivalent conjugated meningococcal vaccines include the following:

Menactra (Initial License: 2005) and Menveo (Initial License: 2010)

- ◆ Preteens 11-12 years of age should receive:
  - 1 dose followed by a booster dose at 16 years of age
- ◆ Starting July 1, 2017 per Nevada Administrative Code (NAC 392.105 and 394.250) all children enrolling in 7<sup>th</sup> grade need 1 dose of meningococcal vaccine.
- ◆ Adolescents 13-15 years of age with no prior history of meningococcal vaccine should receive:
  - 1 dose followed by a booster dose at 16 years of age
  - Minimum interval between doses is 8 weeks
- ◆ Adolescents 16-18 years of age who receive a dose on or after 16 years of age do not need a booster dose.
- ◆ All previously unvaccinated first-year college students 19-21 years of age, who are or will be living in a residence hall or received their first dose before 16 years of age should receive a single dose.
- ◆ Starting September 1, 2017 per Nevada Administrative Code (NAC 441A.755) all freshmen enrolling in a Nevada university who are less than 23 years of age need one dose of meningococcal vaccine on or after 16 years of age.
- ◆ Persons 2 months of age and older (ACIP allows use in persons 56 years of age and older) at increased risk for meningococcal disease.

On October 29, 2014, the FDA licensed the first serogroup B meningococcal vaccine (Trumenba ®).

FDA approved this vaccine for use in people 10-25 years of age as a 3-dose series. In April 2016 the FDA approved a 2-3 dose series depending upon the person's risk factors and the time frames between the doses of vaccine. In May of 2017 the ACIP approved the 2-3 dose recommendation. On January 23, 2015, FDA licensed a second serogroup B meningococcal vaccine (Bexsero®). FDA approved this vaccine for use in people 10-25 years of age as a 2-dose series.<sup>3</sup>

The routine recommendation for meningococcal B vaccines includes the following:

Bexsero (MenB-4C) (Initial License: 2015) and Trumenba (MenB-FHbp) (Initial License: 2014)

- ◆ Healthy persons 16-23 years of age (preferred age is 16-18 years) may be given at the healthcare provider's discretion and persons 10 years of age and older at increased risk of meningococcal disease caused by serogroup B (ACIP allows use for persons 26 years of age and older)
  - Bexsero
    - 2 dose series for healthy persons not at increased risk for meningococcal disease caused by serogroup B and for persons 10 years of age and older at increased risk for meningococcal disease caused by serogroup B
    - 0-1 month schedule
  - Trumenba
    - 2 dose series for healthy persons not at increased risk for meningococcal disease caused by serogroup B
    - 0-6 month schedule
  - Trumemba
    - 3 dose series for persons 10 years of age and older at increased risk for meningococcal disease caused by serogroup B (ACIP allows use for persons 26 years of age and older)
    - 0, 1-2 and 6 month schedule

**Table 2.1 Doses of Meningococcal Vaccine Administered, Washoe County, 2017.**

Vaccine	WCDHD	VFC Providers	All Other Providers	Total
Meningococcal	769	9,145	3,450	<b>13,364</b>

### III. Invasive Pneumococcal Disease

#### A. Epidemiology

*Streptococcus pneumoniae* (pneumococcus) is a leading cause of illness in young children, and a cause of illness and death among elderly persons and persons with certain underlying medical conditions. *S. pneumoniae* causes meningitis, bacteremia, pneumonia and otitis media. In Nevada, only meningitis caused by *S. pneumoniae* had historically been a reportable condition. Effective January 1, 2007, enhanced surveillance to include all invasive pneumococcal diseases (IPDs) was implemented. Effective January, 2011, all IPDs became reportable in Nevada.

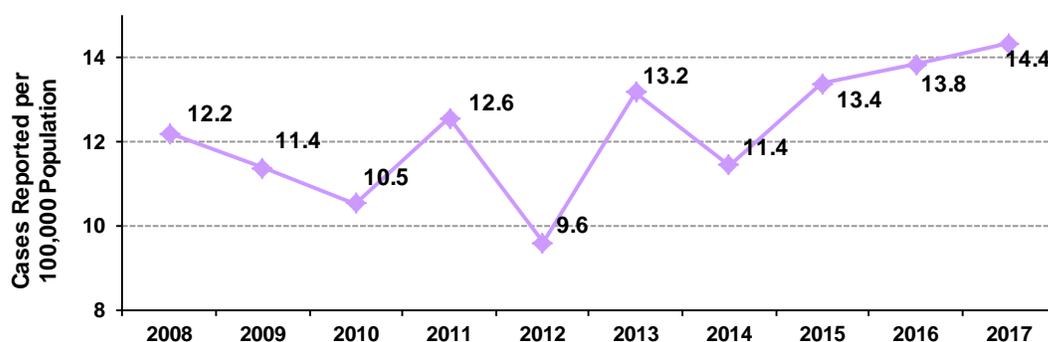
Eighty-eight percent (88%) of all serotypes that are known to cause invasive disease are included in the 23-valent polysaccharide vaccine, which was licensed in 1983. Before the pneumococcal conjugate vaccine (PCV) was introduced in 2001, over 80% of invasive isolates in children under 5 years of age were included in a 7-valent vaccine. Since February 2010, PCV13 has been licensed and recommended for children in the US and PCV13 replaced the previous version of Prevnar®, known as PCV7. This new vaccine covers the 13 pneumococcal serotypes, which cause the majority of pneumococcal infections in young children.

<sup>3</sup> <https://www.cdc.gov/vaccines/pubs/pinkbook/mening.html>

## 1. Reported Incidence

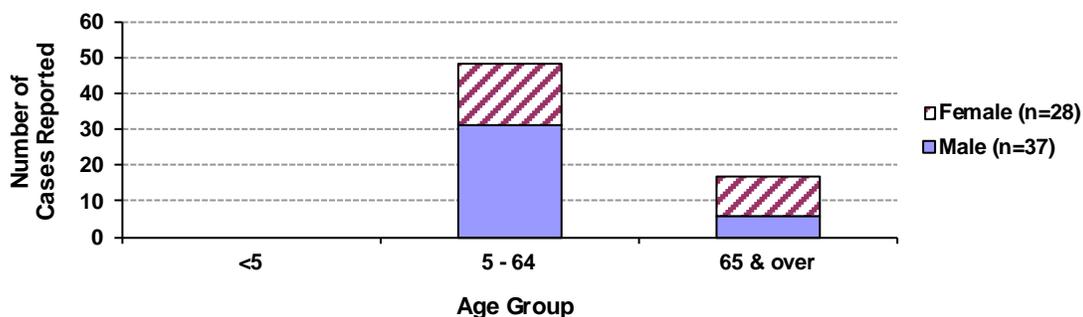
Sixty five (65) laboratory-confirmed cases of invasive pneumococcal disease (IPD) were reported in Washoe County in 2017 for an incidence rate of 14.36 cases per 100,000 population. The national incidence rate (all invasive pneumococcal disease) in 2015 was 6.93 cases per 100,000 and 7.87 cases per 100,000 population among children under five years. The Healthy People 2020 national health objective for IPD is 12 cases per 100,000 population among children under 5 years. Washoe County’s incidence in 2017 for this age group was 14.4 cases per 100,000 population. The Healthy People 2020 national health objective for IPD is 36 cases per 100,000 population among adults 65 years and older. Washoe County’s incidence in 2016 for this age group was 25.02 cases per 100,000 population. Local statistics prior to 2007 cannot be compared to national statistics, as the rate was calculated based only on pneumococcal meningitis cases. Of the 65 IPD cases in 2017, five (5) cases were fatal. Five (5) of the fatal cases were in adults. Four (4) cases were White and one (1) Black. Three cases were female.

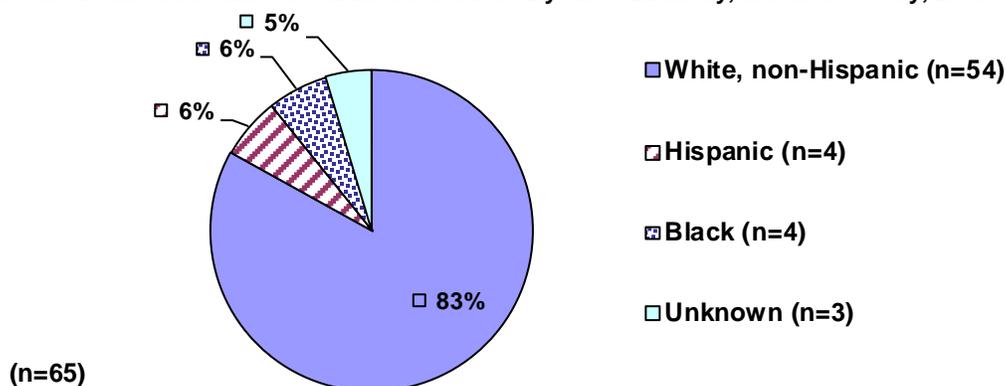
Figure 3.1 Rate of Reported Cases of Invasive Pneumococcal Disease, Washoe County, 2008 – 2017.



## 2. Population Affected

Figure 3.2 Invasive Pneumococcal Disease Cases by Age and Gender, Washoe County, 2017 (n=65).



**Figure 3.3 Invasive Pneumococcal Disease Cases By Race/Ethnicity, Washoe County, 2017.**

## B. Prevention and Control

Pneumococcal vaccine is an inactivated vaccine indicated for the active vaccination against *Streptococcus pneumoniae* (pneumococcus). There is one pneumococcal 13 valent conjugate vaccine, Prevnar 13® (PCV13) and one pneumococcal 23 valent polysaccharide vaccine, Pneumovax 23® (PPSV23) licensed for use in the United States. Please note that each of the pneumococcal vaccines is licensed for specific age groups and indications.

The routine recommendations for pneumococcal vaccines include the following:

Prevnar 13 (PCV13) (Initial U.S. Approval: 2010)

- ◆ Children 6 weeks-4 years of age (required for childcare since 2007)
  - 4 dose series
  - Recommended at 2, 4, 6, and 12-15 months of age
- ◆ Adults 65 years of age and older
  - Single dose
- ◆ Persons 5-64 years of age at increased risk for invasive pneumococcal disease

Pneumovax 23 (PPSV23) (Initial U.S. Approval: 1983)

- ◆ Adults 66 years of age and older at least one year after receiving Prevnar13 (PCV13) and at least 5 years after their previous dose of Pneumovax 23 (PPSV23) (if applicable).
  - Single dose
- ◆ Persons 19-64 years of age at increased risk for invasive pneumococcal disease

Since October 31, 2007, *Streptococcus pneumoniae* vaccination has been required for all children enrolled in a childcare facility in Nevada.

**Table 3.2 Doses of Pneumococcal-Containing Vaccine Administered, Washoe County, 2017.**

Vaccines	WCHD	VFC Providers	All Other Providers	Totals
PNUcon*	575	20,257	10,036	30,868
PNUps**	60	4,306	5,823	10,189
<b>TOTALS</b>	<b>635</b>	<b>24,563</b>	<b>15,859</b>	<b>41,057</b>

## IV. Pertussis

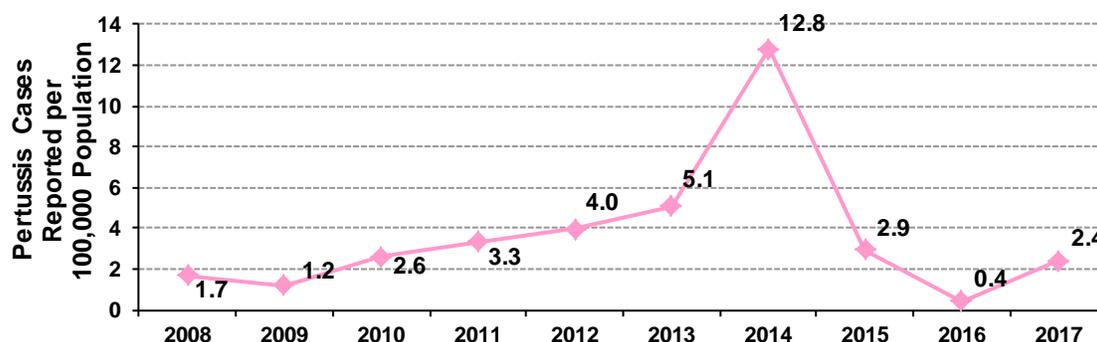
### A. Epidemiology

Pertussis, or “whooping cough,” is caused by the bacteria *Bordetella pertussis*. The bacteria attaches to the ciliated epithelial cells of the respiratory track. Toxin produced by the bacteria paralyzes the cilia which interferes with the clearing of pulmonary secretions. Pneumonia is the most common complication. Young infants are at highest risk for developing complications,

#### 1. Reported Incidence

In 2017, 1 confirmed case and 10 probable cases of pertussis were reported in Washoe County for an incidence of 2.43 cases per 100,000 population. The 2016 provisional national incidence was 5.6 cases per 100,000 population<sup>4</sup>. The Healthy People 2020 national health objective for pertussis is to reduce the incidence in children under age 1 year by 10% from the 2004-2008 baseline of 2,777 to 2,500. In 2014, the highest incident rate was reported in the past decades (see 2014 Annual Communicable Disease Summary).

Figure 4.1 Rates of Reported Cases of Pertussis, Washoe County, 2008– 2017.



#### 2. Population Affected

The median age of reported pertussis cases was 28 years (range: 4 days – 76 years). Six (6) cases were female, seven (7) white and two (2) Hispanic. One (1) infant was hospitalized for 17 days and no deaths were reported. 91% of reported cases had received the recommended doses of pertussis-containing vaccine.

<sup>4</sup> <https://www.cdc.gov/pertussis/downloads/pertuss-surv-report-2016.pdf>

**Table 4.1 Rate of Reported Cases of Pertussis by Age, Washoe County 2017.**

Age	No. of Cases	%
< 1	2	18.2%
1-9	1	9.1%
10-19	0	0.0%
20-29	3	27.3%
30-39	0	0.0%
40-49	1	9.1%
50-59	3	27.3%
60-65	0	0.0%
+65	1	9.1%
<b>Total</b>	<b>11</b>	<b>100.0%</b>

## B. Prevention and Control

A pertussis containing vaccine has been available since the 1940s. In 1991 the FDA approved the first acellular pertussis containing vaccines because of concerns about the safety of whole-cell pertussis. Initially pediatric diphtheria, tetanus, acellular vaccine DTaP vaccine was only approved for the fourth and fifth dose of the vaccine series. In 1997, the ACIP recommended DTaP for all 5 doses in the diphtheria, tetanus, acellular pertussis vaccine series to replace whole-cell pertussis vaccine. In 2005, the FDA approved two adolescent/adult formulations of tetanus, diphtheria, acellular pertussis vaccines.

Acellular pertussis vaccine is an inactivated vaccine indicated for the active vaccination against pertussis. It is only available in combination with diphtheria and tetanus vaccine antigens. There are two pediatric formulations of diphtheria, tetanus, acellular pertussis vaccines, Daptacel® (DTaP) and Infanrix® (DTaP) and two adolescent/adult formulations of tetanus, diphtheria acellular pertussis vaccines Boostrix® (Tdap) and Adacel® (Tdap).

There are four pediatric diphtheria, tetanus, and acellular pertussis vaccines, in combination with other vaccine antigens. These vaccines include diphtheria, tetanus, acellular pertussis, hepatitis B, inactivated polio vaccine-Pediarix® (DTaP-HepB-IPV); diphtheria, tetanus, acellular pertussis, inactivated polio vaccine, Haemophilus influenzae type b-Pentacel® (DTaP-IPV/Hib); diphtheria, tetanus, acellular pertussis, inactivated polio vaccine-Kinrix® (DTaP-IPV) and Quadracel® (DTaP-IPV) licensed in the United States. Please note the pertussis containing vaccines are licensed for specific age groups and indications.

The routine recommendations for pertussis containing vaccines include the following:

Daptacel® (DTaP) (Initial U.S. Approval: 2002) and Infanrix® (DTaP) (Initial U.S. Approval: 1997)

- ◆ Children 6 weeks-6 years of age
- ◆ 5 dose series
- ◆ Administered at 2, 4, 6, 12-18 months and 4-6 years of age

Pediarix® (DTaP-HepB-IPV) (Initial U.S. Approval: 2002)

- ◆ Children 6 weeks-6 years of age
- ◆ 3 dose series
- ◆ Administered at 2, 4, and 6 months of age

Pentacel® (DTaP-IPV/Hib) (Initial U.S. Approval: 2008)

- ◆ Children 6 weeks-4 years of age.
- ◆ 4 dose series

- ◆ Administered at 2, 4, 6 and 12-18 months of age

Kinrix®, (DTaP-IPV) (Initial U.S. Approval: 2008) and Quadracel® (DTaP-IPV) (Initial U.S. Approval: 2015)

- ◆ Children 4-6 years of age
- ◆ Single dose

Adacel® (Tdap) (Initial U.S. Approval: 2005) and Boostrix® (Tdap) (Initial U.S. Approval: 2005)

- ◆ Children 7-10 years of age (ACIP allows use) who have not completed the primary series of diphtheria, tetanus, acellular pertussis vaccine
- ◆ Unvaccinated adolescents 11-12 years of age (required for 7<sup>th</sup> grade enrollment in all public and private schools in Nevada)
- ◆ Unvaccinated adolescents 13-18 years of age
- ◆ Unvaccinated adults 19 years of age and older (ACIP allows use of Adacel in adults 65 years of age and older)
- ◆ Pregnant women during each pregnancy regardless of their previous history of Tdap vaccination, preferably early in the 27-37 gestational week window to maximize maternal antibody response and passive antibody transfer to the infant
- ◆ Unvaccinated postpartum women
  - Single dose in a life time (except for pregnant women, adolescents who received a dose between 7-10 years of age to complete their primary series and when Td vaccine is not available for routine vaccination or wound management)

A total of 19 persons were identified as contacts to pertussis cases and 9 received prophylaxis.

**Table 4.2 Doses of Pertussis-Containing Vaccine Administered, Washoe County, 2017.**

Vaccines	WCHD	VFC Providers	All Other Providers	Totals
DTaP	210	4,986	1,132	6,328
DTaP-HepB-IPV	308	7,813	2,914	11,035
Tdap	897	14,447	16,107	31,451
DTaP-IPV/Hib	247	4,100	29	4,376
DTaP-IPV	294	3,742	912	4,948
<b>TOTALS</b>	<b>1,956</b>	<b>35,088</b>	<b>21,094</b>	<b>58,138</b>

## V. Rotavirus

### A. Epidemiology

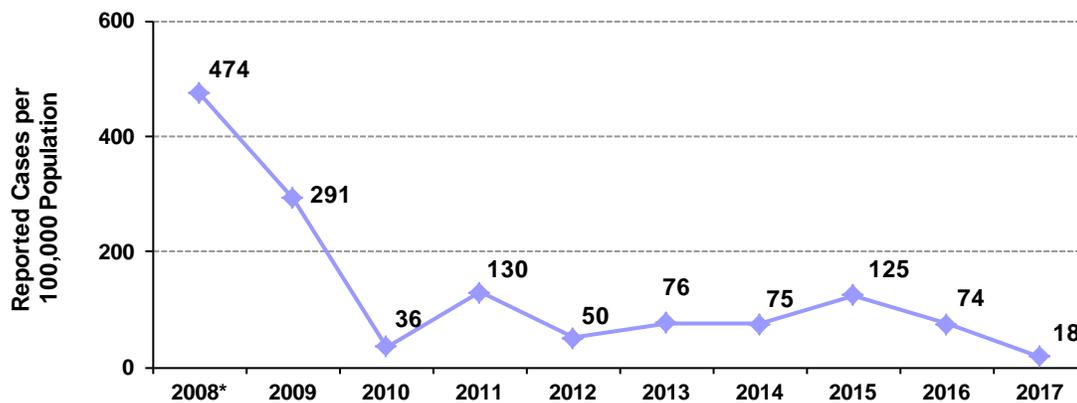
#### 1. Population Affected

Rotavirus is the most common cause of severe diarrhea among children. In the U.S., the highest rates of illness occur among infants and young children, and most children are infected by 5 years of age. Adults can also be infected, though disease tends to be mild. The annual epidemic peak in the U.S. characteristically starts during autumn in the southwest, and moves sequentially to reach the northeast by spring.

#### 2. Reported Incidence

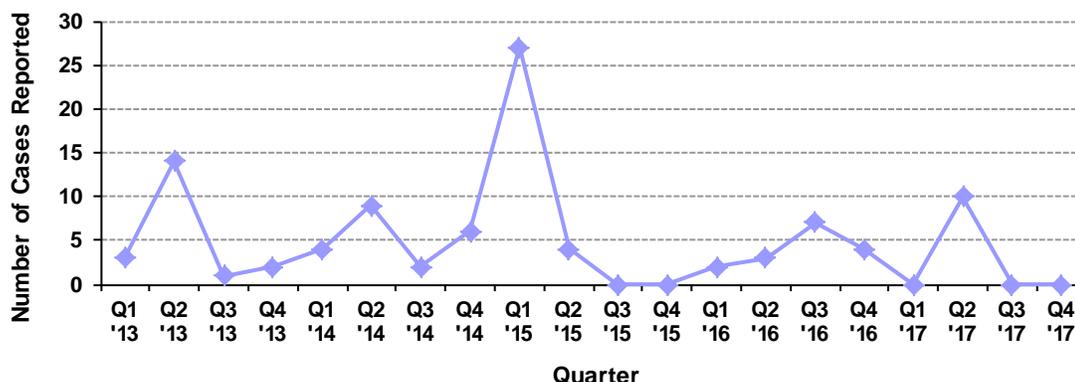
Ten (10) laboratory-confirmed cases of rotavirus were reported in Washoe County in 2017. Of the 10 cases, 3 (30%) were in the age group 0 – 2 years. The 2017 reported incidence of rotavirus infection was 18 cases per 100,000 children  $\leq$  2 years of age (population for this age group was 16,523 in 2017).

Figure 5.1 Rate of Reported Cases of Rotavirus in Children  $\leq$  2 Years of Age, Washoe County, 2008-2017.



\*Effective in 2008 data on age for lab-confirmed rotavirus cases was collected.

Figure 5.2 Reported Rotavirus Cases By Quarter, Washoe County, 2013- 2017.



In 2017, no confirmed rotavirus outbreaks were reported or identified in Washoe County.

## B. Prevention and Control

Rotavirus vaccine is an oral live virus vaccine indicated for the active vaccination against rotavirus. There are two rotavirus vaccines, RotaTeq® (RV5) and Rotarix® (RV1) licensed for use in the United States.

The routine recommendations for rotavirus vaccines include the following:

RotaTeq® (RV5) (Initial U.S. Approval 2006)

- ◆ Children 6 weeks-8 months of age
- ◆ 3 dose series
- ◆ Administered at 2, 4, and 6 weeks of age

Rotarix® (RV1) (Initial U.S. Approval 2008)

- ◆ Children 6 weeks-8 months of age

- ◆ 2 dose series
- ◆ Administered at 2 and 4 months of age

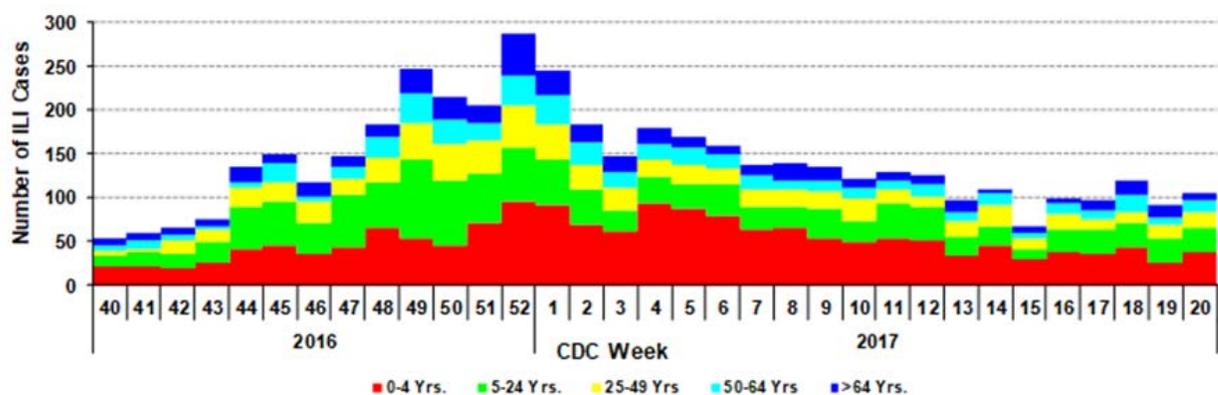
**Table 5.1 Doses of Rotavirus Vaccine Administered, Washoe County, 2017.**

Vaccine	WCHD	VFC Providers	All Other Providers	Total
Rotavirus	203	8,927	2,217	11,347

## VI. Influenza

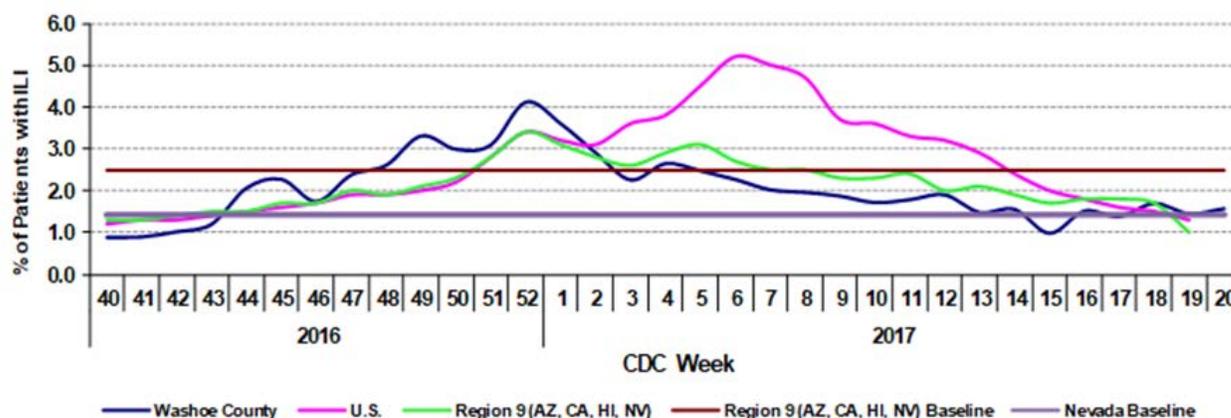
A. The Washoe County Health District has participated in the CDC national influenza surveillance program since 1984 and conducts year-round influenza surveillance. Emergency departments, urgent cares, private providers and University of Nevada-Reno (UNR) Student Health Services participate by reporting the number of patients seen with influenza-like illness (ILI) on a weekly basis and collecting specimens for PCR testing. ILI is defined as a fever  $\geq 100^{\circ}$  F **AND** a cough and/or sore throat, in the absence of a known cause other than influenza.

The Washoe County 2016-17 influenza surveillance program was conducted between October 2, 2016 (week 40) and May 20, 2017 (week 20). The surveillance components include ILI monitoring among sentinel sites, death certificate review, laboratory testing, and real-time data captured in syndromic surveillance systems. Twelve local health care providers (“sentinel physicians”) reported weekly on the number of persons seen with ILI compared with the total number of patients seen for any reason in their respective practices. WCHD staff searched death certificates for reports of deaths due to influenza or pneumonia.

**Figure 6.2 Number of ILI Cases by Week and Age Group Reported by Sentinel Physicians, Washoe County Influenza Surveillance, 2016–17.**

The percentage of overall patient visits for ILI in Washoe County peaked at 4.1% during the week ending on December 31, 2016 (Week 52, Figure 6.3). During the two influenza seasons before the H1N1 pandemic (2007-08 and 2008-09), the peak percentage of patient visits for ILI ranged from 5.9-7.3% and occurred in mid-to late February and early March. During the 2009 H1N1 pandemic, however, the percentage of patient visits for ILI peaked at 7.2% in mid-October. During the five influenza seasons after the H1N1 pandemic (2011-12, 2012-13, 2013-14, 2014-15, and 2015-16) the peak percentage of the patient visits for ILI ranged from 3.5%-6.0% and occurred in early March (twice), mid-February, late December, and early January.

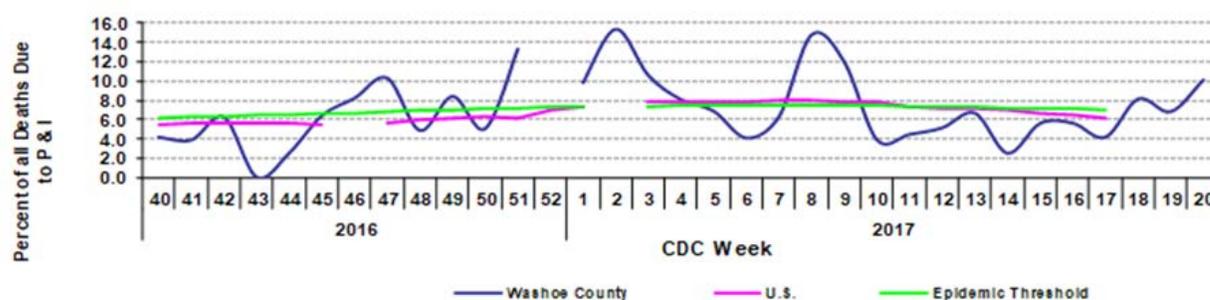
**Figure 6.3 Proportion of Patients Seen with ILI by Sentinel Physicians, Washoe County Influenza Surveillance, 2016-17.**



The proportion of deaths due to pneumonia and influenza (P&I ratio) in Washoe County peaked at 15.4% during the week ending January 14, 2017 (week 2, Figure 6.4). During the previous seasons, the peak percentage of deaths attributed to P&I was as follows:

- 2009-10 season (2009 pandemic): 15%.
- 2010-11 season: 19.5%
- 2011-12 season: 13.7%
- 2012-13 season: 22.1%
- 2013-14 season: 27.8%
- 2014-15 season: 16.7%
- 2015-16 season: 14.9%

**Figure 6.4 Pneumonia and Influenza Mortality, Washoe County Influenza Surveillance, 2016-17.**

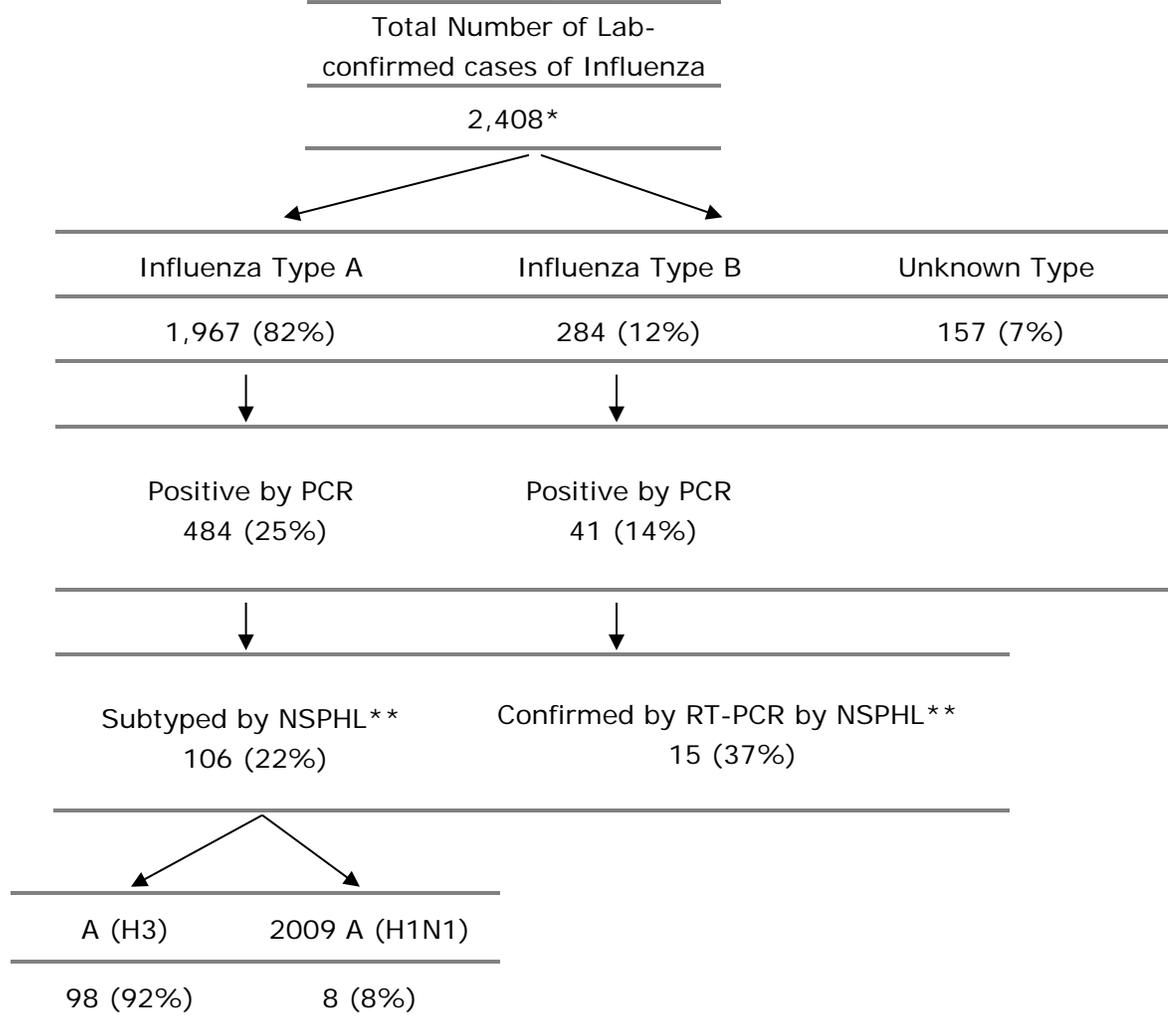


The large variation in P&I from week to week is likely attributable to the relatively small population size of the county as compared to the U.S. as a whole. In addition, the P&I percent each week is calculated based on when the death is registered. This, in turn, can be impacted by staffing levels in the office of Vital Statistics which consists of only three individuals. The data can be skewed as a result of vacation, sick leave or a holiday occurring during a particular week. During week 52 no deaths were processed due to employee turnover. The National Center for Health Statistics (NCHS) also experienced some data processing problems during the season leading to a few weeks without national P&I data.

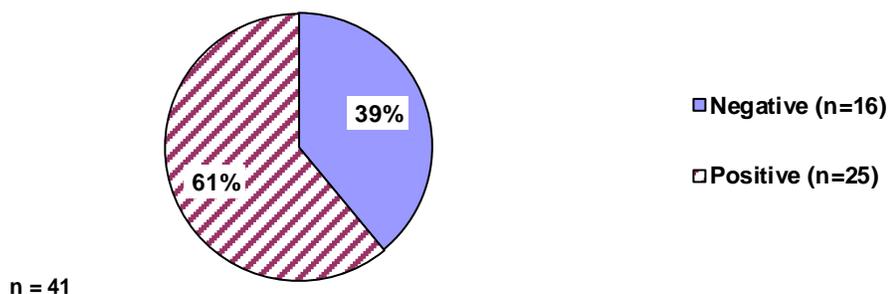
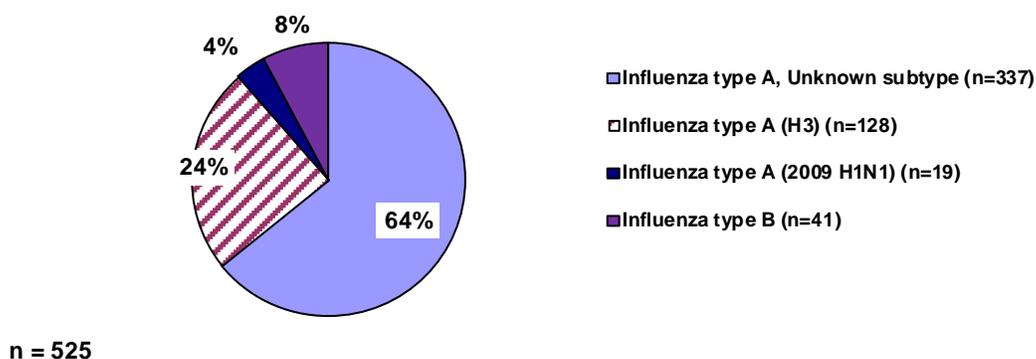
WCHD provided viral culture media to two (2) sentinel providers who collected specimens from patients whose signs and symptoms met the ILI definition. Sentinel providers submitted 41 specimens to the Nevada State Public Health Laboratory (NSPHL) for viral testing. Twenty-five (25) specimens (61%) were positive for influenza by RT-PCR (Real Time Reverse Transcription Polymerase Chain Reaction). All 25 (100%) positive specimens were identified as influenza type A; 24 (96%) were influenza A (H3) and 1 (4%) was influenza A 2009 H1N1.

A total of 2,408 laboratory-confirmed cases of influenza were reported in Washoe County during the 2016-17 surveillance season (Figure 6.5). Of these 2,408 cases, 525 (22%) were positive by PCR. Influenza A predominated during the 2016-17 influenza season, accounting for 82% of confirmed cases. Among influenza A positive results confirmed by NSPHL, 92% were influenza A (H3). The earliest specimen confirmed by PCR was a specimen collected on October 13, 2016. This specimen was collected by a hospital and subsequently identified as influenza A (H3).

**Figure 6.5 Influenza Testing Results, Washoe County, October 2, 2016 - May 20, 2017**



\* Including all rapid test done by the providers' office \*\*Nevada State Public Health Laboratory

**Figure 6.6 Test Results from Sentinel Providers, Washoe County Influenza Surveillance, 2016 – 17.****Figure 6.7 Influenza Positive Specimens by Type, Washoe County Influenza Surveillance, 2016–17.**

The CDC performed antigenic characterization for three influenza A specimens from Washoe County. NSPHL did additional characterization for 15 influenza B specimens. (Table 6.1).

**Table 6.1 Antigenic Characterization of 12 Confirmed Influenza Isolates, Washoe County, 2016 – 17.**

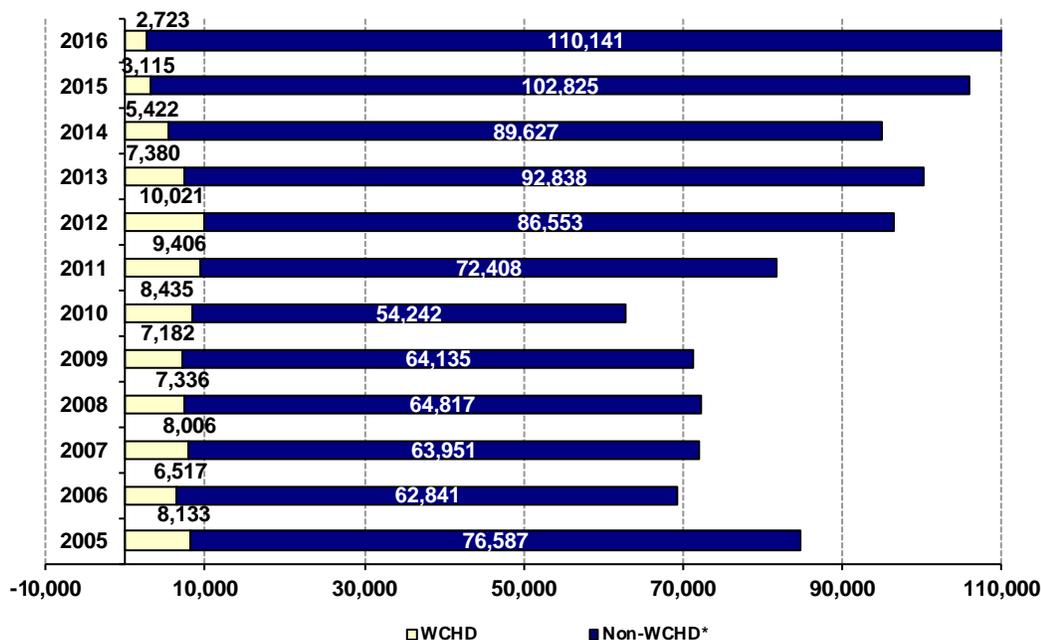
Total #	Influenza Type	PCR Suptype	Antigenic Characterization
1	B	B	B/Victoria Lineage
3	A	A (H3N2)	A/Hong Kong/4801/2014-Like (H3N2) GP
14	B	B	B/Yamagata Lineage

- B. All of the above virus strains were components of the 2016-2017 seasonal influenza vaccine; however Yamagata lineage influenza B was only included in the quadrivalent vaccine while Victoria lineage influenza B was included in both the trivalent and quadrivalent vaccines. Since 2009 vaccine effectiveness for A (H3N2) viruses has typically been lower than for A (H1N1) and influenza B viruses. Possible reasons for this include more frequent antigenic changes among A (H3N2) viruses, egg-adapted changes during vaccine production, and host factors. This trend of reduced vaccine effectiveness against A (H3N2) viruses continued during the 2016-17 season during which influenza A (H3N2) infections predominated.

## C. Prevention and Control

Since 2010 the Advisory Committee on Immunization Practices (ACIP) has recommended for all persons 6 months of age and older to receive an annual influenza vaccination unless there is a contraindication. Vaccinating persons at high risk for influenza complications is the most effective means of reducing the impact of influenza. The majority of influenza vaccine is administered from the beginning of fall through December, which is the optimal time to vaccinate.

**Figure 6.8 Total Doses of Influenza Vaccine Administered by WDHD and Non-WCHD Clinics, 2005 – 2016.**



\* 110,141 doses of flu vaccine were entered into WebIZ by local providers, which includes  
 Private physicians  
 Costco Pharmacy  
 CVS Pharmacy  
 Don's Pharmacy  
 HAWC  
 Northern Nevada Medical Center  
 Raley's Pharmacy  
 REMSA  
 Renown Health System  
 Safeway Pharmacy  
 Saint Mary's Regional Medical Center  
 Savemart Pharmacy  
 Scolari's  
 Smith's Pharmacy  
 Tahoe Pacific Hospital  
 Target Pharmacy  
 University Health Systems,  
 University of Nevada Reno Student Health Center  
 Walgreens

## VECTOR-BORNE DISEASES

### I. Mosquito-Borne Diseases

#### A. Arboviral Encephalitides

Arthropod-borne viruses or “arboviruses” occur in nature by cycling between vertebrates and invertebrate disease vectors. Humans and domestic animals can become accidental hosts when exposed to vector species. Mosquitoes in the genus *Culex* are the primary vectors of mosquito-borne arboviruses. Two *Culex* species (*Culex tarsalis* and *Culex pipiens*) are common in the Truckee Meadows. Viruses associated with these two species and human diseases include: St. Louis Encephalitis (SLE), Western Equine Encephalomyelitis (WEE), and most recently West Nile Virus (WNV).

#### 1. West Nile Virus Reported Incidence

WNV first appeared in the United States in New York in 1999 and caused West Nile Virus Disease. WNV disease is often categorized into two primary groups: neuroinvasive disease such as aseptic meningitis or encephalitis and nonneuroinvasive disease such as West Nile Fever. Table 1.1 summarizes human WNV disease in the U.S.

**Table 1.1 Summary of WNV Cases, U.S., 1999-2017**

Year	Neuroinvasive disease	Non-Neuroinvasive	Total Human Cases Reported to CDC	Deaths	Case Fatality Rate (%)
1999	59	3	62	7	11.3
2000	19	2	21	2	9.5
2001	64	2	66	9	13.6
2002	2,946	1,210	4,156	284	6.8
2003	2,866	6,996	9,862	264	2.7
2004	1,148	1,391	2,539	100	3.9
2005	1,309	1,691	3,000	119	4.0
2006	1,495	2,774	4,269	177	4.1
2007	1,227	2,403	3,630	124	3.4
2008	689	667	1,356	44	3.2
2009	386	334	720	32	4.4
2010	629	392	1,021	57	5.6
2011	486	226	712	43	6.0
2012	2,873	2,801	5,674	286	5.0
2013	1,267	1,202	2,469	119	4.8
2014	1,347	858	2,205	97	4.4
2015	1,455	720	2,175	146	6.7
2016	1,140	898	2,038	94	4.6
2017	1,425	672	2,097	146	7.0

## b. Population Affected

Twenty-five laboratory confirmed human cases of West Nile Virus were reported in Washoe County in 2017. Thirteen cases were non-neuroinvasive and 12 were neuroinvasive. Statewide Nevada had a total of 67 cases, 36 non-neuroinvasive, 31 neuroinvasive, and 3 deaths. Two deaths occurred in Washoe County in 2017.

## B. Parasitic Diseases

### 1. Malaria

Malaria is caused by infection with any of four species of the protozoan parasite *Plasmodium* (i.e., *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae*). The *Plasmodium* parasite is transmitted by the bite of an infected Anopheline mosquito. Until the 1940s, malaria was endemic in the United States.

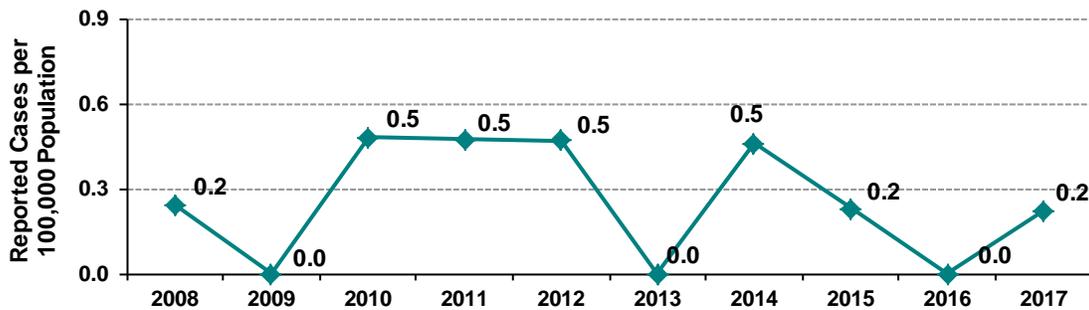
*Anopheles* mosquitoes are present in the Truckee Meadows, although most likely not in dense enough numbers for the transmission of malaria.

The Healthy People 2020 national health objective for malaria is to reduce the number of cases of malaria reported in the United States from the 1,298 new cases reported in 2008 to 999 new cases in 2020.

#### a. Reported Incidence

One case of malaria was reported in Washoe County in 2017.

Figure 1.1 Annual Rates of Reported Cases of Malaria, Washoe County, 2008 – 2017.



#### b. Population Affected

One case of malaria was reported in Washoe County in 2017.

## C. Mosquito-Borne Disease Surveillance, Prevention & Control

The District Health Department's Vector-Borne Diseases Program (VBDP) conducts field surveillance, prevention and control activities in Washoe County for diseases transmitted to people by animal vectors.

### 1. Surveillance

Mosquito-borne disease surveillance consists of monitoring conditions necessary for viral disease transmission, including adequate extrinsic incubation temperature, a minimum density of mosquitoes,

and the presence of virus. These contributing conditions are monitored in order to evaluate the risk of virus transmission to humans. Controlling the mosquito population for these viruses also controls malaria and other potential parasitic diseases.

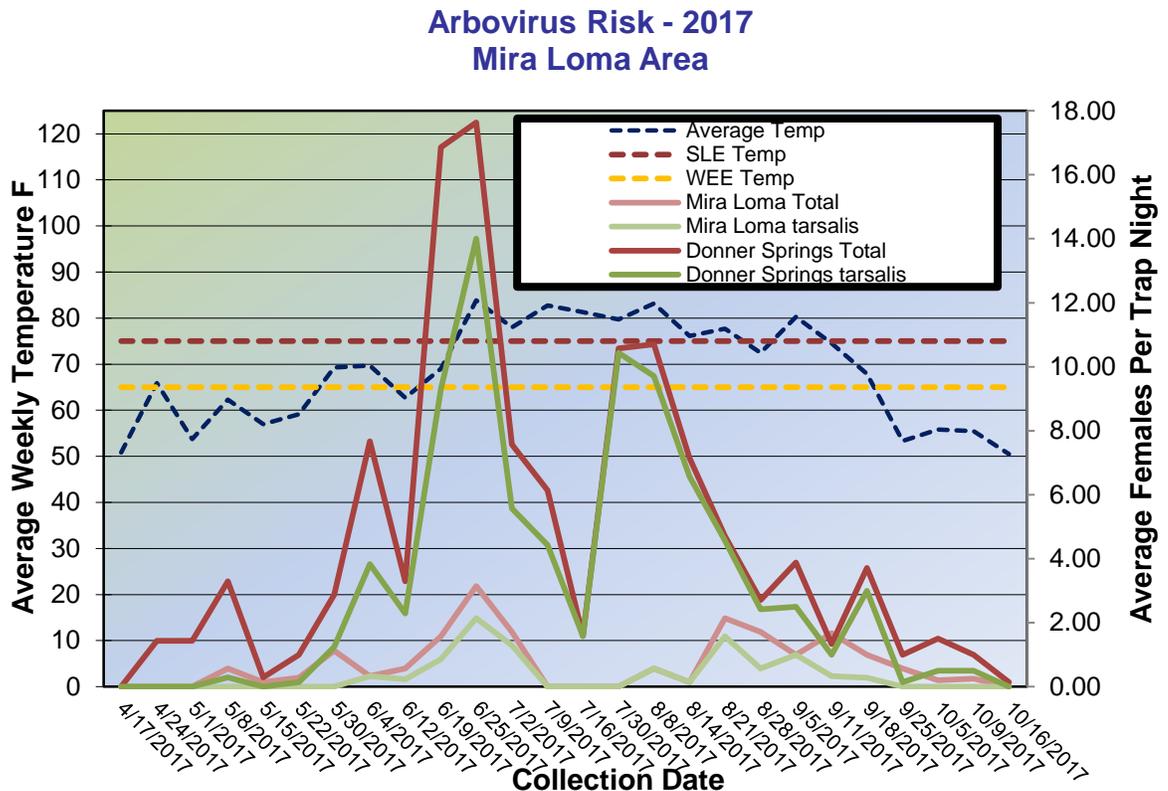
**a. Environmental Conditions**

Extrinsic incubation temperature refers to the temperature needed for the pathogen to survive and multiply within the hemocoel (a blood-containing body cavity) and salivary glands of the mosquito. Daily average temperatures must exceed 65° F for Western Equine Encephalitis (WEE) and 75° F for Saint Louise Encephalitis (SLE) for 10 days or more. The optimal average daily temperature for West Nile Virus (WNV) appears to be approximately 80°F.

**b. Mosquito Population Density**

Adult mosquito surveillance is conducted through the use of New Jersey Light Traps. The minimum density of mosquitoes required for transmission of WEE and SLE is 10 or more females per New Jersey trap per night. The minimum density for WNV appears to be lower, although the value has not yet been determined. Densities of vector-competent mosquito species are plotted against daily average temperatures, providing a “real time” indicator of disease transmission risk (Figure 1.2).

Figure 1.2 Trend of Average Weekly Temperature and Average Female Mosquitoes Collected Per Trap Night, Washoe County, May 23 through October 17, 2016



### c. Testing for the Presence of Arboviruses

#### 1) Sentinel Chickens

Studies show that sentinel birds will test positive for antibodies to WEE, SLE and WNV approximately two weeks before the disease occurs in humans. This provides a window of opportunity to increase control efforts in the geographic area where the virus is identified.

Five sentinel chicken flocks of 10 chickens each are placed at Washoe County sites based on the local prevalence of vector species and proximity to human populations. Flocks are sampled bi-weekly from June through September. Blood samples are tested for antibodies specific to WEE and SLE. SLE and WNV are members of the same virus family *Flaviviridae*, so serological tests cross-react. Therefore, any samples that test positive for SLE are further tested for WNV.

No samples tested positive for Flaviviruses (potential West Nile Virus) or Alphaviruses (WEE) in Washoe County in 2017.

#### 2) Wild Birds

Twenty birds were tested for West Nile Virus in 2017. Thirteen tested positive for WNV including 5 Scrub Jays, 3 crows, 1 Downy Woodpecker, 1 Red Tailed Hawk, 1 House Sparrow, and 1 Raven.

#### 3) Mosquitoes

Collection of adult female mosquitoes for Arbovirus testing was conducted by WCDH-Vector Borne Diseases Program (VBDP) in cooperation with the Nevada State Department of Agriculture, Animal Disease Laboratory (ADL), Nevada State Department of Agriculture, Entomology Program, Churchill County Vector Control District, Douglas County Mosquito Abatement District and members of the Nevada Mosquito and Vector Control Association. Adult female mosquitoes were trapped using CDC CO<sub>2</sub> traps. VBDP staff trapped and identified (to species and sex) 39,137 mosquitoes from 1,543 pools.

The Nevada State Department of Agriculture ADL performed tests (RT-PCR) for all pools, which included tests for the primary arboviruses of concern. These included the Flaviviruses, West Nile Virus, St. Louis Encephalitis (family Flaviviridae, genus *Flavivirus*) and the Alphavirus Western Equine Encephalomyelitis (family Togaviridae, genus *Alphavirus*). Results are typically reported within 24-48 hours of submission allowing the VBDP and other participating agencies to respond to foci of infected mosquito populations with appropriate control measures.

A total of 133 mosquito pools tested positive for West Nile Virus in Washoe County in 2017.

## 2. Mosquito Abatement

### a. Ground and Aerial Larvicides and Aerosol Fog Applications

The use of ArcGIS® software and digital orthophotography (provided by Washoe County IT-GIS) has become a standard tool in conducting field surveys and aerial larvicide applications. Staff creates digital flight plan maps from field survey data that are loaded into a GPS unit (Trimble® AgGPS 170) mounted in the treatment helicopter. These maps provide for highly accurate larvicide applications while the GPS unit simultaneously records treated areas. Table 1.2 shows

the areas treated in 2017.

**Table 1.2 Acres Treated for Mosquito Control, 2017.**

Method/Location	Acres Treated	Number of Treatments
Larvicide Applications	9,333	154
Adulticide Fog Applications	8,536	47
<b>Totals</b>	<b>17,869</b>	<b>201</b>

### **b. Storm Drain Catch Basins**

A geodatabase (ArcGIS® software) is used to manage the survey and treatment data and is currently populated with over 20,000 catch basins. Field staff utilize mobile GIS/GPS “PDA’s” (Nomad®) equipped with ArcPad® software allowing digital maps to be taken into the field. This equipment automates field data collection (e.g., date visited, number of larvae present, treatment used, etc.) as well as integrates the data into the geo-database.

Continued surveillance of storm drain catch basins confirms that they are a significant source of urban mosquitoes, especially *Culex pipiens* and *Culiseta incidens*. During the 2017 summer season, VBDP staff made 7,256 storm drain catch basin treatments.

## **II. Flea-borne Diseases**

### **A. Plague**

Plague, caused by the bacterium *Yersinia pestis*, is endemic in most of the western United States. It is associated with rodents and their fleas. When outbreaks occur in rodent populations, many rodents die and their fleas look for blood meals elsewhere. People living in or visiting areas where there has been a rodent “die off” (epizootic) are at increased risk for contracting plague. Humans usually become infected from being bitten by infected rodent fleas.

#### **1. Reported Incidence**

No cases of plague (*Yersinia pestis*) were reported in Washoe County in 2017.

#### **2. Population Affected**

No cases of plague (*Yersinia pestis*) were reported in Washoe County in 2017.

### **B. Surveillance, Prevention and Control**

#### **1. Animal Testing**

The VBDP screens and submits rodents to the Nevada Department of Agriculture Animal Diseases Lab (ADL) to test for *Yersinia pestis*. Zero (0) of four (4) rodent tissue specimens collected by VBDP staff tested positive for plague by ADL using fluorescent antibody testing. Results are summarized below.

**Table 1.3 Summary of Rodent Tissue Test for *Yersinia pestis*, Washoe County, 2017.**

Species	Common Name	# Positive	# Tested
<i>Otospermophilus beecheyi</i>	California ground squirrel	0	3
<b>Total</b>		<b>0</b>	<b>3</b>

## 2. Flea Suppression

The VBDP conducts regular flea suppression in Washoe County to reduce the risk of plague. Rodent burrows are treated with a dust insecticide, DeltaDust®, that kills fleas on rodents and fleas in the burrow. Treatment sites are chosen based on history of plague activity, flea load of reservoir rodent populations and areas of human recreation.

In 2017 the VBDP conducted flea suppression at the following locations:

- Bartley Ranch Regional Park,
- Bowers Mansion Regional Park,
- Davis Creek Regional Park,
- Idlewild Park,
- Manzanita Park,
- Paradise Park,
- Rancho San Rafael Regional Park,
- South Valleys Regional Park,
- Sand Harbor State Park,
- Lazy 5 Regional Park

## III. Tick-Borne Diseases

### A. Lyme Disease

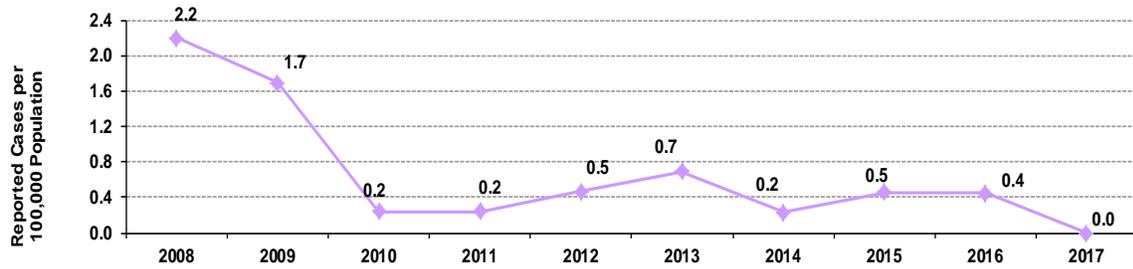
Lyme disease, caused by infection with *Borrelia burgdorferi*, is not common in Nevada but is one of the most commonly reported vector-borne diseases in the United States. A total of 26,203 confirmed cases were reported nationally in 2016 for an incidence rate of 8.1 cases per 100,000 population. While most cases are reported from the northeastern, north-central and Pacific coastal regions, occasional cases occur in the interior western U.S. In the northeastern and north-central United States, the blacklegged tick or deer tick (*Ixodes Scapularis*) transmits Lyme disease. In the Pacific coastal United States, the disease is spread by the Western blacklegged tick (*Ixodes Pacificus*). Other tick species found in the United States have not been shown to transmit *Borrelia burgdorferi*.

The Healthy People 2010 national health objective for Lyme disease is 9.7 new cases per 100,000 population in endemic states; There is no Healthy People 2020 objective available for Lyme disease, to-date.

### 1. Reported Incidence

There were no confirmed cases but one probable case of Lyme disease reported in Washoe County in 2017.

Figure 3.1 Annual Rates of Reported Cases of Lyme Disease, Washoe County, 2008 – 2017.



## 2. Population Affected

No population data were available for the probable human case.

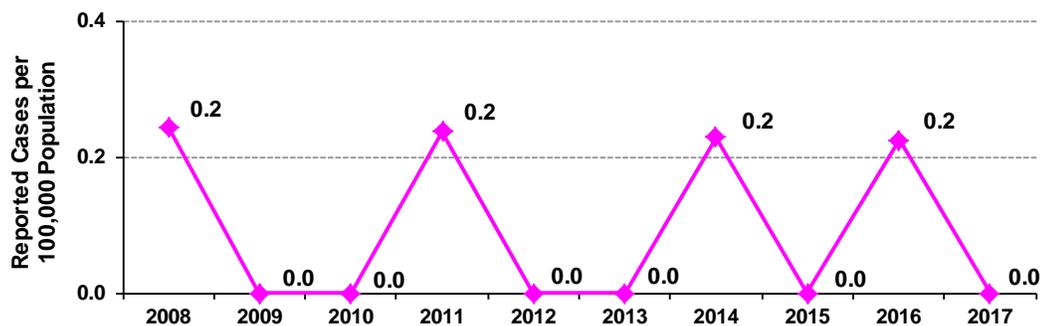
### B. Relapsing Fever

Relapsing fever is caused by several species of spirochetes in the genus *Borrelia*. In tick-borne relapsing fever (TBRF) the pathogen is transmitted to humans via ticks in the family Argasidae. Rodents are the reservoirs for relapsing fever in North America. Locally, TBRF is caused by *Borrelia hermsii* and is seen occasionally in the Lake Tahoe basin. The tick vector is *Ornithodoros hermsi*. Outbreaks occur occasionally in limited areas of the western U.S. and Canada. Relapsing fever is reportable in Nevada but not nationally.

#### 1. Reported Incidence

No cases of relapsing fever were reported in Washoe County in 2017.

Figure 3.2 Annual Rates of Reported Cases of Relapsing Fever, Washoe County, 2008 – 2017



## 2. Population Affected

C. Zero cases of relapsing fever were reported in Washoe County in 2017.

## D. Tick-Borne Disease Surveillance, Prevention and Control

VBDP staff will identify submitted ticks and test [via Indirect Fluorescent Antibody (IFA)] for *Borrelia* spirochetes. In 2017, zero (0) of the twenty-one (21) ticks tested by VBDP tested positive for *Borrelia* spirochetes. Results are summarized below.

**Table 3.1 Summary of Ticks Identified in 2017.**

Species	Common Name	# Tested
<i>Ixodes pacificus</i>	Western Deer Tick	9
<i>Dermacenter variabilis</i>	Western Dog Tick	11
<i>Amblyomma americanum</i>	Lone Star Tick	1
<b>Total</b>		<b>21</b>

## IV. Rabies

### A. Human Rabies

Rabies in humans is a rare occurrence in the United States with an average of less than 5 cases per year. Worldwide, an estimated 30,000 to 50,000 deaths are due to rabies each year. In the U.S., rabies in domestic animals such as dogs, cats and cattle has declined dramatically since the 1950s. This decrease is mainly due to rabies vaccination programs and stray animal control by animal control agencies.

#### 1. Reported Incidence

No human cases of rabies were reported in Washoe County in 2017.

#### 2. Population Affected

No human cases of rabies were reported in Washoe County in 2017.

### B. Animal Rabies

Eight bats tested positive for rabies in Washoe County in 2017. All rabies testing in Nevada is performed by the Animal Disease Lab using rabies fluorescent antibody.

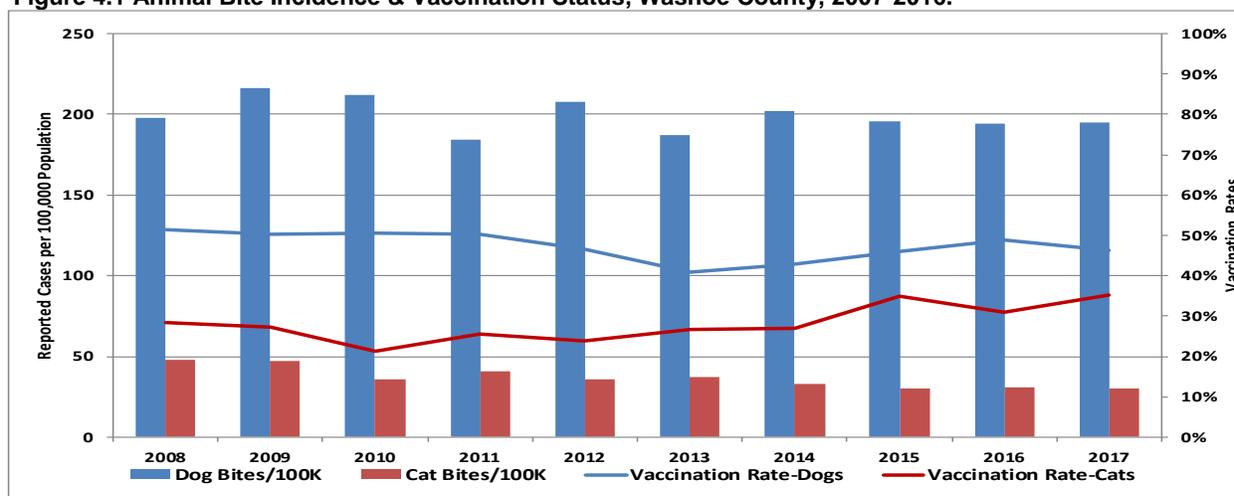
**Table 4.1 Summary of Specimens Tested for Rabies, Washoe County, 2017**

Species (Common name)	# Positive	# Tested	% Positive
Bat (All species)	8	70	11.43%
Canine (Domestic)	0	109	0.00%
Coyote	0	6	0.00%
Feline (Domestic)	0	26	0.00%
Fox	0	1	0.00%
Raccoon	0	8	0.00%
Skunk	0	2	0.00%
Squirrel	0	3	0.00%
<b>Total</b>	<b>8</b>	<b>225</b>	

## C. Surveillance, Prevention and Control

Effective in 2008, all animal bite reports received by WCHD were directly entered into the Washoe County Animal Control Authority's (WCACA) database called "Chameleon" to ensure a timely investigation and appropriate quarantine procedures. The following data were reported by WCACA.

**Figure 4.1 Animal Bite Incidence & Vaccination Status, Washoe County, 2007-2016.**



\*Vaccination Rates were calculated by: Number of animals with confirmed current rabies vaccination at time of bite incident/Total number of bite incidents

**Table 4.3 Vaccination Status of Biting Animals, Washoe County, 2017.**

Agency	Species	# Vaccinated	Total	% Vaccinated
Washoe County Regional Animal Control	Dogs	442	885	49.9
	Cats	47	135	34.8

## V. Hantavirus

### A. Hantavirus Pulmonary Syndrome (HPS)

In 1993, a respiratory illness caused by a previously unknown viral pathogen was described among residents of the southwestern U.S. Hantavirus Pulmonary Syndrome, as it was termed, was subsequently recognized throughout the contiguous U.S. and the Americas. The virus found to cause HPS was later identified and named Sin Nombre Virus (SNV). "Through January 6, 2016, a total of 690 cases of HPS have been reported in the United States. Of these, 659 cases occurred from 1993-onward, following the initial identification of HPS, whereas 31 cases were retrospectively identified. Thirty-six percent (36%) of all reported cases have resulted in death. More than 96% of reported cases have occurred in states west of the Mississippi River." (Special Pathogens Branch, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, January 12, 2016).<sup>1</sup>

<sup>1</sup> <http://www.cdc.gov/hantavirus/surveillance/index.html>

## **Hantavirus Pulmonary Syndrome (HPS)**

### **a. Reported Incidence**

Two cases of HPS were reported in Washoe County in 2017 for incident rate of 0.24 cases per 100,000 population. Prior to 2017 the last case of human Hantavirus in Washoe County was reported in 2006.

### **d. Population Affected**

Two cases of HPS were reported in 2017. Both cases were male in the 65+ age group. One case was White and one was of unknown race. Both cases were hospitalized. Unfortunately, one case was fatal. The epidemiological investigation revealed that the infections were most likely acquired in Washoe County.

## **B. Surveillance, Prevention and Control Activities**

Hantavirus is endemic in Washoe County. Past surveillance has indicated that about 17% of Deer mice (*Peromyscus maniculatus*) are infected with Hantavirus in Washoe County. Because of wide distribution of Deer mice and the endemic nature of Hantavirus the best means of preventing infection is avoidance of mice and their droppings. Regular testing was discontinued beginning in 2013 in Washoe County.

**TECHNICAL NOTES****I. Data Sources & Data Providers**

The following table lists data sources and data providers for this report.

**Data Sources & Providers, WCHD Annual Communicable Disease Summary, 2016**

Section of Report	Data Sources	Data Provider (Division/Program)
<b>Enteric Diseases</b>	NBS FBI Complaints Outbreak Inventory	EPHP - CD Program EHS - Food Safety Program ORT
<b>Hepatitis</b>	NBS Hepatitis B Surveillance Hepatitis C Surveillance WebIZ	EPHP - CD Program EPHP - CD Program EPHP - CD Program CCHS - Immunization Program
<b>Other Reportable Diseases</b>	NBS & CD Log	EPHP - CD Program
<b>Sexually Transmitted Diseases</b>	STD*MIS & NBS eHARS/HIV CTS Data STIS & Patagonia	CCHS - STD Program CCHS - HIV/AIDS Program EPHP - CD Program & CCHS
<b>Tuberculosis</b>	Patagonia & NBS	CCHS - TB Program
<b>Vaccine Preventable Diseases</b>	NBS & CD log WebIZ	EPHP - CD Program CCHS - Immunization Program
<b>Vector-Borne Diseases</b>	NBS Vector Surveillance Data Chameleon	EPHP - CD Program EHS - Vector Program Washoe County Regional Animal Services

NBS=NEDSS (National Electronic Disease Surveillance System) Base System; FBI=Foodborne Illness; STD\*MIS = Sexually Transmitted Diseases Management Information System; eHARS=Enhanced HIV/AIDS Reporting System; CTS=Counseling, Testing, and Services; STIS=Sexually Transmitted Infections Surveillance; EPHP=Division of Epidemiology & Public Health Preparedness; EHS=Division of Environmental Health Services; CCHS=Division of Clinical and Community Health Services; CD=Communicable Disease; ORT=Outbreak Response Team

**II. Washoe County Population Data for 2016**

The total population estimate for Washoe County was 452,766 for 2017. Population breakdown by demographic characteristics is described in the following table. Projection data was provided by the State Demographer via the Nevada Division of Public and Behavioral Health (NDPBH) in June 2018.

**Population Estimates by Demographics, WCHD Annual Communicable Disease Summary, 2017**

Gender	Male	227,760	Age group	<1	5,481
	Female	225,007		1-4	22,203
<b>Total</b>		<b>452,767</b>	5-14	60,155	
<b>Race/Ethnicity</b>	White, non-Hispanic	290,192	15-24	61,236	
	Black, non-Hispanic	11,355	25-34	64,797	
	Native American, non-Hispanic	7,300	35-44	56,437	
	Asian, non-Hispanic	31,200	45-54	56,407	
	Hispanic	112,720	55-64	58,123	
	<b>Total</b>		<b>452,767</b>	65-74	43,166
			75-84	18,605	
			85+	6,157	
			<b>Total</b>	<b>452,767</b>	

Denominators used in this report for the time period 2008-2017 were adjusted based on population estimates data for 2008-2017 provided by NDPBH in June 2018. Therefore, there were slight changes in the respective historical incidence rates in this report compared to those published previously.