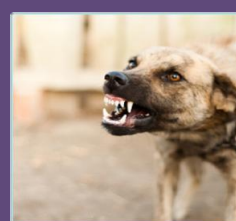
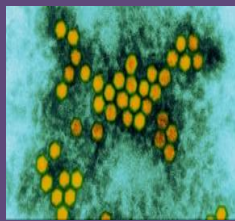
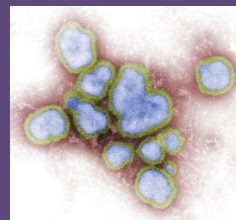


Davis County Health Department



Communicable Disease & Epidemiology Division

Communicable Diseases Davis County 2014



Communicable Diseases Davis County 2014

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Executive Summary

This annual communicable disease surveillance report summarizes all communicable diseases reported in Davis County in 2014. It provides a baseline picture of the disease burden in Davis County and describes trends and highlights of those diseases that had the greatest impact on the health and well-being of our community. Unusual disease occurrences are also discussed.

The most notable disease event in 2014 was the West Africa Ebola outbreak and its impact on public health. In March 2014, the Centers for Disease Control and Prevention (CDC) reported an Ebola Hemorrhagic Fever (EHF) outbreak in Guinea, Sierra Leone, and Liberia. On September 30, 2014, the first imported case of Ebola was reported in the United States and later died on October 8, 2014. To date, there have been four confirmed cases of Ebola in the United States, with one death.

Health departments across the nation spent numerous hours developing and enhancing response plans. Utah's preparedness efforts included development of Ebola-specific disease plans and guiding documents that were implemented by the local health departments. Davis County Health Department reached out to hospitals, medical clinics, physicians/staff, and emergency medical systems across the county. Updates and informational resources were distributed as they became available. The Communicable Disease and Epidemiology Division conducted site visits to both hospitals in Davis County to help assess their readiness to respond to an Ebola case. Presentations were provided to medical clinics to assist them in their preparation efforts. CDC activated control measures in the U.S. which included public health monitoring of returning travelers from West Africa. This impacted several Utah counties, including Davis. The outbreak is ongoing and protective measures remain in place. CDC reports, "The 2014 Ebola outbreak is the largest Ebola outbreak in history and the first Ebola outbreak in West Africa. This Ebola outbreak is the first epidemic the world has ever known."

Other communicable diseases of concern/interest in 2014 are summarized below:

1. In May 2014, CDC confirmed two imported cases of Middle East Respiratory Syndrome (MERS) in the United States. Both cases were healthcare providers who lived and worked in Saudi Arabia prior to returning to the U.S. During 2014, Davis County investigated four suspect cases of MERS. All four individuals had recently traveled from the Middle East and developed symptoms consistent with MERS infection upon returning to the United States. Testing was performed at Utah Public Health Laboratory and forwarded to CDC for further evaluation. Isolation restrictions were imposed and close household contacts evaluated. MERS infection was ruled out in all four symptomatic individuals. Two other Davis County residents were quarantined due to an airplane exposure to one of the confirmed U.S. cases. Both individuals did not develop symptoms and tested negative for MERS by CDC.

-
2. Cases of gonorrhea in Davis County increased by 57% in 2014 from 60 reported cases in 2013 to 94 in 2014. There were 1,397 cases of gonorrhea reported in Utah during 2014. The disease burden between genders was equal (50%). The median age of those infected was 28 years, which was similar to what was seen last year (27), indicating a move into the younger population. Risk factors identified through disease investigations were men who have sex with men (MSM), multiple sex partners, substance abuse, anonymous partners, incarceration and anal intercourse. In 2014, 79% of gonorrhea cases identified themselves as heterosexual. A statewide workgroup was put together in 2014 to help identify possible causes for the increase in cases. A supplemental survey was developed and piloted for six months by three local health departments – including Davis County. Conclusions from the survey will help guide the STD program activities in 2015.
 3. In 2014, Hansen’s Disease (Leprosy) was diagnosed in a Davis County resident. The infection was acquired outside of the country, but symptoms developed while in the United States. Davis County Health Department worked closely with the Utah Department of Health (UDOH) and the National Hansen’s Disease Program (NHDP) to assist in the diagnosis and appropriate care of the infected individual. This case was determined to be the lepromatous form and will require one year of daily therapy. During the initial phase of treatment, medication was administered under directly observed therapy (DOT), which required the health department to watch the individual take the medication in person and document compliancy. Treatment is expected to be completed in 2015.
 4. Davis County continues to see an increase in pertussis cases each year. In 2014, 117 cases of pertussis were reported, as compared to the 104 cases reported in 2013. For the past three years, outbreaks have been detected in school settings and/or school-sponsored extracurricular events. During 2014, another educational facility was impacted by pertussis. In this situation, additional cases were detected in the surrounding community. Cases were excluded from attending class until completion of appropriate antibiotics or through the disease incubation period of 21 days. High-risk contacts were recommended antibiotic prophylaxis. A vaccination clinic was set up in the facility in an effort to provide convenient and inexpensive Tdap vaccinations. Control measures were effective and disease transmission was suspended.
 5. The peak of influenza for the 2013-14 season occurred in January 2014 with hospitalized cases continuing to be reported into the early summer months – which is not a typical occurrence. The majority of hospitalized cases were sub-typed as A (H1N1). Davis County had one pediatric death. The 2014-15 influenza season is showing a significant increase in cases with 116 hospitalized cases season-to-date. CDC determined that the circulating influenza strain in the 2014-15 season is influenza A (H3), but it has drifted from the vaccine strains which may account for the large increase of cases already seen this season.

-
6. Campylobacteriosis cases increased by 65% from 2013 to 2014. Disease investigations identified an association between infection and the consumption of raw milk – as seen in past outbreaks. Several Davis County cases reported purchasing and consuming raw unpasteurized milk from a dairy in Weber County. Other cases across Utah (more heavily noted in Northern Utah) reported drinking raw milk from the same dairy. The Utah Department of Agriculture and Foods (UDAF) inspected the dairy, collected samples, and isolated *campylobacter* in some of the specimens. The organism’s DNA pattern matched the current cluster of human infections. The dairy’s permit to sell raw milk was suspended until clean samples were obtained. When additional cases with a matching pattern were reported in the fall of 2014, the dairy’s license was permanently revoked.

Introduction

The Davis County Health Department Communicable Disease and Epidemiology Division works in partnership with the medical community and neighboring health districts to control and prevent the occurrence and spread of communicable diseases. This is accomplished through disease surveillance, disease investigation, coordination of prevention efforts, treatment, education, training, and policy development. The program aims to:

- Interrupt/contain the spread of communicable diseases within the community
- Conduct surveillance for >75 communicable diseases/syndromes
- Provide education to infected/exposed citizens
- Facilitate appropriate treatment and preventive therapy
- Enforce measures that protect the community (e.g. isolation)
- Develop policies to address priority health issues

The Communicable Disease and Epidemiology Division is organized into four main program areas: STD/HIV, Tuberculosis Control, Infectious Disease, and Disease Surveillance. Program descriptions follow:

STD/HIV program:

STDs affect men and women of all ages, backgrounds, and economic status. The United States has made progress in identifying cases through better testing procedures, sexual partner testing/treatment, and risk-reduction education. There are still an estimated 20 million new cases of STDs reported each year. HIV/AIDS, chlamydia, gonorrhea, syphilis, and chancroid are the STDs reportable by law in the state of Utah. Hospitals, laboratories, physicians, and clinics are mandated to report these diseases to the local health department.

The STD/HIV program strives to ensure that all reported infected individuals are interviewed by a skilled communicable disease nurse to:

- Verify that appropriate treatment was prescribed and taken
- Confidentially identify and notify contacts/partners of infected individuals who may have been exposed and facilitate testing and treatment
- Provide risk-reduction counseling and education

Tuberculosis Control program:

The Davis County Tuberculosis (TB) Control program is dedicated to the prevention, control, and elimination of TB disease and the identification and treatment of latent TB infection (LTBI).

The successful control of tuberculosis in Davis County is largely due to the following program activities:

- Early identification, isolation, and appropriate treatment of individuals suspected of or diagnosed with tuberculosis disease
- Effective contact investigation activities to identify individuals exposed to TB and the completion of medication therapy for those diagnosed with LTBI
- Targeted testing for those who are at higher risk for developing TB disease following an exposure (e.g. homeless, foreign-born, residents of correctional institutions, substance abusers)

Infectious Disease program:

Communicable diseases reportable in the state of Utah, with the exception of STDs and tuberculosis, fall under this program. Once reported, the Infectious Disease program implements the following activities:

- Interview infected individuals to obtain a thorough history and identify exposed contacts
- Review and interpret laboratory results
- Implement control measures to interrupt disease transmission (e.g. exclusion from work/school)
- Monitor the disease process, assessing for changes in expected manifestations
- Facilitate treatment and prophylaxis for those infected or exposed
- Provide education on the specific disease and important preventive measures
- Formalize findings and report to the Utah Department of Health (UDOH)

The Infectious Disease program has been further divided into the following categories:

- **Enteric Diseases** (Food and/or Waterborne)
 - Bacterial, viral, and parasitic diseases involving the gastrointestinal tract
- **Vaccine-Preventable Diseases**
 - Diseases that are preventable with vaccines
- **Vector/Zoonotic Diseases**
 - Diseases transmitted by insects, animals, or birds
- **Invasive Diseases**
 - Bacterial infections of the blood stream, cerebral spinal fluid (e.g. meningitis/encephalitis) or other normally sterile sites (e.g. synovial, pleural or pericardial fluid)
- **Other reportable diseases/conditions**
 - Diseases that do not fall under the above categories

Disease Surveillance program:

The Surveillance program is responsible for the systematic collection, analysis, and dissemination of data pertaining to infectious diseases of public health importance. The goal of the Surveillance program is to provide statistics that prompt public health preventive action. Core functions of the Surveillance program include:

- Providing medical professionals with access to disease reporting 24-hours a day/seven days a week
- Maintaining a computerized system for efficient storage and access to data
- Incorporating a variety of data sources including:
 - Notifiable disease reports
 - School absenteeism
 - Sentinel physician reports
 - Syndromic data
- Monitoring the occurrence and distribution of infectious disease activity
- Disseminating surveillance data to the public and medical professionals

Communicable diseases are reported to the local health department for investigation in accordance with the Utah State Health Code (R38-702). Prompt reporting of confirmed and suspect cases helps ensure necessary control and prevention actions.

Entities required to report confirmed or suspected diseases are physicians, hospitals, healthcare facilities, laboratories, schools, and daycares. All case reports should include:

- Disease
- Patient's name
- Address
- Telephone number
- Date of birth
- Pertinent clinical information.

All reports required by rule are confidential and are not open to public inspection.

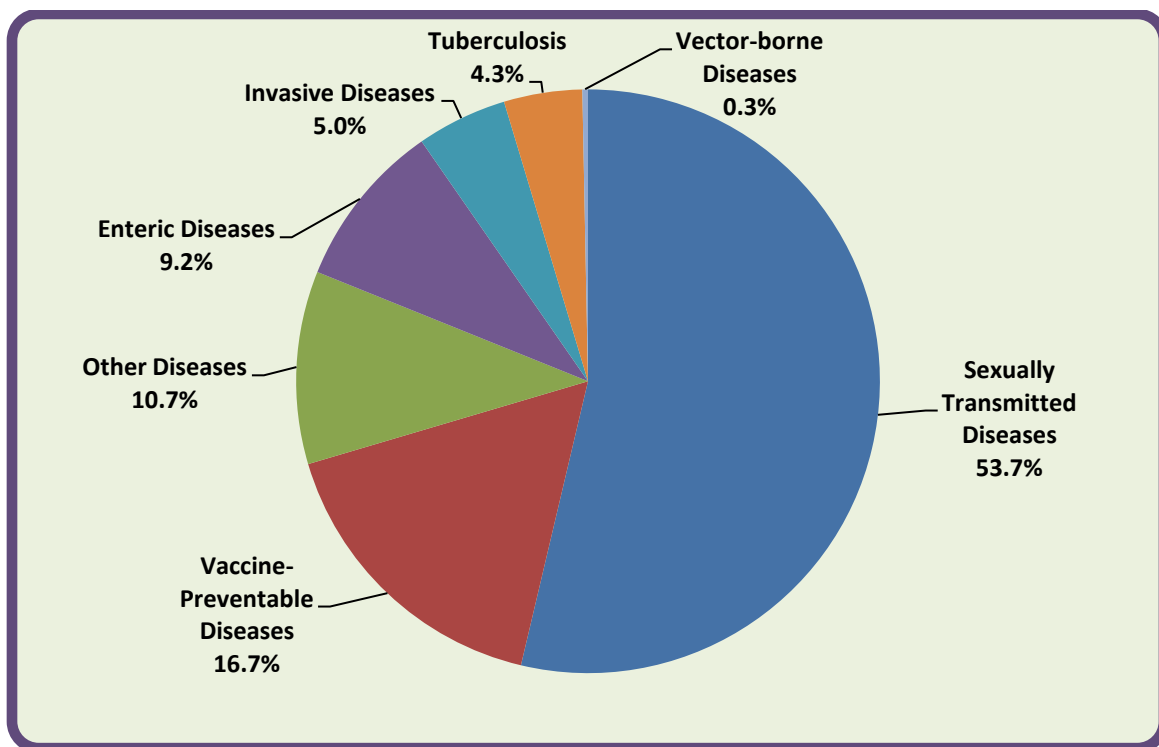
Reportable Disease Summary

Disease morbidity and mortality have decreased over the past century, partly due to the partnership between private and public health care. Unfortunately, new emerging diseases are surfacing, requiring additional efforts from both the medical community and public health. Existing pathogens are also increasing as our population increases. Disease affects all races, ethnicities, ages, and genders.

The Davis County Health Department received a total of **1,937** disease reports during 2014, slightly more than the 1,739 disease reports received in 2013.

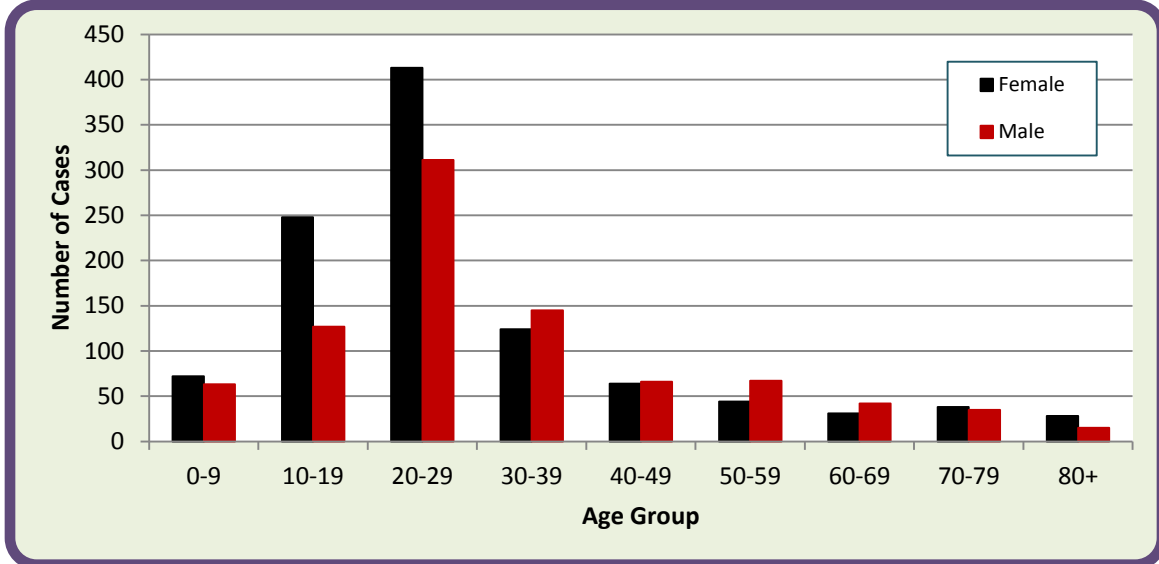
Over half (53.7%) of the diseases reported were sexually transmitted diseases, followed by vaccine-preventable diseases (16.7%), other diseases (10.7%), enteric diseases (9.2%), invasive diseases (5.0%), tuberculosis infections (4.3%) and vectorborne/zoonotic diseases (<1%).

Diseases Reported by Type, Davis County, 2014



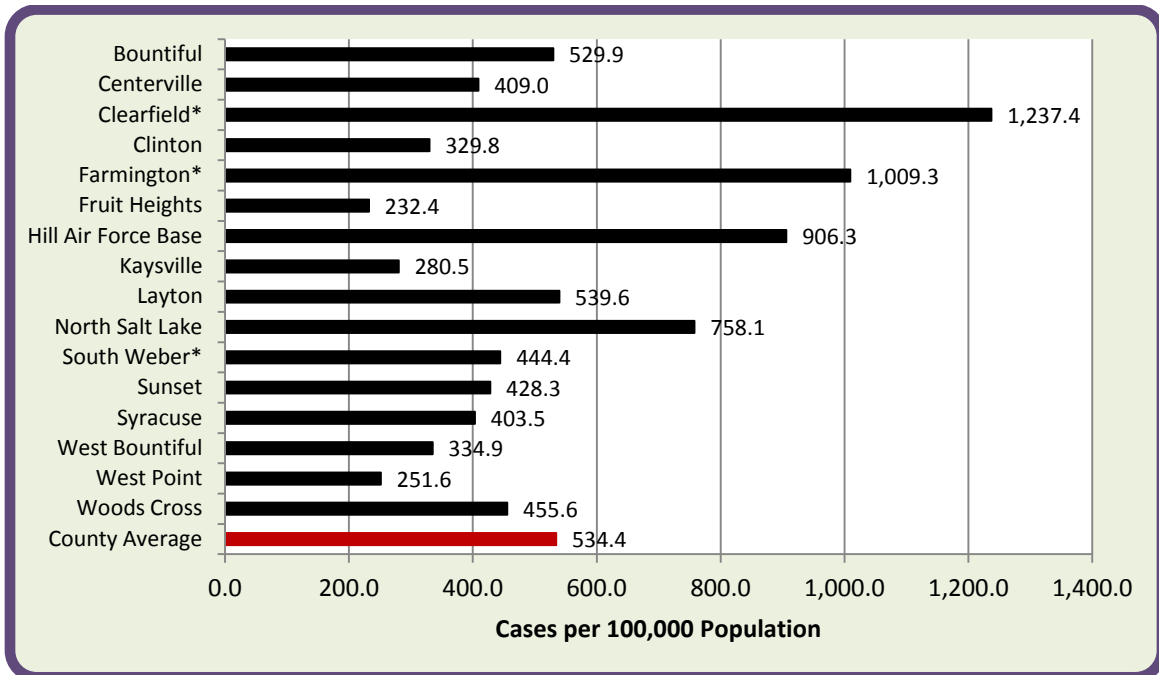
Cases were most often reported among females (54.9%) and among 20-29 year-olds. Sexually transmitted diseases had a significant impact on the 20-29 year old age group. Statistically, females are more impacted by sexually transmitted diseases.

Disease Reports by Age Group and Gender, Davis County, 2014



Disease rates by city are identified by the place of residence of the affected individual at the time of diagnosis. These rates do not suggest that one city is better or worse than another, but simply describe the disease burden in each city. Tuberculosis data are not included because most infections were acquired outside of Davis County.

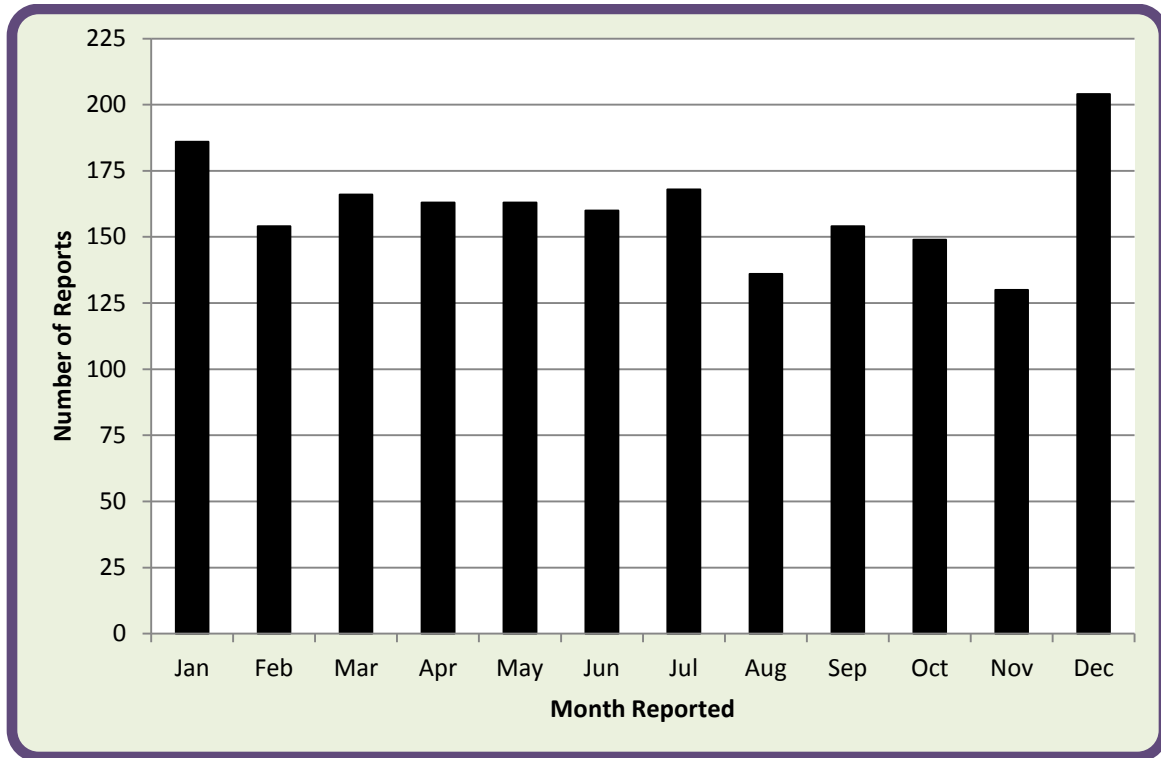
Incidence of All Reportable Diseases by City, Davis County, 2014



*These cities are impacted by temporary residential establishments (i.e. federal job corps and correctional facilities).

The disease burden in Davis County normally stays consistent throughout the year. In 2014, on average, 161 diseases were reported each month.

Disease Reports by Month, Davis County, 2014



Top 20 Diseases

Disease	Rank	Number of Cases
Chlamydia	1	923
Hepatitis C, acute & chronic	2	189
Influenza, hospitalized	3	130
Pertussis	4	117
Gonorrhea	5	94
Tuberculosis, latent infection	6	84
Campylobacteriosis	7	71
Streptococcal disease, invasive	8	67
Hepatitis B, acute & chronic	9	42
Chickenpox	10	33
Salmonellosis	10	33
Norovirus	12	27
Meningitis, aseptic/viral	13	21
Giardiasis	14	20
Cryptosporidiosis	15	14
Syphilis – all stages	15	14
HIV/AIDS	17	9
Shiga toxin-producing <i>E. coli</i> (STEC)	17	9
<i>Acinetobacter</i> , carbapenem non-susceptible	19	7
Lyme disease	20	5

Diseases Reported by Year, 2009-2014

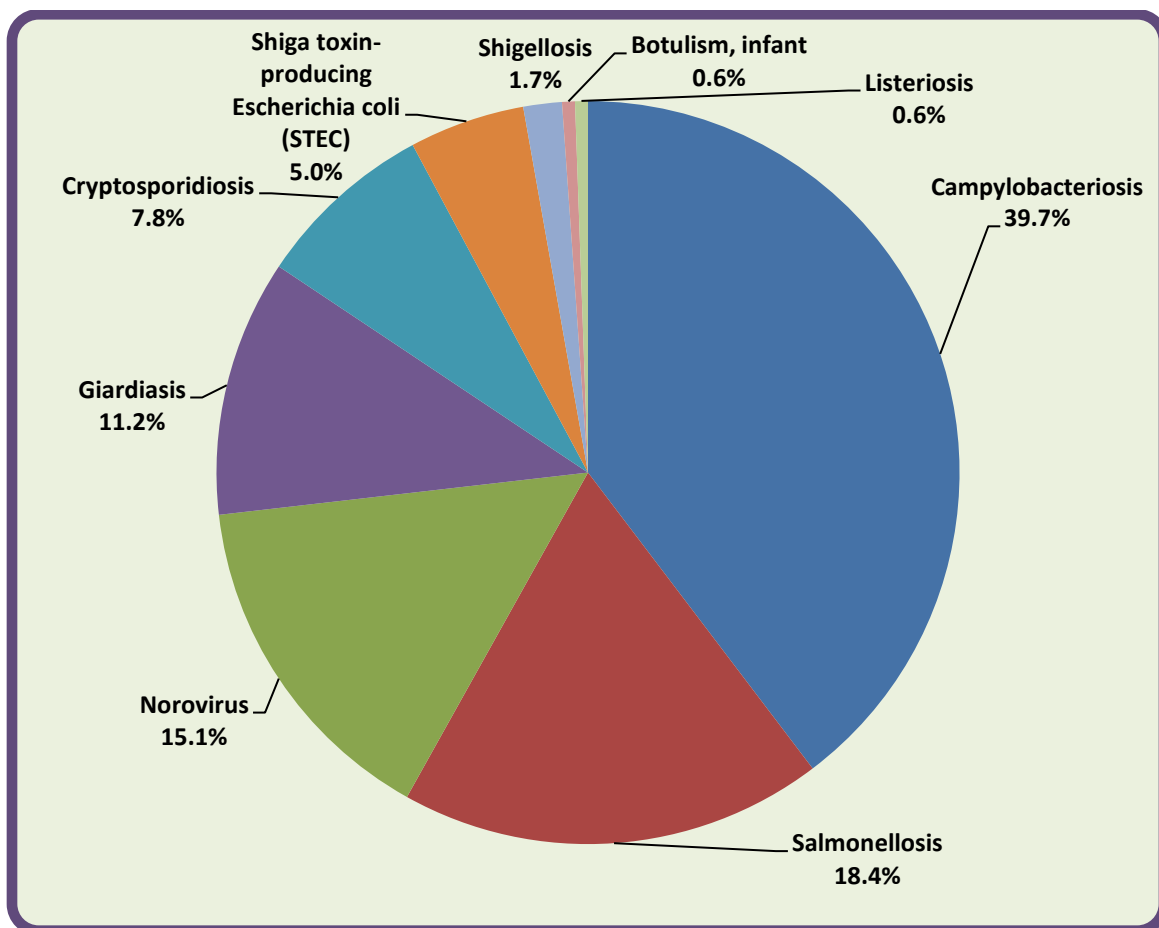
Disease	2009	2010	2011	2012	2013	2014	5 Yr Ave (2009-13)
Amebiasis	0	1	1	0	1	0	0.6
Botulism, infant	0	0	1	3	0	1	0.8
Brucellosis	0	0	1	1	0	0	0.4
Campylobacter	26	19	33	36	43	71	31.4
Carbapenem-Resistant Enterobacteriaceae (CRE)	*	*	*	2	3	7	2.5
Chickenpox	97	62	42	37	39	33	55.4
Chlamydia	735	702	739	862	847	923	777.0
Coccidioidomycosis	3	1	2	9	3	3	3.6
Creutzfeldt-Jakob Disease (CJD)	2	0	1	1	0	2	0.8
Cryptosporidiosis	3	22	19	46	33	14	24.6
Dengue Fever	0	1	0	1	1	0	0.6
Encephalitis	1	1	1	1	0	0	0.8
Giardiasis	35	31	23	37	29	20	31.0
Gonorrhea	35	38	18	40	60	94	38.2
<i>H. influenzae</i> , invasive disease	4	0	3	1	3	4	2.2
Hansen's Disease (Leprosy)	1	0	0	0	0	1	0.2
Hemolytic Uremic Syndrome (HUS)	2	0	1	0	0	0	0.6
Hepatitis A	1	2	3	1	3	2	2.0
Hepatitis B, acute & chronic	31	24	26	21	24	42	25.2
Hepatitis C, acute & chronic	115	71	150	196	189	189	144.2
HIV/AIDS	10	9	4	11	4	9	7.6
Influenza, hospitalized	157	11	43	43	82	130	67.2
Legionellosis	3	0	9	2	2	4	3.2
Listeriosis	1	2	0	1	2	1	1.2
Lyme Disease	1	0	1	4	3	5	1.8
Meningitis, aseptic/viral	22	9	9	16	10	21	13.2
Meningitis, bacterial & other	2	2	2	1	2	4	1.8
Meningococcal disease	1	0	1	0	1	1	0.6
Mumps	1	1	0	0	0	0	0.4
Norovirus	1	7	20	6	20	27	10.8
Pertussis	18	28	25	139	104	117	62.8
Q fever, chronic	0	0	0	0	1	0	0.2
Salmonellosis	30	21	39	19	49	33	31.6
Shiga toxin-producing <i>E. coli</i>	20	15	12	12	12	9	14.2
Shigellosis	5	4	1	1	0	3	2.2
Spotted Fever Rickettsiosis	0	0	0	0	0	1	0.0
Streptococcal disease, invasive	48	74	57	78	73	67	66.0
Syphilis - all stages	5	13	11	21	20	14	14.0
Tuberculosis, active disease	3	3	0	1	1	0	1.6
Tuberculosis, latent infection	100	80	66	81	75	84	80.4
West Nile Virus infection	0	1	1	0	0	0	0.4
Vancomycin-intermediate resistance to <i>Staphylococcus aureus</i> (VISA)	0	0	1	0	0	1	0.2
Total (Infrequent diseases are included in total, but not listed)	1,520	1,256	1,366	1,732	1,739	1,937	1,522.6

Enteric Diseases

Enteric diseases are caused by bacterial, viral, or parasitic organisms that are shed in the feces and can be spread person-to-person or through contaminated food and water. Enteric diseases are generally characterized by gastrointestinal symptoms such as nausea, vomiting, and diarrhea.

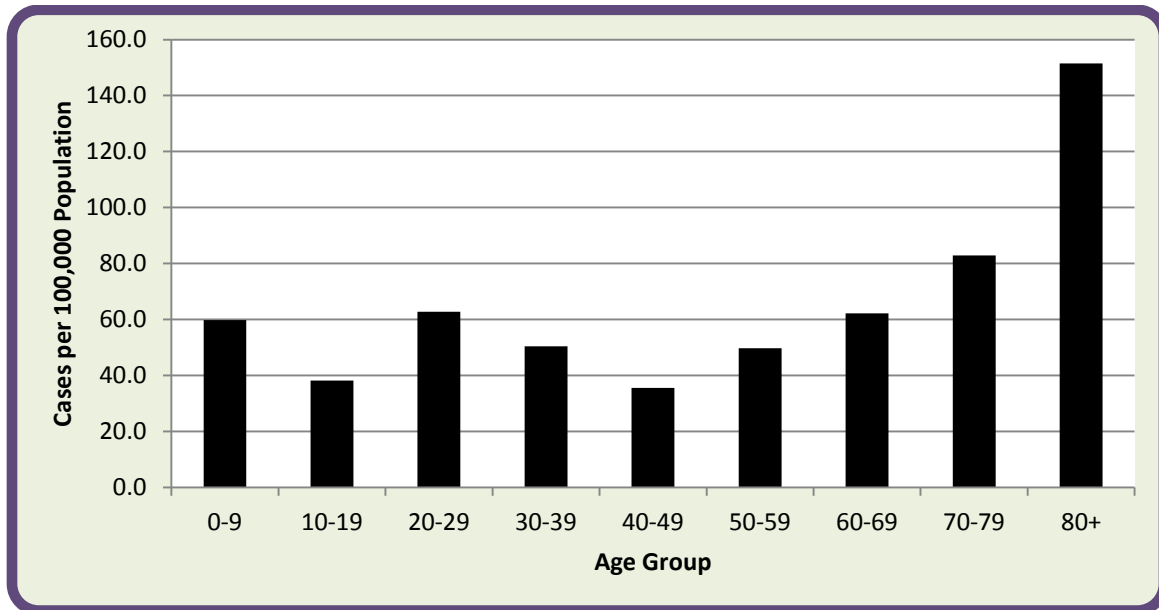
There were **179** enteric disease cases reported during 2014. Campylobacteriosis was the most frequently reported enteric disease with **71** cases (39.7%), followed by salmonellosis with **33** cases (18.4%), norovirus with **27** cases (15.1%), giardiasis with **20** cases (11.2%), cryptosporidiosis with **14** cases (7.8%), Shiga toxin-producing *E. coli* (STEC) with **9** cases (5.0%), shigellosis with **three** cases (1.7%), infant botulism with **one** case (<1%), and listeriosis with **one** case (<1%).

Enteric Diseases, Davis County, 2014



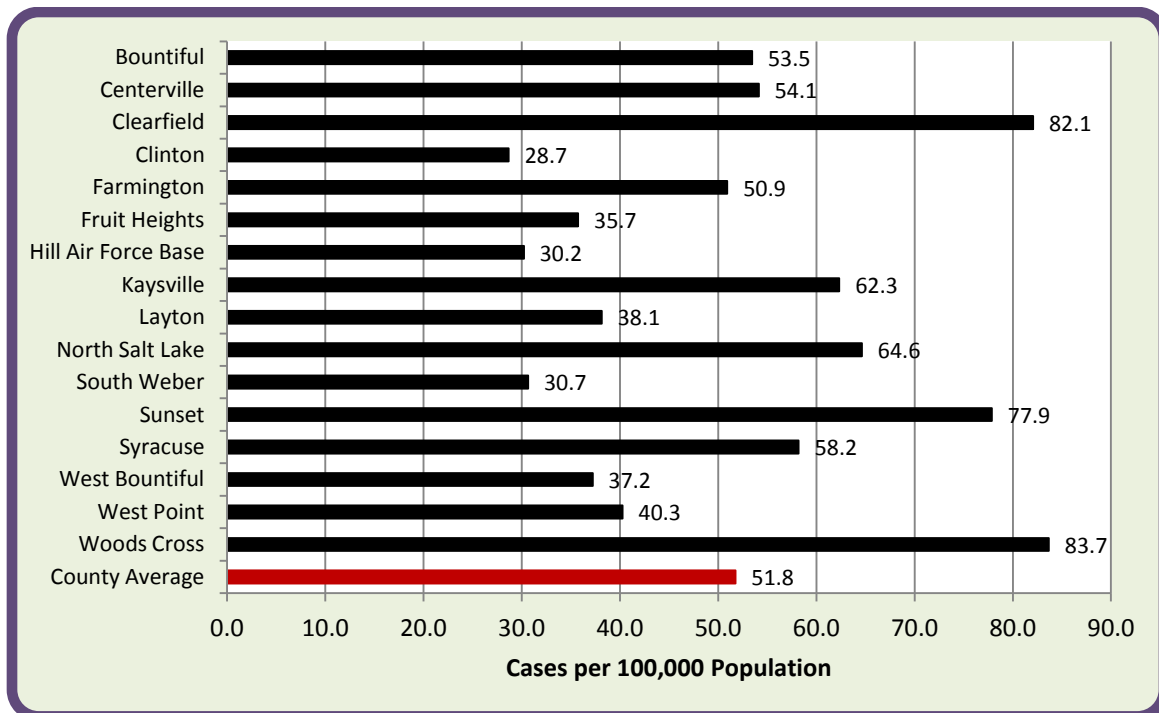
Over half of the cases were males (55.9%) and rates of illness were highest among those ≥ 80 years of age.

Incidence of Enteric Diseases by Age Group, Davis County, 2014



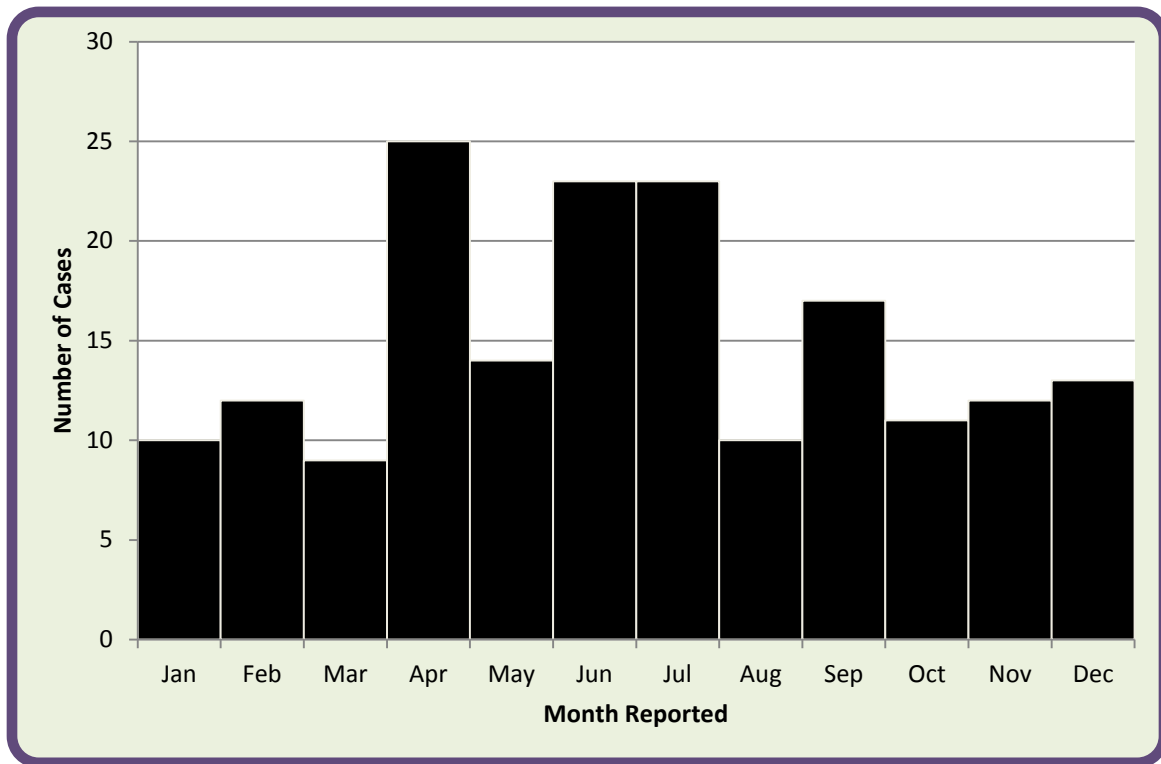
Enteric diseases were reported among residents of every city within Davis County. The rate by city varied, but the average rate of enteric diseases was 51.8 per 100,000 residents.

Incidence of Enteric Diseases by City, Davis County, 2014



Enteric diseases are reported year-round, with a higher incidence during the summer months.

Enteric Diseases by Month Reported, Davis County, 2014



Botulism

Food-borne botulism is a food poisoning caused by a toxin produced by the bacteria, *Clostridium botulinum*. Food-borne botulism occurs after eating food containing the toxin. This toxin does not cause a bad odor or taste to food. The disease most often develops after consuming improperly processed home-canned foods or home-preserved meats.

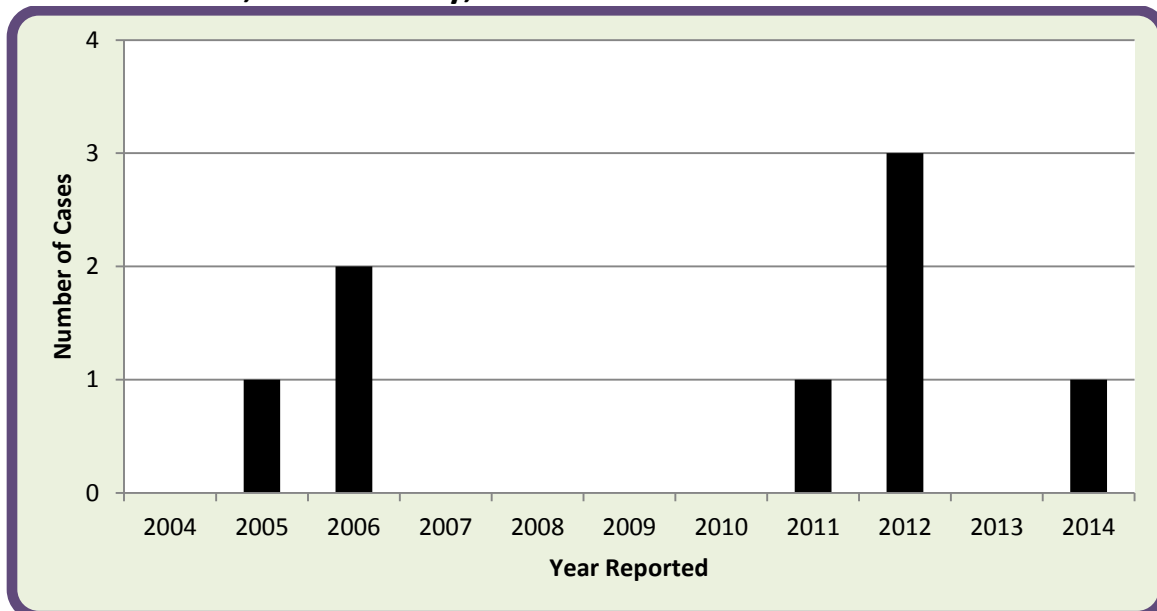
Infant botulism is a disease caused when the *Clostridium botulinum* toxin is produced in the intestines of very young children after becoming infected by the bacteria. Children who get infant botulism are generally younger than six months old. The spores of *Clostridium botulinum* are common in soil, and can also be found in a variety of foods and in dust. Infant botulism has been associated with feeding contaminated honey (and rarely corn syrup) to infants, but not in children older than one year of age or in adults.

Wound botulism usually presents with the same clinical picture as foodborne botulism. In wound botulism, the organism multiplies in the wound and produces the toxin which is then absorbed into the bloodstream

In the United States an average of 110 cases of botulism are reported each year. Of these, approximately 25% are food-borne, 72% are infant botulism, and 3% are wound botulism. Outbreaks of food-borne botulism involving two or more persons occur most years and are usually caused by eating contaminated home-canned foods. The number of cases of food-borne and infant botulism has changed little in recent years, but wound botulism has increased because of the use of black-tar heroin, especially in California.

During 2014, there was **one case** of infant botulism and **no cases** of food-borne or wound botulism reported in Davis County. The case of infant botulism was not associated with the consumption of honey or corn syrup.

Infant Botulism, Davis County, 2004-2014

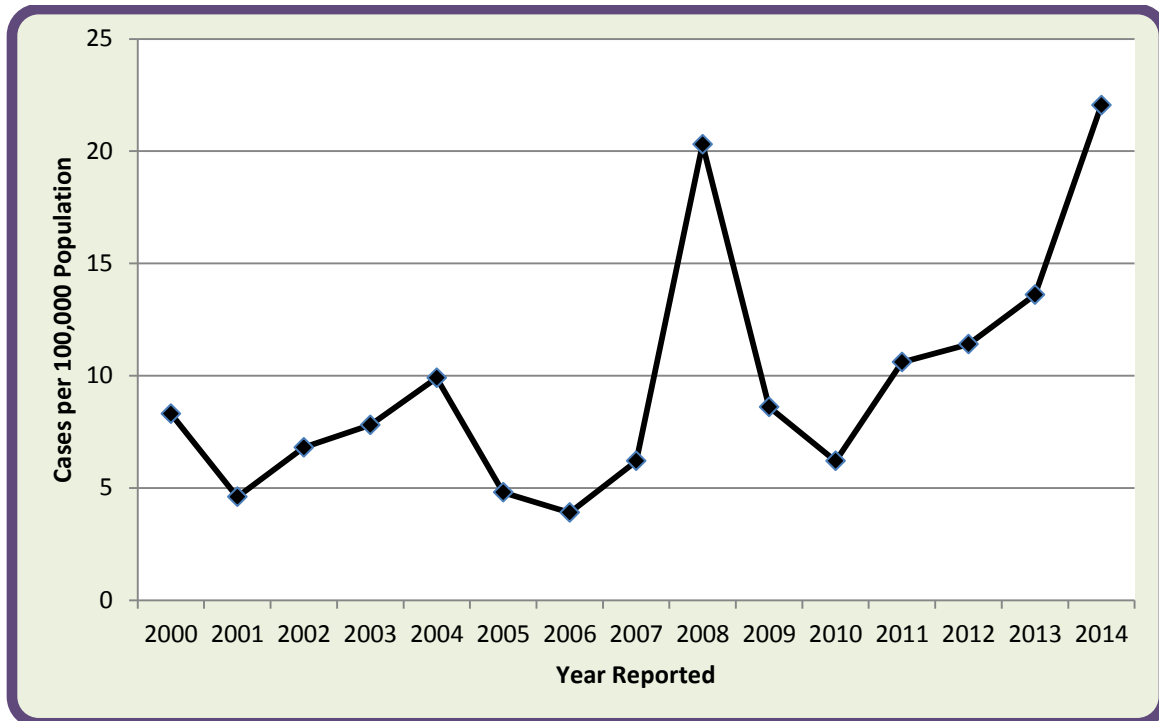


Campylobacteriosis

Campylobacteriosis is an infectious disease caused by bacteria of the genus *Campylobacter*. The bacteria are transmitted via the fecal-oral route. Improperly cooked poultry, untreated water, and unpasteurized milk are the main sources of infection. *Campylobacter* is one of the most common bacterial causes of diarrheal illness in the United States. Virtually all cases occur as isolated, sporadic events, not as part of large outbreaks. Active surveillance through CDC indicates about 15 cases are diagnosed each year for every 100,000 persons in the population. Many more cases go undiagnosed or unreported. Campylobacteriosis is estimated to affect over 1 million persons every year, or 0.5% of the general population.

During 2014, there were **71** cases of campylobacteriosis reported in Davis County.

Incidence of Campylobacteriosis, Davis County, 2000-2014



2014 Disease Highlights:

In 2014, Davis County investigated 71 cases of campylobacteriosis – the highest annual number of cases reported in the last 15 years. The Communicable Disease and Epidemiology Division investigated two clusters of campylobacteriosis in 2014. These investigations are summarized below:

-
- In May 2014, Davis County Health Department (DCHD) was notified of a statewide cluster of campylobacteriosis cases – the majority of which had consumed raw milk from a local dairy. The Utah Department of Health (UDOH) and the Utah Department of Agriculture and Food (UDAF) inspected the facility in June 2014 and took samples of the raw milk. On July 29, 2014, UDAF recovered campylobacteriosis from the samples with a PFGE pattern that matched the cluster pattern. The dairy’s license was suspended on August 4, 2014 until subsequent milk samples were negative. When additional cases began to appear into the fall, the dairy’s license to sell raw milk was permanently revoked. In total, 94 cases were associated with this outbreak, 33 (35.1%) of which were Davis County residents.
 - In June 2014, DCHD interviewed a patient confirmed with campylobacteriosis who had recently traveled to Mexico City on a school trip for a college course. A total of 16 students were on the trip and all became ill. The Salt Lake County Health Department (SLCHD) was notified due to the educational facility residing in their jurisdiction. No other cases were identified in Davis County related to this school trip.

Cryptosporidiosis

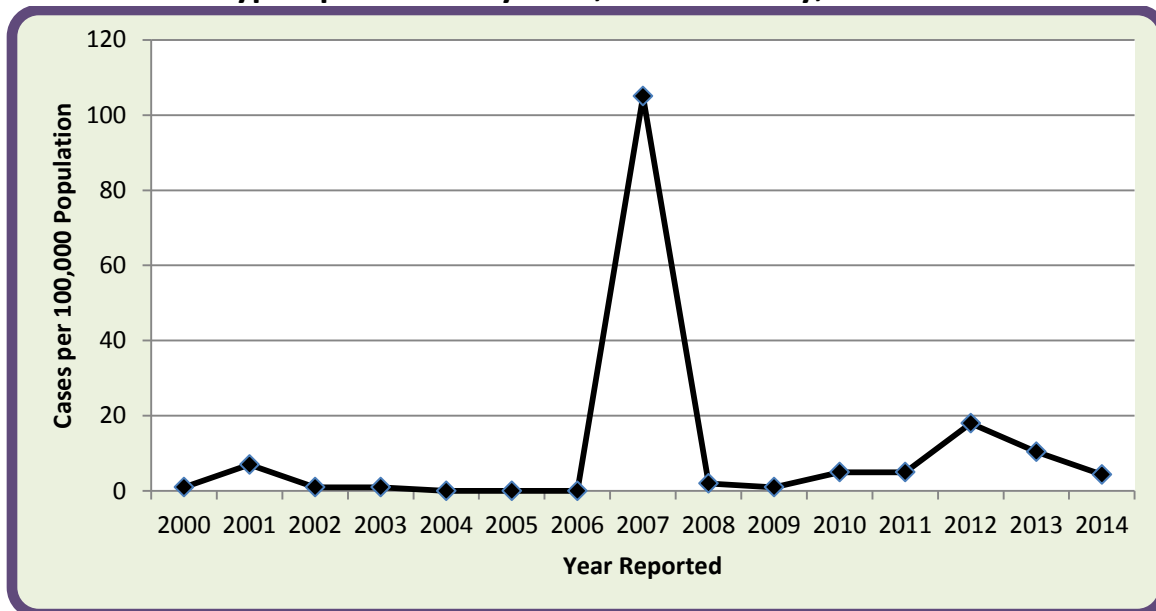
Cryptosporidiosis is an infection caused by the protozoan organism *Cryptosporidium parvum*. *Cryptosporidia* have been found in many hosts, including humans, cattle and other domestic mammals. Infections occur via person-to-person, fecal-oral, animal-to-person, and waterborne transmission. During the past two decades, “crypto” has become recognized as one of the most common causes of waterborne disease in humans in the United States. The parasite may be found in drinking water and recreational water in every region of the United States and throughout the world.

During 2014, there were **14** cases of cryptosporidiosis reported in Davis County.

2014 Disease Highlights:

In 2014, Davis County had only 14 confirmed cases of cryptosporidiosis – a 58% decline from 2013 when 33 cases were reported. The last outbreak of cryptosporidiosis in Utah occurred in 2007 (with 294 reported cases in Davis County) and was associated with public swimming pools. Cases have diminished since that time due to the implementation of new control measures, including installation of UV lights in several Davis County pool systems and several public service announcements.

Incidence of Cryptosporidiosis by Year, Davis County, 2000-2014

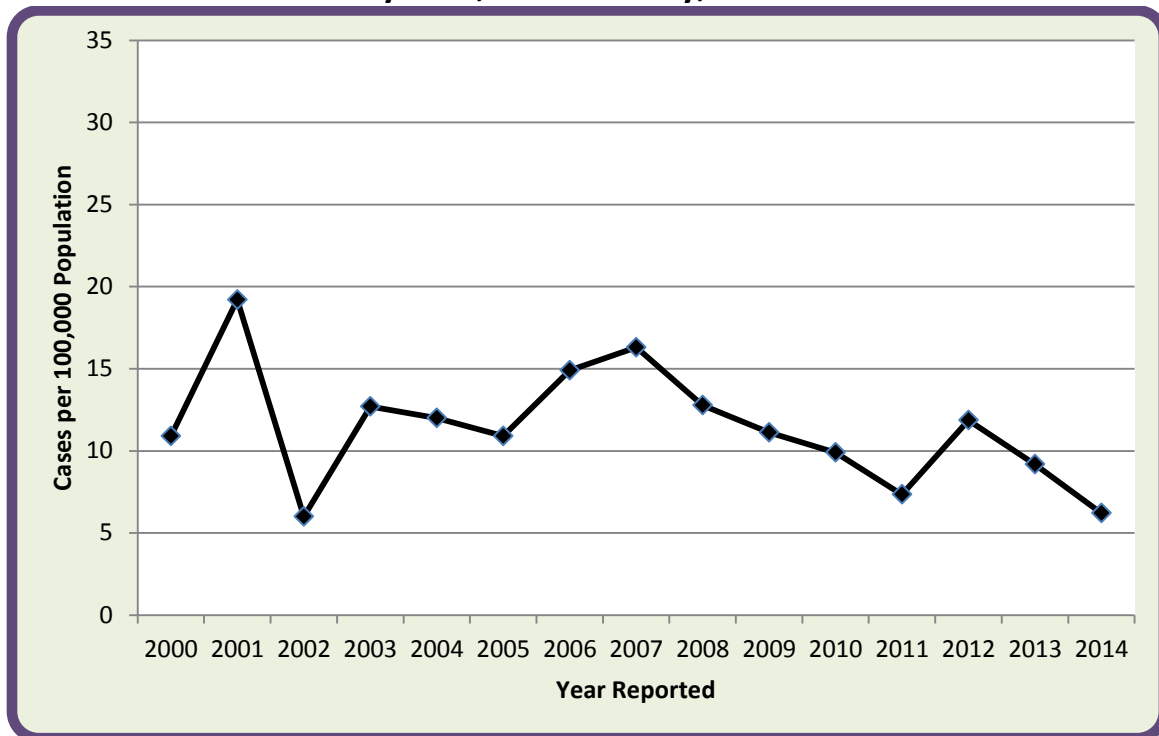


Giardiasis

Giardiasis is an infection of the upper small intestine caused by *Giardia lamblia*, a flagellate protozoan, found widely in nature. Humans and other mammals, (especially beavers, dogs, and cats), are reservoirs and shed the organism in their stool. Persons with giardiasis are infectious to others for the entire period of their illness, which can be weeks or months. Severity of disease varies from no symptoms to chronic diarrhea. Giardiasis tends to have intermittent symptoms, thus individuals may seek medical attention months after the initial infection occurred.

During 2014, there were **20** cases of giardiasis reported in Davis County, a decrease from the 29 cases reported in 2013.

Incidence of Giardiasis by Year, Davis County, 2000-2014



2014 Disease Highlights:

In 2014, Davis County investigated 20 confirmed cases of giardiasis. One case was associated with a college course backpacking trip to the San Rafael Swell. The students used water from the river for food and hygiene purposes, but treated it with iodine before doing so. A total of four participants became ill. Salt Lake County Health Department was notified due to the educational facility residing in their jurisdiction. No additional Davis County cases were identified related to this cluster.

Norovirus

Noroviruses are named after the original strain “Norwalk virus,” which caused an outbreak of gastroenteritis in a school in Norwalk, Ohio, in 1968. There are at least five known norovirus geno-groups, which in turn are divided into at least 31 genetic clusters. Noroviruses are transmitted primarily through the fecal-oral route, by consumption of fecally-contaminated food/water or by direct person-to-person contact. Environmental and fomite contamination are also sources of infection. Evidence exists of transmission via aerosolization of vomitus resulting in droplets contaminating surfaces or entering the oral mucosa and then swallowed. No evidence suggests that infection occurs through the respiratory route. CDC estimates that 23 million cases of acute gastroenteritis due to norovirus infection occur each year, and that at least 50% of all foodborne outbreaks of gastroenteritis can be attributed to noroviruses.

During 2014, there were **27** cases of norovirus reported in Davis County. Two norovirus outbreaks were identified in some Davis County long-term care facilities.

2014 Disease Highlights:

Due to the short duration of illness (typically 24 hours) and the self-limited, mild-to-moderate manifestation, persons infected with norovirus often do not seek medical care. Those who do are rarely tested for norovirus because testing is not widely available. As a result, many norovirus outbreaks are missed. When suspect cases are reported to the health department, they are often received after the patient has recovered or late into the illness, making it difficult to get a confirmed diagnosis. The Communicable Disease and Epidemiology Division investigates several clusters of gastrointestinal illness each year. Most of these clusters are believed to be norovirus based on the symptoms and duration of the illness. Two investigations where norovirus was confirmed or suspected as the cause of illness are summarized below:

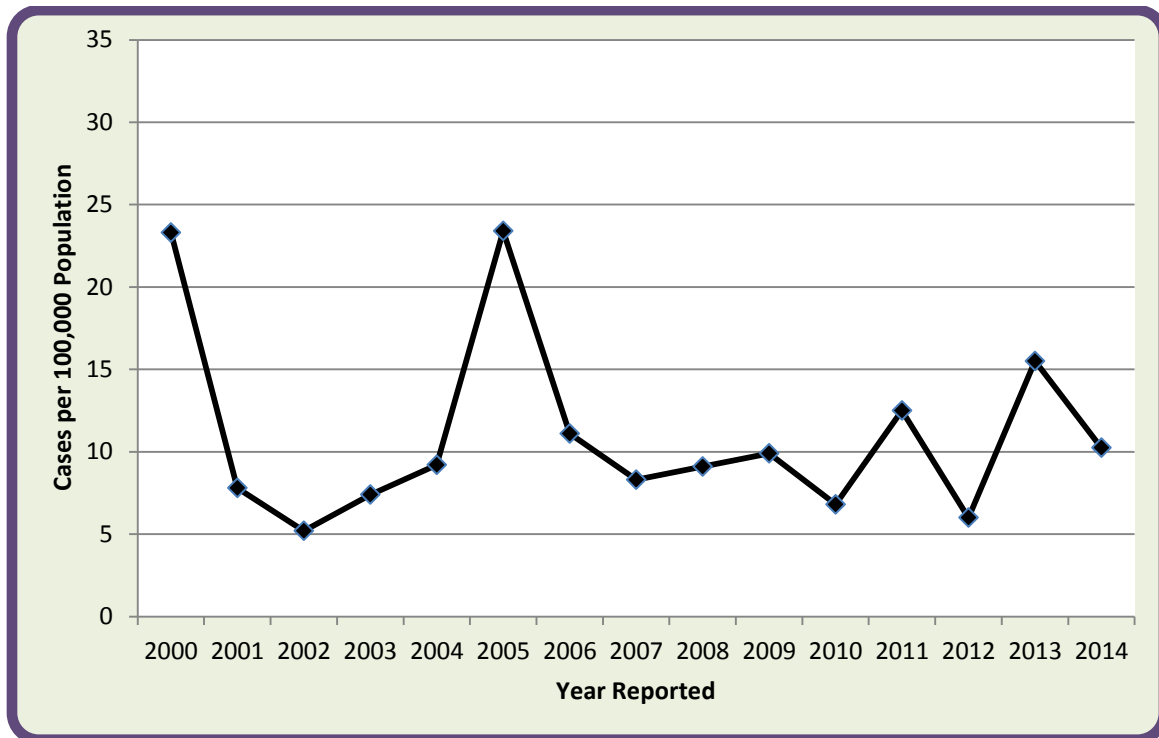
- In April 2014, a cluster of gastrointestinal illness in a long-term care facility was reported to Davis County Health Department (DCHD). The facility’s nurse suspected norovirus and submitted a specimen for laboratory confirmation – which returned positive for norovirus GII. Further investigation revealed that a kitchen staff member had come to work while symptomatic with diarrhea and vomiting. In total, seven employees and eight residents presented with norovirus-like symptoms which subsided 24-48 hours after onset.
- Also in April 2014, a second cluster of gastrointestinal illness was identified in another long-term care facility. A total of 28 of 82 (34.1%) residents presented with symptoms of diarrhea, vomiting, nausea, fever, and/or headache. One (3.6%) resident passed away, but had several pre-existing conditions that may have been aggravated by this infection. A total of 32 of 600 (5.3%) employees became ill – the majority (75.0%) of which were healthcare workers. The etiology of this cluster was not confirmed through laboratory testing, however, due to the clinical presentation of this cluster, norovirus infection was suspected.

Salmonellosis

Salmonellosis is a bacterial infection generally transmitted through ingestion of contaminated food or water. Salmonellosis can also be transmitted by direct contact with an infected human or animal. *Salmonella* bacteria are commonly found in food products and can be carried by many domestic animals. Every year, approximately 40,000 cases of salmonellosis are reported in the United States. Because many mild cases are not diagnosed or reported, the actual number of infections may be thirty or more times greater. Salmonellosis is more common in summer than in winter. Children are the most likely to be diagnosed with salmonellosis. Young children, the elderly, and those who are immunocompromised are most likely to have severe infections. It is estimated that approximately 450 persons die each year from salmonellosis.

A total of **33** cases of salmonellosis were reported in Davis County in 2014, a 33% decrease from the 49 cases reported in 2013.

Incidence of Salmonellosis, Davis County, 2000-2014



2014 Disease Highlights:

Because of the many different strains of *Salmonella*, determining the serotype and PFGE pattern of *Salmonella* isolates is critical to identifying sources and epidemiological links among cases. Serotypes are conventionally named after the city where they were discovered. Private laboratories are required to submit *Salmonella* isolates to the Utah Public Health Laboratory for serotyping and PFGE analysis. PFGE patterns are compared with other Utah and U.S. *Salmonella* isolates to identify possible clusters and suspect sources.

Salmonella Enteritidis was the most commonly reported *Salmonella* serotype during 2014 with **10** cases (30.3%), followed by *Salmonella* Heidelberg with **seven** cases (21.2%), and *Salmonella* Infantis with **five** cases (15.2%). Additional serotypes were reported in 2014, but were not as common. The number of cases of salmonellosis among Davis County residents by serotype is shown in the table below.

Salmonellosis Serotypes, Davis County, 2014

Serotype	Number of Cases	Percent
Enteritidis	10	30.3%
Heidelberg	7	21.2%
Infantis	5	15.2%
Typhimurium	2	6.1%
Anatum	1	3.0%
Hadar	1	3.0%
Javiana	1	3.0%
Mississippi	1	3.0%
Newport	1	3.0%
Oranienburg	1	3.0%
Panama	1	3.0%
Urbana	1	3.0%
Unknown	1	3.0%
Total	33	100.0%

Salmonellosis Clusters

Salmonella Enteritidis

A statewide cluster of *Salmonella* Enteritidis identified four cases with a matching PFGE pattern, one of which was a Davis County resident. Two of the cases reported eating at the same restaurant chain, although at different locations in Salt Lake County. During interviews with these cases, alfalfa sprouts were identified as a common food item that both cases ate at the restaurant. Salt Lake County Health Department inspected both locations and also retrieved alfalfa sprouts for testing which were negative. No other implicated foods were identified.

Salmonella Enteritidis

Two Davis County residents were linked to a second statewide cluster of *Salmonella* Enteritidis infections. A total of 19 cases across the state were also identified by PFGE. Several of these cases reported eating at the same Salt Lake County restaurant.

Supplemental interviews revealed that although no one food item was identified as the source of infection, the majority of cases had a meal with chicken. An inspection of the facility revealed no violations.

Salmonella Infantis

A Davis County resident was part of a state cluster of *Salmonella* Infantis infections. A total of eight cases from various areas of the state had a matching PFGE pattern. No common source was identified, but CDC has identified eggs as a food source that is commonly linked to *Salmonella* Infantis infections. Other identified food sources include raw milk, pork, beef, sprouts, and raw almonds. International travel and contact with reptiles have also been associated.

Salmonella Heidelberg

Two Davis County residents were hospitalized and infected with the same strain of *Salmonella* Heidelberg that had been identified in a national cluster. The national cluster indicated that the source of the outbreak was linked to mechanically separated chicken. However, no source of infection was identified in the Davis County cases.

Salmonella Panama

One *Salmonella* Panama case was reported in Davis County during 2014. The case had been out-of-state visiting family during their exposure period. One of the family members had been ill with diarrhea during their visit and had since been hospitalized with suspected typhoid fever. Cultures from both patients were positive for *Salmonella* Panama. No common food source was identified, but past outbreaks of *Salmonella* Panama have been associated with fresh cantaloupe.

Shiga Toxin Producing *Escherichia coli* (STEC) Infection

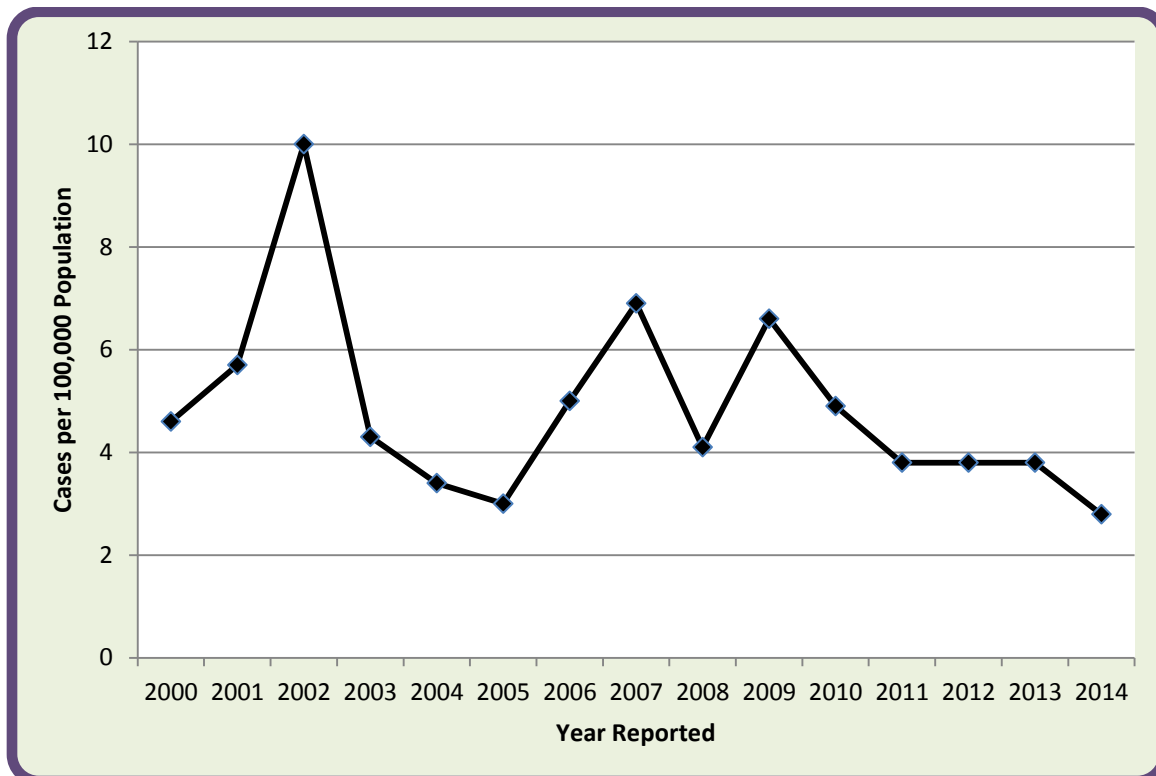
E. coli are bacteria that normally live in the intestines of humans and animals. Certain strains of *E. coli*, including O121, O11, O26 and O157:H7 produce Shiga toxins that can cause hemorrhagic colitis, manifested as bloody stools. The most serious complication of the infection is Hemolytic Uremic Syndrome (HUS), which can lead to permanent kidney damage or death.

Sources of transmission include consumption of undercooked, contaminated ground beef and other beef products, unpasteurized milk, drinking or swimming in water that is contaminated with sewage, or eating unwashed fruits or vegetables. Person-to-person transmission can occur within households, childcare centers, and long-term care facilities.

Due to the potential severity of STEC and the fact that it spreads easily, public health investigates all reported cases thoroughly. Individuals in high-risk settings (e.g. food-handlers and day care workers or attendees) must be cleared by public health before returning to the facility.

In 2014, there were 9 cases of STEC reported in Davis County.

Incidence of STEC Infections, Davis County, 2000-2014



2014 Disease Highlights:

In 2014, the most common strain of STEC reported in Davis County was O5: non-motile with **two** cases (22.2%). Other strains identified included O103, O111, O121, O145, O157:H7, and O26. No Davis County clusters were associated with any national or state STEC clusters this year.

The cases ranged in age from one to 70, with a median age of 13. A total of six cases (66.7%) were male. STEC is most commonly reported during the summer months. However, in 2014 only two cases (22.2%) were reported in June, July, and August.

Only one of the cases was hospitalized and no HUS or deaths were reported. Possible exposures reported by patients included: animal contact, out-of-state travel, swimming in untreated recreational water, and drinking secondary/untreated water.

The number of cases of STEC among Davis County residents by serotype is shown in the table below.

Shiga Toxin Producing *E. coli* Serotypes, Davis County, 2014

Serotype	Number of Cases	Percent
O5: non-motile	2	22.2%
O103	1	11.1%
O111	1	11.1%
O121	1	11.1%
O145	1	11.1%
O157:H7	1	11.1%
O26	1	11.1%
Unknown	1	11.1%
Total	9	100.0%

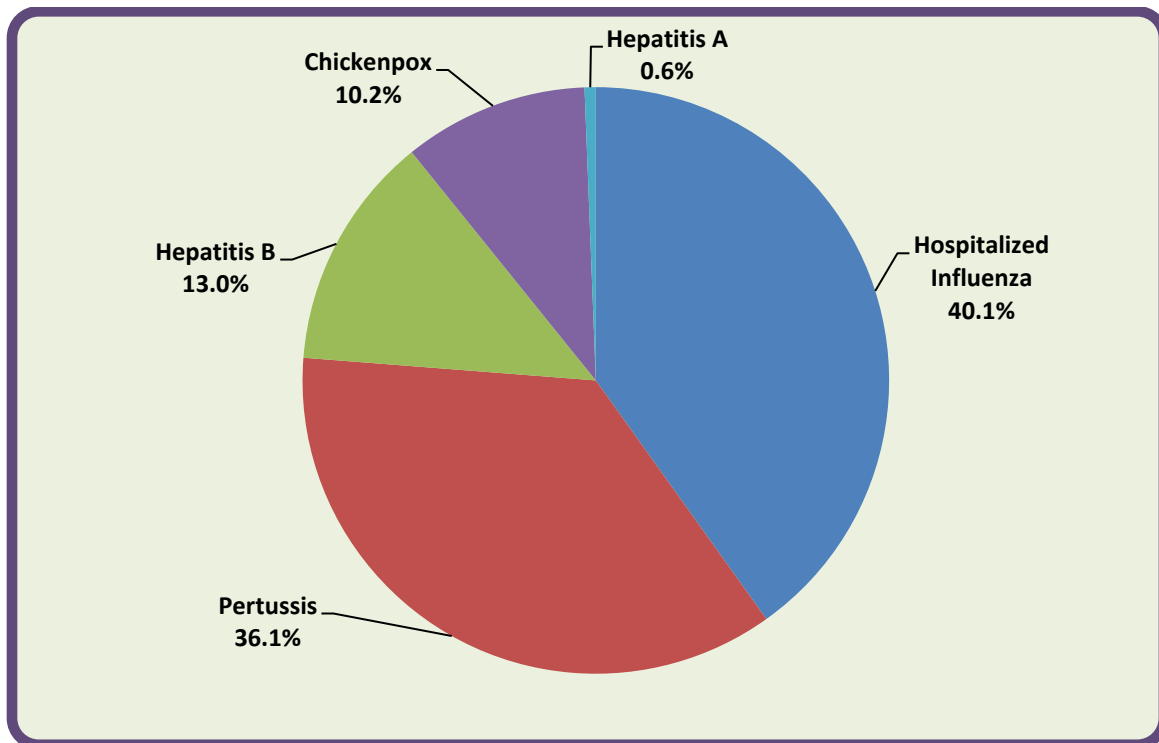
Vaccine-Preventable Diseases

Vaccine-Preventable Diseases (VPDs) are diseases that are preventable through the use of immunizations. Historically, many vaccine-preventable diseases caused a great deal of morbidity and mortality in children. Rates of VPDs have dramatically declined in large part because of immunizations. Yet worldwide each year, 22.6 million children do not receive basic vaccines and more than 3 million people die of vaccine-preventable diseases. Immunizations are the most effective step in protecting the community against VPDs. However, these diseases still occur because of importation, vaccine failure or disease breakthrough, and incomplete or no vaccinations.

When a VPD is diagnosed, it is important that public health measures be quickly implemented to contain the spread. These measures include the administration of prophylactic medications and vaccines, isolation of the infected individual, quarantine of exposed individuals, and public education.

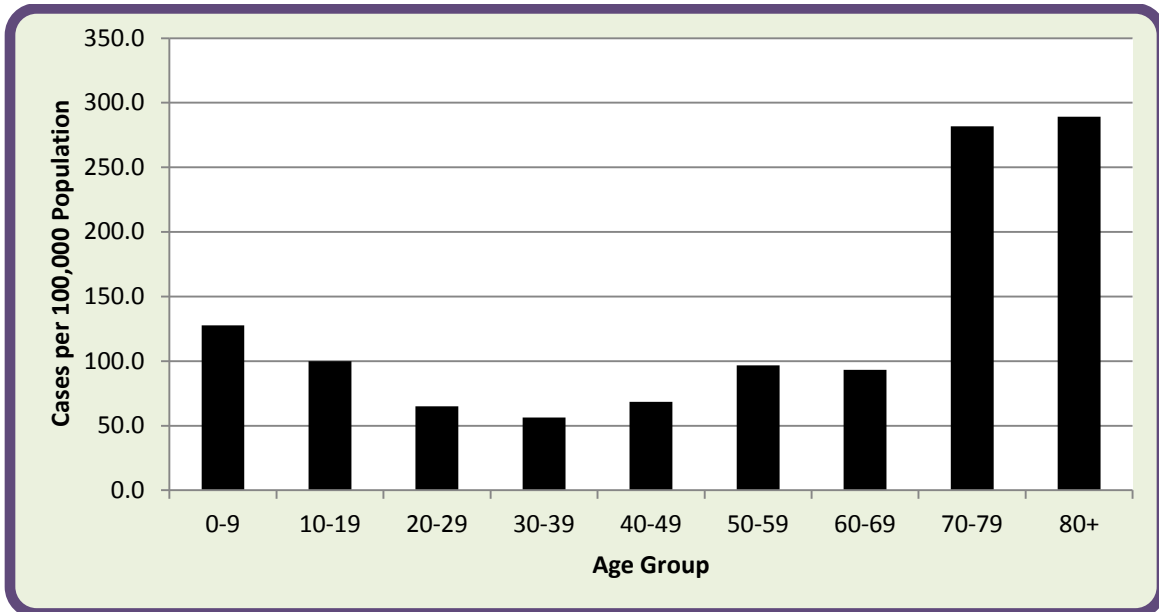
In 2014, hospitalized influenza was the most commonly reported VPD with **130** cases (40.1%). Pertussis was the next most common disease in this category with **117** cases (36.1%), followed by Hepatitis B with **42** cases (13.0%), chickenpox with **33** cases (10.2%), and Hepatitis A with **two** cases (<1%).

Vaccine-Preventable Diseases, Davis County, 2014



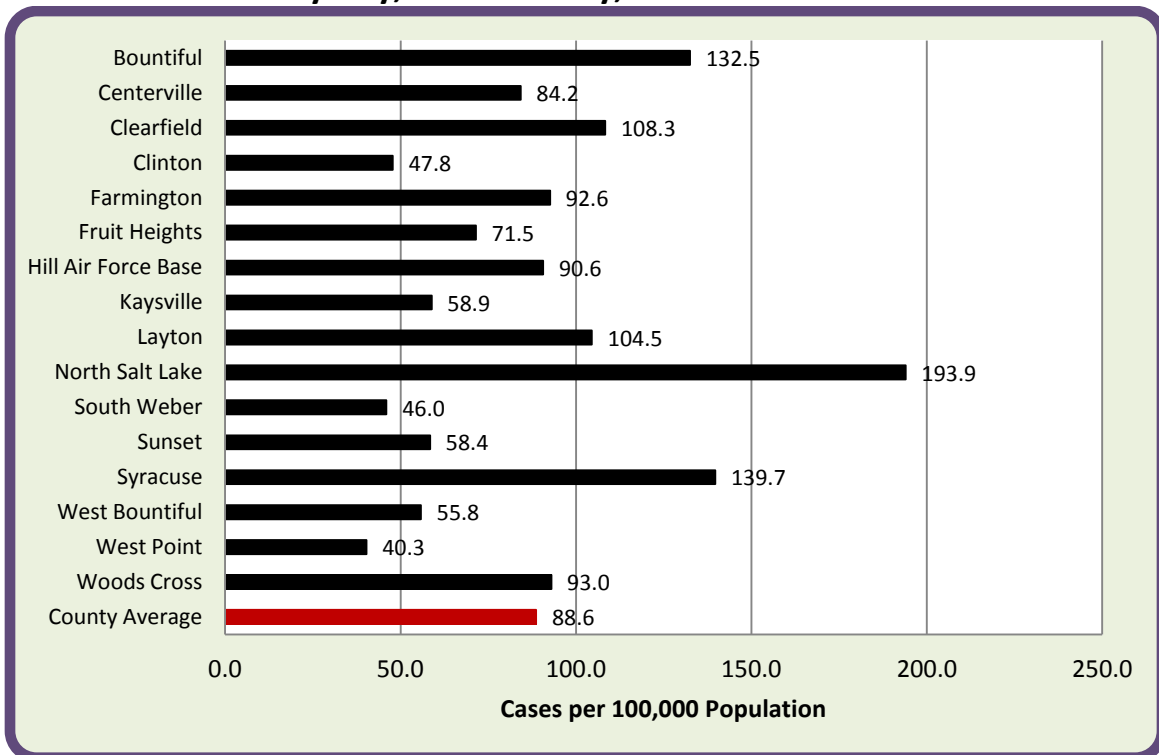
The incidence of vaccine-preventable diseases is highest among children under the age of 10 and the elderly.

Incidence of VPDs by Age Group, Davis County, 2014



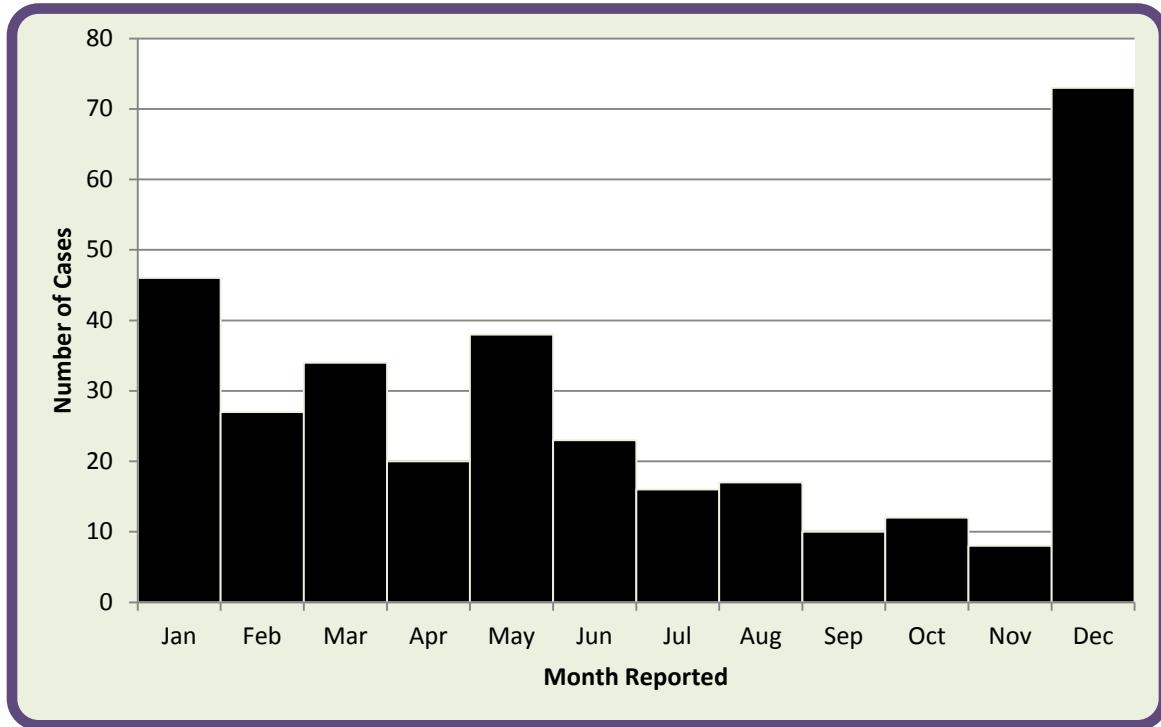
Vaccine-preventable diseases occurred in residents throughout the county. The average rate of vaccine-preventable diseases was **88.6** cases per 100,000 residents.

Incidence of VPDs by City, Davis County, 2014



Vaccine-preventable diseases (particularly pertussis and chickenpox) are usually reported more frequently during the school year. Influenza cases typically peak in January or February. Due to the intensity of the current influenza season, a significant jump in VPDs in the latter end of 2014 can be attributed to the increased number of hospitalized influenza cases reported in Davis County.

VPDs by Month Reported, Davis County, 2014



Hepatitis A

Hepatitis A is a vaccine preventable disease caused by the Hepatitis A virus. It is transmitted via the fecal-oral route either by direct contact or by consumption of contaminated food or water.

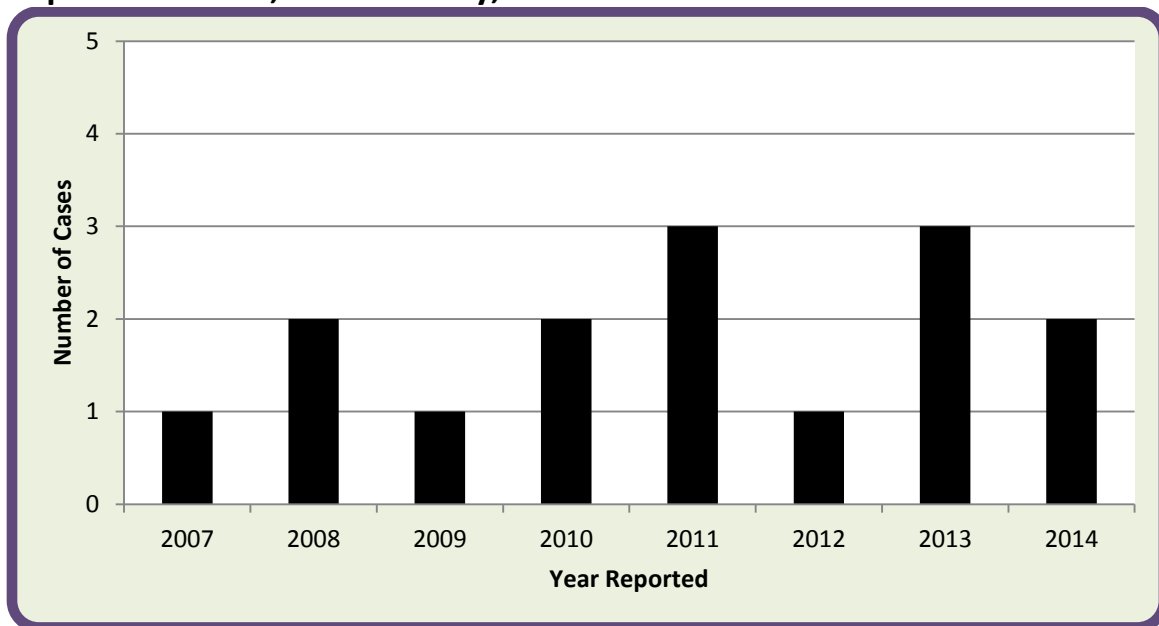
Hepatitis A rates have declined steadily since 1999 when routine vaccination was recommended for children living in states with highest incidence, including Utah. In 2004, the U.S. incidence dropped to an all time low of 1.9 cases/100,000 population.

Davis County had **two** cases of Hepatitis A in 2014.

2014 Disease Highlights:

Suspect cases of Hepatitis A are reported throughout the year. Disease investigations are often able to rule out most infections. In 2014, two cases of Hepatitis A were reported to the health department. One case had traveled to an endemic country during the exposure period and participated in activities that are known to transmit the virus. Several household and other close contacts were potentially exposed and received post-exposure prophylaxis. No other cases were identified.

Hepatitis A Cases, Davis County, 2007-2014



Hepatitis B (Acute and Chronic Infections)

Hepatitis B (HBV) is a vaccine preventable disease caused by the Hepatitis B virus. It is transmitted through blood or body fluids. Common modes of transmission include percutaneous and permucosal exposure to infectious body fluids, sharing needles or syringes, sexual contact with an infected person, and perinatal exposure to an infected mother. In the United States, 5-8% of the total population is infected and 2-9% of the population has chronic infection. Acute HBV infection occurs most commonly among adolescents and adults in the United States.

During 2014, there were **42** cases of HBV reported in Davis County—41 were chronic infections and one was determined to be an acute case. **Six** chronic cases were pregnant and were referred to the Perinatal Hepatitis B Program for further interventions. Several of the non-pregnant HBV cases were at high risk for infection (e.g. foreign born, IDU, sexual/household exposure to a positive contact).

Perinatal Hepatitis B Program:

The Perinatal Hepatitis B program is responsible for the case management (evaluation, monitoring, testing and facilitation of HBIG and Hepatitis B vaccination) of all reported cases of HBsAg positive pregnant females in Davis County. Prior to the baby's birth, arrangements are made with the delivering hospital to administer Hepatitis B immune globulin (HBIG) and the first dose of Hepatitis B vaccine to the newborn within 12 hours after delivery in an effort to prevent the newborn from acquiring the virus. The newborn is monitored until all three doses of vaccine have been administered. After vaccination, serology testing is conducted to ensure antibody protection. If the infant is a non-responder to the vaccine, a second series is given. Testing is repeated at completion of the second series. Women, who are prenatally tested and determined to be chronic Hepatitis B carriers, are interviewed to identify close contacts. Identified close contacts (sexual partners, household contacts, and children) are recommended to have testing to determine their infection status. If serology testing is negative, the Hepatitis B vaccination series is encouraged. The case management of HBsAg positive pregnant females can range from 8-18 months.

As many as 90% of infants who acquire HBV infection from their mothers at birth become chronically infected. Of children who become infected with HBV between 1-5 years of age, 30-50% become chronically infected. By adulthood, the risk of acquiring chronic HBV infection is approximately 5%.

Influenza

Influenza is an acute respiratory disease caused by RNA viruses from the *Orthomyxoviridae* family. Humans are the primary reservoir for human influenza, but many influenza species can also infect birds and mammals. Influenza is transmitted via respiratory droplets and direct contact.

The 2013-14 influenza season (Oct 2013 – May 2014) was very active. There were **85** cases of hospitalized influenza reported in Davis County, a slight increase from the 76 cases reported during the 2012-13 season (Oct 2012 – May 2013).

2014 Disease Highlights:

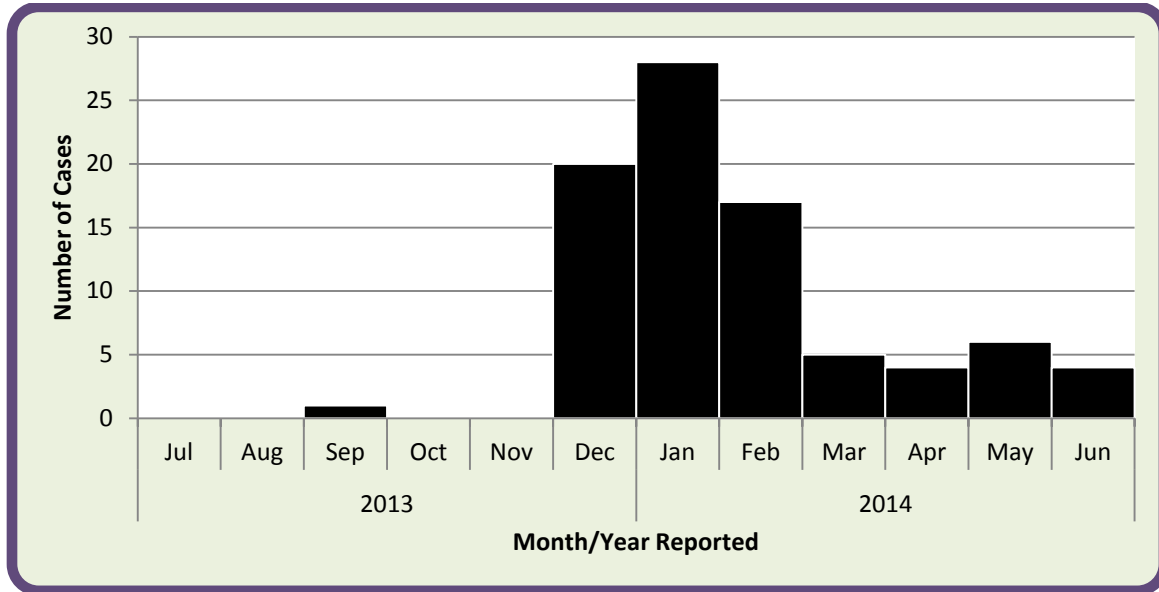
Because of the large number of cases that occur each season, traditional surveillance methods are impractical for influenza. Therefore, the disease is monitored using a variety of mechanisms. One method is through the use of “sentinel sites.” Davis County tracks physician visits for influenza-like illness at sentinel sites throughout the county. These sites report data weekly in order to identify when influenza season begins and ends and to monitor the burden of disease in the county. These sites also submit specimens for influenza testing/typing to the Utah Public Health Laboratory so that circulating strains can be identified. During the 2013-14 influenza season, four sentinel sites reported data to the health department and UDOH.

In addition, medical providers, hospitals and laboratories are required by state law to report hospitalized influenza cases and pediatric influenza deaths to the local health departments. These two levels of reporting help DCHD evaluate disease severity, which is another important aspect of surveillance.

Davis County also partners with the Davis School District to monitor elementary school absentee data. When schools experience a higher than expected absentee rate, the district is notified and an investigation is conducted to determine the cause of the excess absences.

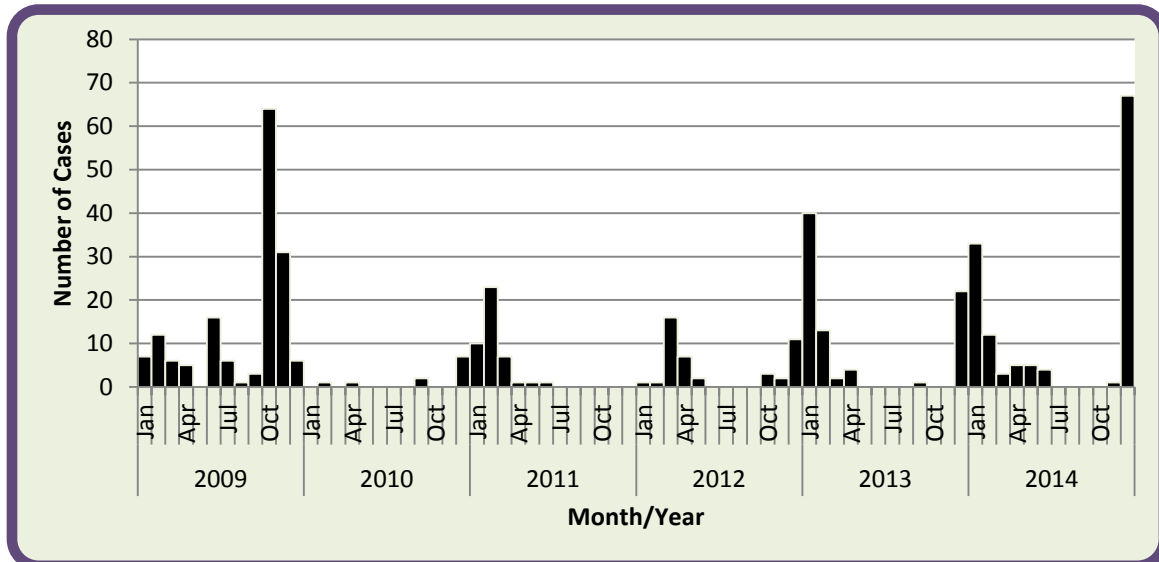
During the 2013-14 influenza season (Oct 2013 – May 2014), the incidence of influenza in Davis County was higher than expected, with 85 cases of hospitalized influenza reported. Thus far, the 2014-15 influenza season (Oct 2014 – May 2015) has been more severe as the predominant circulating strain has drifted from the strain in the vaccine. The number of hospitalized influenza cases season-to-date (116) has already surpassed what was reported last season (85).

Hospitalized Influenza Cases by Month, Davis County, 2013-14 Influenza Season



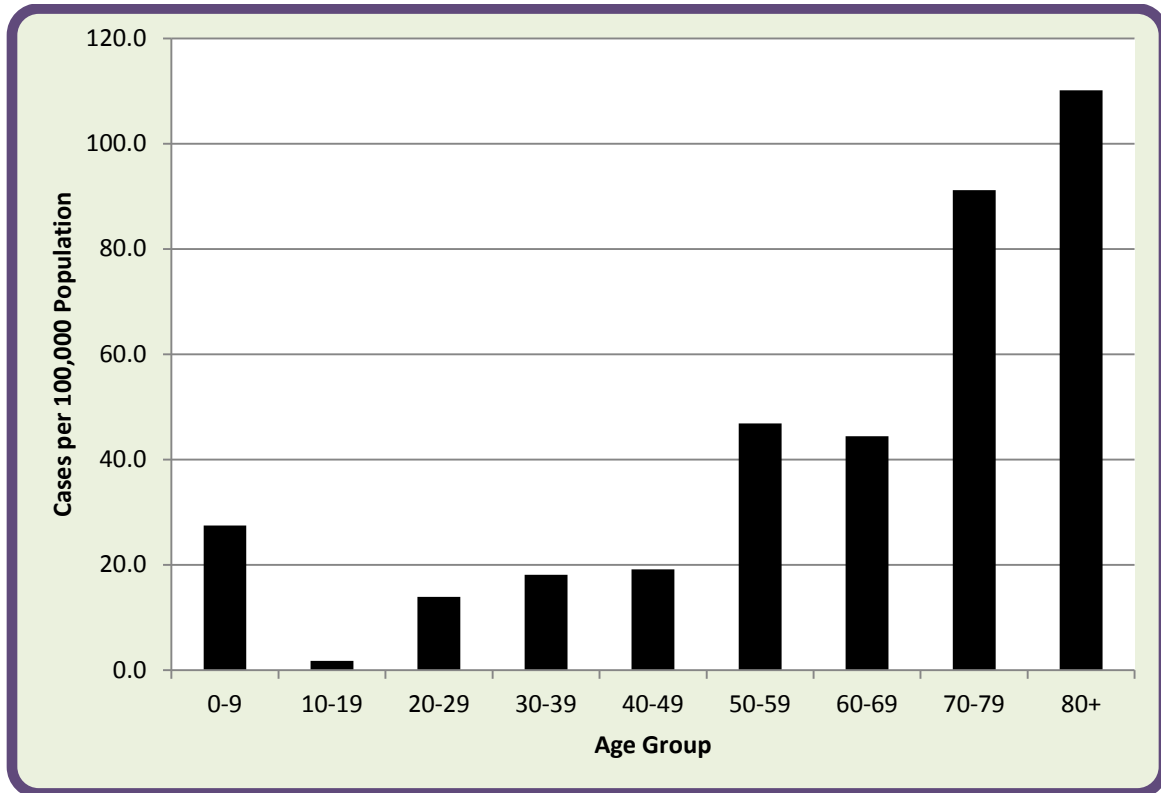
Although influenza cases can occur at any time of year, influenza viruses thrive in cold weather and cases typically peak in the winter months (January and February). During the 2013-14 influenza season (Oct 2013 – May 2014), influenza activity peaked in January and persisted until June. The most common circulating strain was influenza A (H1N1). The 2014-15 influenza season (Oct 2014 – May 2015) has also reported very high levels of activity. Influenza A (H3) has been the most common circulating strain – significantly affecting the very young and elderly populations. It appears that this will continue to be a severe season.

Hospitalized Influenza Cases by Month, Davis County, 2009-2014



The very young and very old are the populations most severely affected by influenza infection. These groups had the highest rates of hospitalizations and deaths due to the disease in the 2013-14 influenza season. **One** pediatric influenza death was reported in Davis County in 2014.

Incidence of Hospitalized Influenza Cases by Age Group, Davis County, 2013-14 Influenza Season

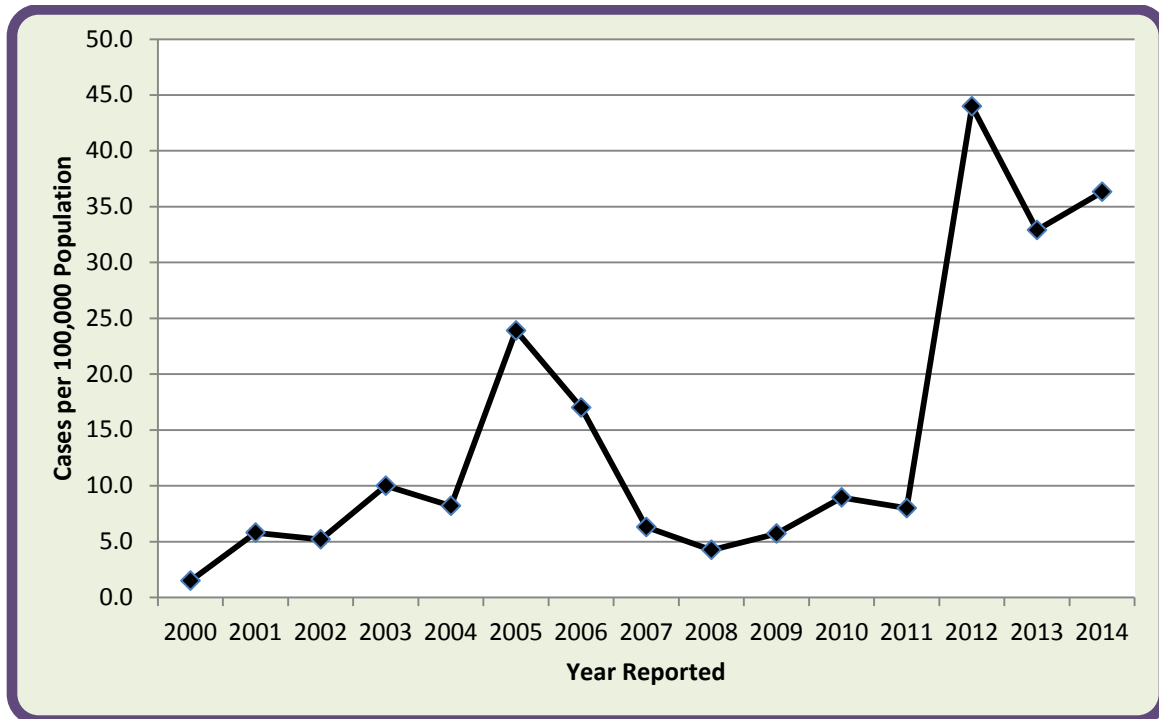


Pertussis

Pertussis is a vaccine-preventable disease caused by the bacteria *Bordetella pertussis*. The disease is of particular concern in infants because of higher rates of hospitalization, pneumonia, and death—compared with older children and adults.

During 2014, there were **117** cases of pertussis reported in Davis County.

Incidence of Pertussis, Davis County, 2000-2014



2014 Disease Highlights:

DCHD investigates approximately 64 pertussis cases each year (based on a 5-year average). In 2014, 117 cases were reported. This corresponds to a 13% increase in comparison to the 104 cases reported in 2013. In 2014, the elevated presence of pertussis was again noted across the state and nation. There were 818 cases of pertussis reported in Utah and the United States saw a 30% increase in cases of pertussis reported between January 1 and August 16, 2014. Disease investigations conducted by DCHD identified symptomatic contacts, indicating a greater disease impact than was initially reported. Risk factors for development of disease included: 1) no vaccination or under-vaccination, 2) waning antibody response, 3) household exposures, and 4) exposure to symptomatic individuals in the community via mass gatherings (e.g. schools, extracurricular events, worksites, and religious meetings).

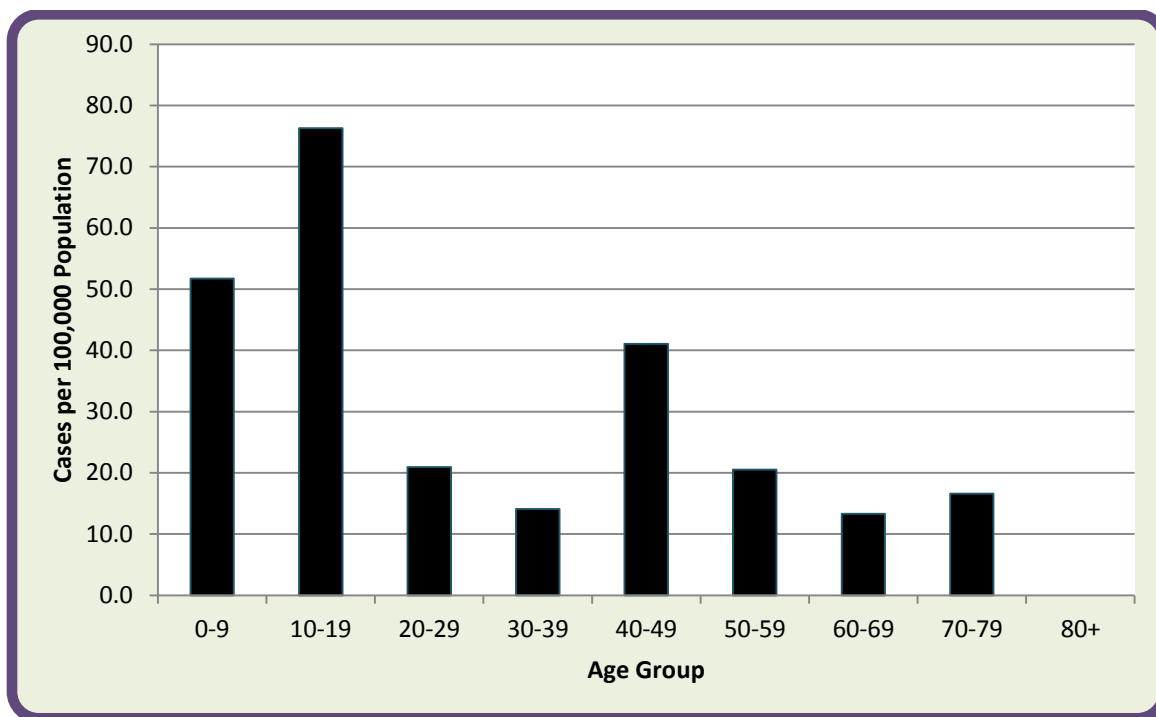
All reported pertussis cases are investigated promptly in an effort to stop disease spread. Contacts that experience a prolonged exposure to an infected case may benefit from

antibiotic prophylaxis – if administered in a timely manner. Children are routinely vaccinated against pertussis before entry into the school system. Upon entry into junior high, a booster dose of TD/Tdap is required. The Tdap (tetanus, diphtheria and acellular pertussis) is a one-time vaccine and recommended for anyone age 11-64. Recent guidance from CDC recommends pregnant women receive Tdap vaccine with every pregnancy, preferably given between weeks 27-36. Tetanus vaccination, however, is recommended every 10 years. The age groups most often affected by pertussis are those who are under-vaccinated including infants/children under five (because they have not completed the full vaccination series) and adolescents/adults (because of waning immunity).

Infants and young children are the groups most severely impacted by pertussis. Although cases are common in older children and adults due to waning immunity, illness in these age groups is usually mild, and the diagnosis is often missed.

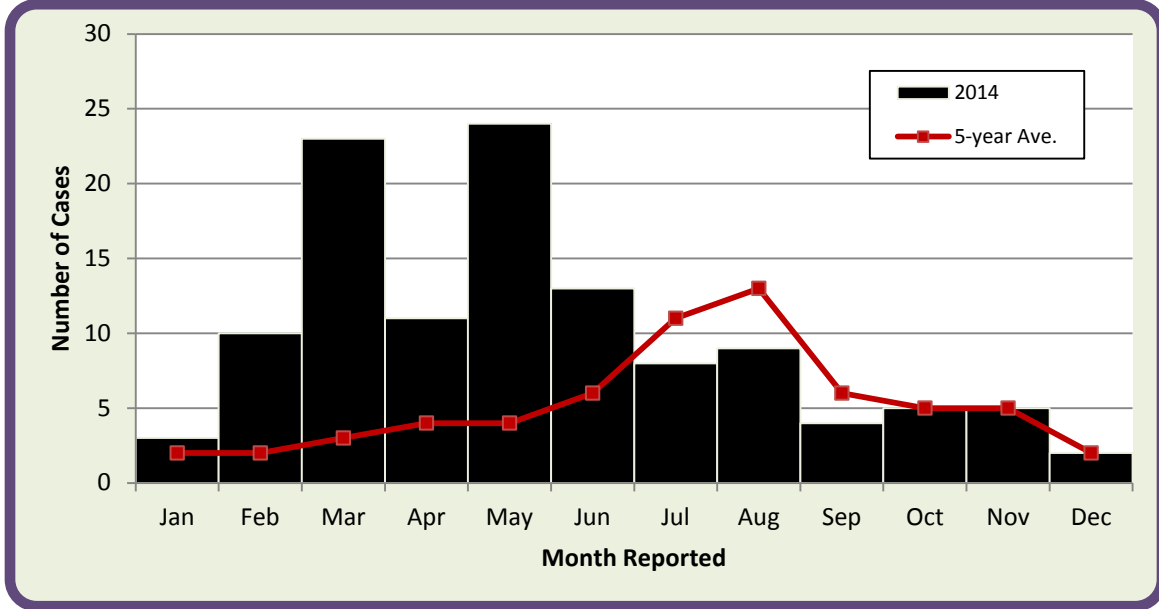
In 2014, a pertussis outbreak was detected and investigated which involved educational facilities and the surrounding community. Control measures were quickly implemented which included isolating infected individuals until completion of appropriate antibiotics or until a 21-day incubation period was complete. Vaccination clinics were set up in the educational facilities to provide a convenient means for students, faculty and community members to receive the Tdap vaccine. Exposed and susceptible individuals were also quarantined until cleared by a medical evaluation. Enhanced surveillance was continued through two incubation periods without any new cases, at which time the outbreak was deemed over.

Incidence of Pertussis by Age Group, Davis County, 2014



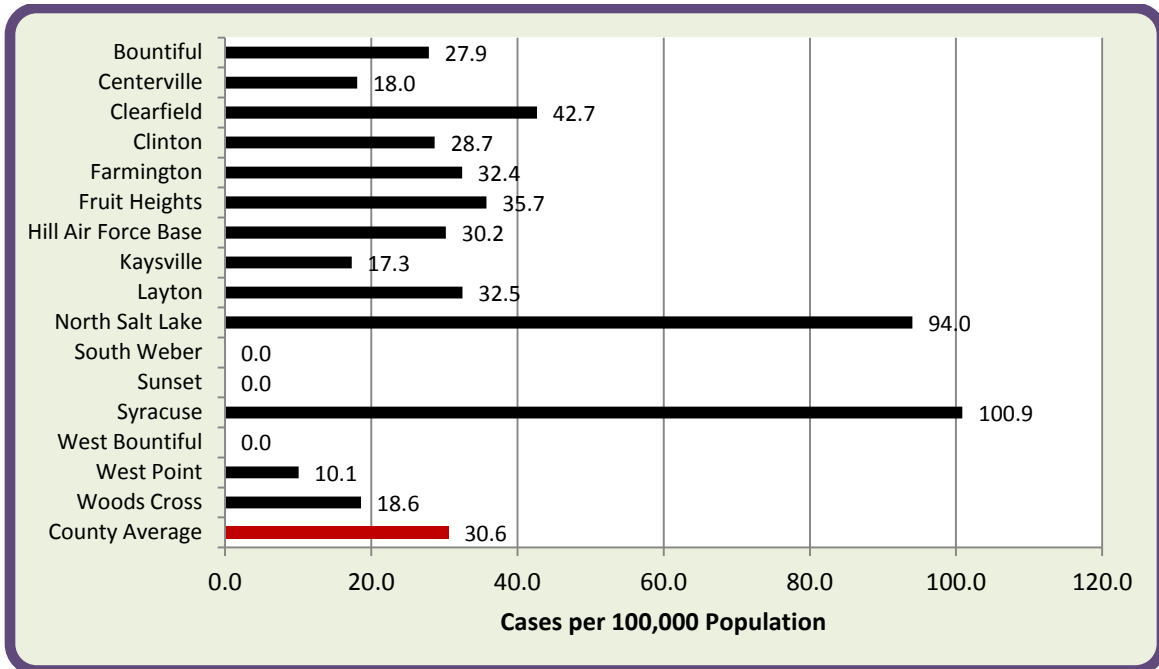
Cases of pertussis began to rise in February and March 2014 and peaked in May. Although the number of cases dropped substantially by the end of the year, the total was still above expected levels. DCHD continues to closely monitor pertussis cases.

Pertussis by Month Reported, Davis County, 2014



In 2014, pertussis cases were reported throughout Davis County. However, the incidence of disease was highest in Syracuse, North Salt Lake, and Clearfield.

Incidence of Pertussis by City, Davis County, 2014



Vectorborne/Zoonotic Diseases

Vectorborne/zoonotic diseases are those diseases transmitted by an animal or insect. Vectorborne/zoonotic diseases do not occur often in Davis County. Some of these diseases, such as malaria and dengue fever, are typically acquired outside of the United States.

In 2014, there were **six** cases of vectorborne/zoonotic diseases reported in Davis County.

Disease	Location of Exposure	Suspected Source of Infection	Number of Cases
Lyme Disease	1 – Pennsylvania 4 – Unknown	Tick bite	5
Spotted Fever Rickettsiosis (i.e. Rocky Mountain Spotted Fever)	Utah	Tick bite	1
Total			6

Five of the cases of vectorborne/zoonotic diseases were female and one was male. Two of the cases were less than 18 years old, while all of the remaining cases were adults.

Vectorborne/zoonotic diseases are rare in Davis County. At least one of the Davis County cases reported in 2014 was acquired outside of Utah.



Rabies

Rabies is a preventable viral disease of mammals most often transmitted through the bite of a rabid animal. The vast majority of rabies cases reported to CDC each year occur in wild animals such as raccoons, skunks, bats, and foxes. Domestic animals account for less than 10% of reported rabies cases, with cats, cattle, and dogs most often infected. In Utah, the majority of cases are reported in bats.

During 2014, there were **no** cases of human rabies and **three** cases of animal rabies reported in Davis County.

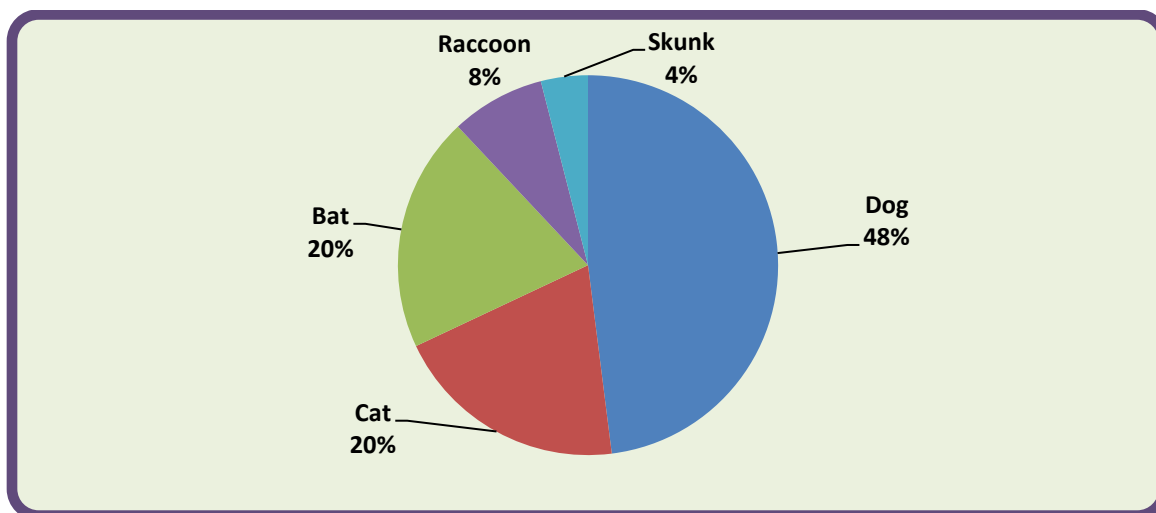
2014 Disease Highlights:

The Communicable Disease and Epidemiology Division evaluated 333 individuals who reported an exposure to an “at-risk” animal in 2014. Each case was evaluated for need of rabies post-exposure prophylaxis (PEP). Those who were recommended PEP were monitored through completion of therapy or until PEP discontinued (either by choice or due to negative test results of the suspect animal). Of those that were recommended PEP, **14** completed, **14** declined, and **one** was lost to follow-up.

During the late spring and summer months, reports of animal bites become more prevalent. Surveillance of rabies-positive animals helps guide the decision-making process. Rabies PEP is available through some hospital emergency rooms. However, individual insurance plans often dictate where prophylaxis must be obtained.

In 2014, the Davis County Environmental Health Division submitted 51 animals for rabies testing. Of these, 36 (71%) involved a human exposure and six (12%) were animal-to-animal exposures. During 2014, **three** animal samples tested positive for rabies including a skunk, myotis bat, and silver hair bat. This is the first time in several years a skunk has tested positive in Utah. Additional testing at Utah Public Health Laboratory determined the skunk was infected with a bat strain. Therefore, the introduction of a new skunk strain into the community was not identified.

Animals Tested for Rabies, Davis County, 2014

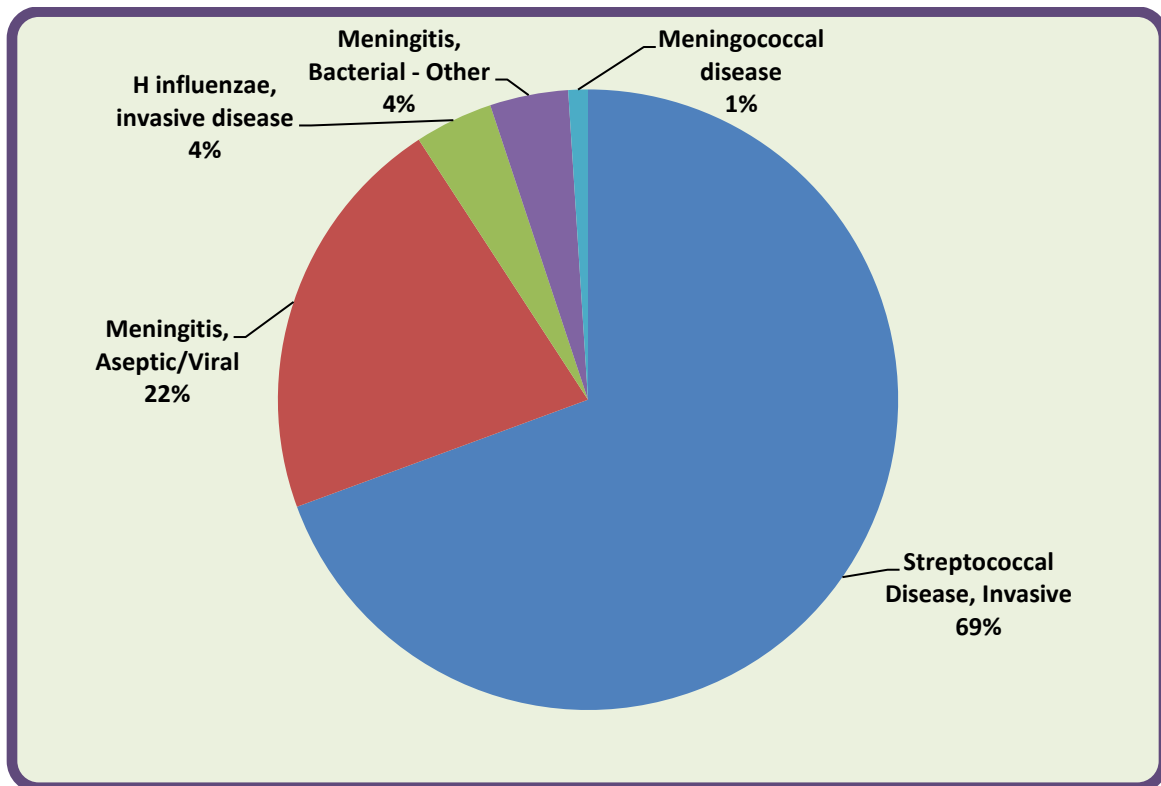


Invasive Diseases

Invasive diseases include infections of the bloodstream as well as meningitis and encephalitis. All cases of meningitis, encephalitis and toxic shock syndrome are reportable to the health department, regardless of the causative organism. In addition, all cases of invasive streptococcal disease (isolation of *Streptococcus* from a normally sterile site) must be reported.

The most common invasive diseases reported in Davis County in 2014 were invasive streptococcal infections. These included Group A *Streptococcus*, Group B *Streptococcus*, Group C & G *Streptococcus*, *Streptococcus pneumoniae*, and other streptococcal infections.

Invasive Diseases, Davis County, 2014



Invasive Streptococcal Infections

The primary invasive streptococcal diseases of public health concern are Group A, Group B and *Streptococcus pneumoniae*.

Group A streptococcal invasive disease manifests as necrotizing fasciitis (NF), streptococcal toxic shock syndrome (STSS), bacteremia, and pneumonia. It is transmitted person-to-person by contact with infectious secretions. Asymptomatic pharyngeal carriage occurs among all age groups, but is most common among children.

Group B streptococcal invasive disease (GBS) in neonates manifests as sepsis, pneumonia and meningitis. Infection in the first week of life is called "early-onset disease." In adults, sepsis and soft tissue infections are most common. Pregnancy-related infections include sepsis and amnionitis. Asymptomatic carriage in gastrointestinal and genital tracts is common and intrapartum transmission via ascending spread from vaginal and/or gastrointestinal GBS colonization occurs. Mode of transmission of disease in non-pregnant adults and older infants (>1 week) is unknown.

Group C streptococcus is typically a zoonotic illness and the organisms can be found as pathogens in domestic animals such as horses, cows, birds, rabbits, and guinea pigs. Laboratories may misidentify them as Group A strep. They can also be found as part of normal human flora. Many people with Group C infection have underlying health problems, but more recent studies have implicated this disease as an emerging human pathogen.

Group G streptococci are normal human flora and individuals infected with this organism usually have underlying health problems, especially cancer.

Streptococcus pneumoniae invasive disease manifests as pneumonia, bacteremia, meningitis, and arthritis. More than 90 serotypes exist, and of the strains causing invasive disease, 88% are serotypes included in the 23-valent polysaccharide vaccine. Before the new pneumococcal conjugate vaccine was introduced in 2001, over 80% of invasive isolates in children <5 years old were those that are included in the 7-valent vaccine.

In 2014, there were **67** cases of invasive streptococcal infections reported among Davis County residents (the 5-year average is 66). The majority of cases were due to strains that do not require an investigation or the implementation of public health control measures (e.g. *S. mutans*, *sanguinis* and *mitis*).

2014 Disease Highlights:

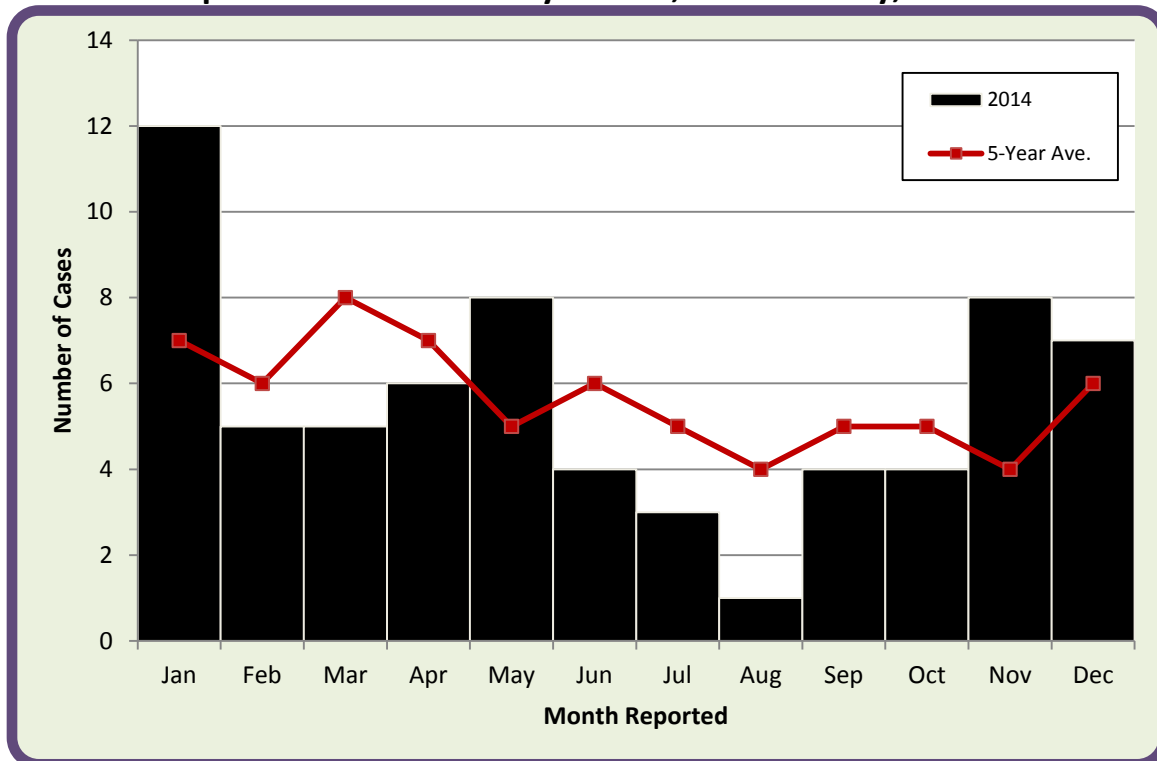
Invasive streptococcal infections tend to cause severe illness. In 2010, over 12% of reported invasive streptococcal infections were fatal. Since then, the fatality rate among streptococcal infections has declined. In 2014, three out of 68 cases were fatal, a case fatality rate of 4.4%.

Types of Invasive Streptococcus Infections, Davis County, 2014

Type	Number of Cases
Group A <i>Streptococcus</i>	12
Group B <i>Streptococcus</i>	10
Other <i>Streptococcus</i> (<i>mitis</i> , <i>viridans</i> , etc...)	27
<i>Streptococcus pneumoniae</i>	18
Total	67

Infection with *Streptococcus pneumoniae* is particularly serious. In 2014, three of the 18 reported *S. pneumoniae* cases were fatal. This organism is the leading cause of vaccine-preventable illness and death in the United States. Pneumococcal pneumonia kills approximately one out of 20 people who are infected. Bacteremia kills roughly one person in five and meningitis about three in ten. There are more than 90 strains of pneumococcal bacteria. Fortunately, there are vaccines available to prevent some infections.

Invasive Streptococcal Infections by Month, Davis County, 2014



Meningococcal

Meningococcal Disease is a severe infection caused by the bacteria *Neisseria meningitidis*. The organism is transmitted via respiratory droplets. Carriers may be asymptomatic or have only mild respiratory symptoms. Risk factors for invasive meningococcal disease include age less than one year, smoking, recent viral respiratory infection, and living in certain close settings such as dormitories.

The current rate of disease in the United States is 1.3 cases per 100,000 population per year. In the United States, serogroups C and Y are the most prevalent, each causing 33% of the reported invasive disease. This disease is most common in winter and spring.

Invasive meningococcal infections have a 7-13% mortality rate. An estimated 10-20% of survivors may suffer from long-term sequelae (including hearing loss, mental deficits, and loss of limbs). Therefore, suspicion of this disease needs to be reported versus waiting for confirmatory results. Davis County has had meningococcal outbreaks in the past, but these outbreaks were contained due to rapid notification, early identification, prompt prophylactic treatment of contacts, and the administration of the meningococcal vaccine.

During 2014, there was **one** case of invasive meningococcal disease reported in Davis County.

2014 Disease Highlights:

One case of invasive meningococcal disease was reported in a young child in 2014. The patient was hospitalized. A significant amount of effort was required to facilitate contact management as the patient had a large immediate and extended family and also attended daycare – expanding the exposed contact index. As a result of implemented control measures, no additional cases were detected.

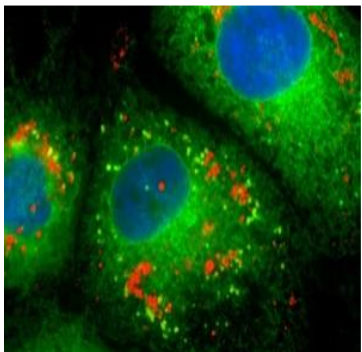
Other Reportable Diseases/Conditions

Diseases that do not fall under a specific identified category will be discussed in this section.

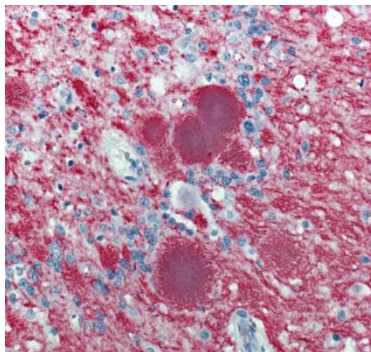
Hepatitis C infections made up the majority of this category, followed by carbapenem-resistant Enterobacteriaceae (CRE), legionellosis, coccidioidomycosis, and Creutzfeldt-Jakob Disease (CJD).

Other Reportable Disease/Conditions, Davis County, 2014

Disease	Number of Cases
Hepatitis C, acute and chronic	189
Carbapenem-Resistant Enterobacteriaceae (<i>Acinetobacter</i>)	7
Legionellosis	4
Coccidioidomycosis	3
Creutzfeldt-Jakob Disease (CJD)	2



Hepatitis C



Creutzfeldt-Jakob Disease (CJD)



Acinetobacter

Carbapenem-Resistant Enterobacteriaceae

The public health problem of antibiotic resistance is not new. However, due to the overuse of antibiotics in humans and animals, the problem is increasing in magnitude and new multidrug-resistant organisms (MDROs) are emerging. Carbapenem-resistant Enterobacteriaceae (CRE) are particularly concerning. Some CRE bacteria have developed resistance to most available antibiotics. CRE infections are very difficult to treat, can spread quickly, and may contribute to death in 40% of patients who become infected. Although these organisms are rare, they are increasingly identified in health care facilities throughout the United States.

To address this issue, UDOH has created a coalition of stakeholders to identify areas where improvement is needed to prevent the spread of MDROs. Areas of focus for the group include:

- Laboratory identification
- Surveillance
- Isolation Signage/Personal Protective Equipment
- Patient Transfer Communication
- Environmental Cleaning

In addition, beginning in 2013, Utah laboratories and health care facilities are now required to report the following CREs to the state or local health department:

- *Acinetobacter* species with resistance or intermediate resistance to carbapenem (meropenem and imipenem) from any site
- *Escherichia coli* with resistance or intermediate resistance to carbapenem (meropenem, ertapenem, and imipenem) from any site
- *Klebsiella* species with resistance or intermediate resistance to carbapenem (meropenem, ertapenem, and imipenem) from any site

It is hoped that better surveillance of these organisms will facilitate a more clear understanding of where they are occurring and how to prevent their spread within and between facilities.

2014 Disease Highlights:

A total of **seven** CREs were reported to the Davis County Health Department during the year. Only two of these patients were at a Davis County health care facility when they developed their respective infection. Appropriate control measures to prevent spread were implemented at each facility.

Creutzfeldt-Jakob Disease (CJD)

Prion diseases or transmissible spongiform encephalopathies (TSEs) are a family of rare progressive neurodegenerative disorders that affect both humans and animals. They are distinguished by long incubation periods, characteristic spongiform changes in the brain associated with neuronal loss, and failure to induce inflammatory response.

The causative agent of TSEs is believed to be a prion. A prion is an abnormal, transmissible agent that is able to induce abnormal folding of normal cellular prion proteins in the brain, leading to brain damage and the characteristic signs and symptoms of the disease. Prion diseases usually progress rapidly and are always fatal.

Classic CJD is a human prion disease. It is a neurodegenerative disorder with characteristic clinical and diagnostic features. Infection with this disease leads to death usually within 1 year of onset of illness.

Classic CJD has been recognized since the early 1920s. The most common form of classic CJD is believed to occur sporadically, caused by the spontaneous transformation of normal prion proteins into abnormal prions. This sporadic disease occurs worldwide, including the United States, at a rate of approximately one case per 1 million population per year, although rates of up to two cases per million are not unusual. The risk of CJD increases with age, and in persons >50 years of age. The annual rate is approximately 3.4 cases per million. In recent years, the United States has reported fewer than 300 cases of CJD a year. Whereas the majority of cases of CJD (about 85%) occur as sporadic disease, a smaller proportion of patients (5-15%) develop CJD because of inherited mutations of the prion protein gene.

Appropriate post mortem care is critical with any suspect case of CJD. A system is in place to assist family members in obtaining appropriate testing, which includes an autopsy. These services are provided free of charge. An autopsy is required in order to confirm the diagnosis of CJD. Specimens collected during the autopsy are submitted to the National Prion Disease Pathology Surveillance Center (NPDPS) for disease confirmation. Cases of prion disease (e.g. CJD) reported to the NPDPS are examined individually to aid in the timely detection of new or atypical cases and establish more accurate classifications of prion diseases.

CJD is found everywhere in the world, but it is very rare. Only one in a million people each year will get this disease. Since 1980, 35 Utahns have died of CJD. This number is not higher than expected. Utah averages two cases of CJD a year.

2014 Disease Highlights:

Davis County investigated **two** suspect cases of sporadic Creutzfeldt-Jakob disease (CJD) in 2014. One case had preliminary positive test results consistent with CJD. However, post-mortem testing could not be performed due to cremation.

Ebola (Ebola Hemorrhagic Fever)

Ebola, previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the Ebola virus strains. Ebola can cause disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees).

Ebola is caused by infection with a virus of the family *Filoviridae*, genus *Ebolavirus*. There are five identified Ebola virus species, four of which are known to cause disease in humans: Ebola virus (*Zaire ebolavirus*); Sudan virus (*Sudan ebolavirus*); Tai Forest virus (*Tai Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*); and Bundibugyo virus (*Bundibugyo ebolavirus*). The fifth, Reston virus (*Reston ebolavirus*), has caused disease in nonhuman primates, but not in humans.

Ebola viruses are found in several African countries. Ebola was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo. Since then, outbreaks have appeared sporadically in Africa. The natural reservoir host of Ebola virus remains unknown. However, on the basis of evidence and the nature of similar viruses, researchers believe that the virus is animal-borne and that bats are the most likely reservoir. Four of the five virus strains occur in an animal host native to Africa.

Symptoms include: fever, headache, joint and muscle aches, weakness, diarrhea, vomiting, stomach pain, lack of appetite, and abnormal bleeding. Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola virus, although 8-10 days is most common.

Ebola is transmitted through direct contact with the blood or bodily fluids of an infected symptomatic person or through exposure to objects (such as needles) that have been contaminated with infected secretions. Individuals who are not symptomatic are not contagious. In order for the virus to be transmitted, an individual would have to have direct contact with an individual who is experiencing symptoms. Ebola virus is not spread through the air or through contaminated food or water.

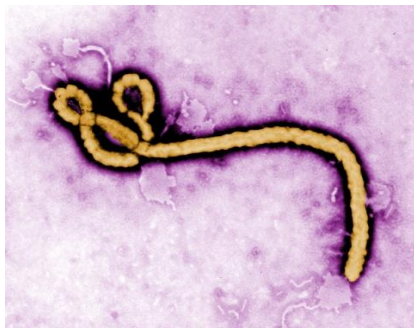
In outbreak settings, Ebola virus is typically first spread to humans after contact with infected wildlife and is then spread person-to-person through direct contact with bodily fluids such as, but not limited to, blood, urine, sweat, semen, and breast milk. Patients can transmit the virus while febrile and through later stages of disease, as well as after death, when persons touch the body during funeral preparations.

2014 Disease Highlights:

The 2014 Ebola epidemic is the largest in history, affecting multiple countries in West Africa. Two imported cases, including one death, and two locally acquired cases in healthcare workers have been reported in the United States. CDC and public health partners are taking precautions to prevent the further spread of Ebola within the United States.

Davis County Health Department dedicated numerous hours to planning and preparing for Ebola. The likelihood of having another human case in the United States has drastically declined with the implementation of Ebola Monitoring Events – which entails a personal assessment at the departing airport for individuals traveling from West Africa to the United States. Additional assessment stations were set up in several U.S. airports that frequently receive passengers from West Africa. Upon arrival in the U.S., travelers are once again evaluated and given a C.A.R.E kit (Check and Report Ebola) to use for the next 21 days. This care kit contains a thermometer with instructions, temperature/symptom log, important phone numbers, and visual aids on Ebola symptoms. Public health is notified by CDC of the traveler and a monitoring system is set-up, which involves daily contact with the recent traveler to assess for Ebola symptoms. The type of exposure the individual may have had in West Africa determines the conditions of the monitoring event. This monitoring system was created to identify suspect Ebola cases at the early stages of disease and to get individuals into appropriate care before exposing family, friends, and the community. Davis County engaged in monitoring events during 2014.

CDC has put together Ebola Response Teams that consist of public health and hospital infection control experts—including medical officers, epidemiologists, infection control specialists, and analysts—based at CDC’s headquarters in Atlanta who can be mobilized to go anywhere in the United States within a few hours after laboratory confirmation of Ebola infection. Updated guidance and new prevention/control strategies continue to be developed and incorporated into public health response efforts. Davis County is working closely with the medical community and emergency medical system as the disease outbreak in Africa persists. For the first time since June 29, 2014, there have been fewer than 100 new confirmed cases reported in a week in Guinea, Liberia, and Sierra Leone.



<p>Facts <i>about</i> Ebola in the U.S.</p>	<p>You CAN'T get Ebola through AIR</p>
<p>You CAN'T get Ebola through WATER</p>	<p>You CAN'T get Ebola through FOOD grown or legally purchased in the U.S.</p>



Hansen's Disease (Leprosy)

Hansen's Disease, also known as Leprosy, is a complex, chronic bacterial infection caused by *Mycobacterium leprae*. Although the mode of transmission is not fully understood, the most commonly accepted theory is that the disease is transmitted person-to-person by way of the respiratory tract. It is not highly contagious and 95 percent of the population has a natural immunity. Those at greatest risk of infection are the family members of someone with untreated disease, either because they are genetically susceptible and/or they have prolonged contact with the infected individual.

Hansen's Disease is rare in the United States. The National Hansen's Disease Program (NHDP) in Baton Rouge, Louisiana, is the only institution in the United States exclusively devoted to Hansen's Disease. It functions as a referral and consulting center, and also provides diagnostic services and medications at no charge. There are approximately 6,500 cases on the NHDP Registry, which includes all cases reported since the registry began and are still living. Between 150 and 200 new U.S. cases are reported to the Registry annually, with the largest number from California, Florida, Hawaii, Louisiana, New York, Texas and Puerto Rico. Most new cases in the United States are immigrants, especially those with Southeast Asian and Hispanic origins.

Classification of Hansen's Disease is complex, but overall there are two forms: tuberculoid, which is more limited, and lepromatous, which is more generalized and severe. Proper classification requires a skin biopsy. Because it is an infection of the skin and nerves, loss of feeling in the hands or feet may be the first signs, along with pale or slightly red areas or a rash on the trunk or extremities. It is often associated with a decrease in light touch sensation. It sometimes affects other tissues, such as the eyes, lymph nodes, muscles and internal organs, but always affects peripheral nerves.

Hansen's Disease responds well to antibiotics and becomes non-infectious within a few days. If diagnosed and treated early, it does not cause disability. The NHDP recommends treatment for one or two years, depending on the form of disease.

During 2014, there was **one** case of Hansen's Disease reported in Davis County.

2014 Disease Highlights:

A case of Hansen's Disease was reported to Davis County in 2014. The infection was acquired outside of the country, but symptoms were manifested in the U.S. Davis County Health Department worked closely with the Utah Department of Health and the NHDP to provide appropriate diagnosis and care. This case is the lepromatous form and will require at least one year of daily therapy.

Hepatitis C

Hepatitis C is a disease caused by a virus that infects the liver. Over time it can cause liver damage including cirrhosis, liver failure and cancer. Approximately 15-25% of those infected with HCV will recover from the infection. The remaining ~80% develop chronic infection. Each year 8,000-10,000 people die from the complications of liver disease caused by Hepatitis C.

Most of those who develop chronic HCV infection remain asymptomatic for many years. Some experience a range of symptoms including fatigue, headache, joint aches, muscle aches, nausea, jaundice, loss of appetite and abdominal pain.

HCV is a bloodborne pathogen that is predominantly spread by exposure to contaminated blood or blood products. Currently, the most prevalent mode of transmission is sharing needles or syringes to inject drugs. Blood transfusions pose an extremely limited risk now, but for patients who received a blood transfusion prior to June 1992, the risk of infection was approximately 1.5% per transfusion recipient. Sexual transmission of HCV can occur, but does not appear to be an efficient mode of transmission. However, recent studies indicate that persons with multiple partners have a higher incidence of transmission. Other potential risks for transmission include long-term hemodialysis, sharing straws for intranasal cocaine use, mother-to-infant transmission, occupational blood exposure, various medical procedures (including dental), and tattooing or body piercing with non-sterile equipment. HCV is not spread through casual contact, kissing, sneezing, hugging, sharing glasses/utensils, or from breast milk.

In 2014, Davis County received reports on **189** cases of HCV – which is no change from 2013 (189).

2014 Disease Highlights:

Hepatitis C is typically reported as a positive screening test for HCV antibodies. Investigation of this disease is focused on determining whether the case is acute, chronic, or a false-positive test. Additional confirmatory testing is necessary. Several reports of Hepatitis C come from blood donation centers, which have limited contact information on the person donating. Therefore, investigation of the disease is difficult. Of those investigated, the most prevalent risk factor identified was injecting drugs, currently or in the past. Most infected individuals were unaware of their infection. Treatment for HCV infection is becoming more available with a greater success rate. Unfortunately, there is still no vaccine for Hepatitis C.

Davis County received a grant in 2012 which facilitated screening in the incarcerated population. The grant was completed in December 2014. A total of 122 incarcerated individuals tested positive for Hepatitis C through grant activities in 2014. Inmates were provided counseling, disease education and linked to care once they were released from the facility. An information packet was made available containing educational materials, prophylactic supplies, and a donated Deseret Industries \$20.00 voucher.

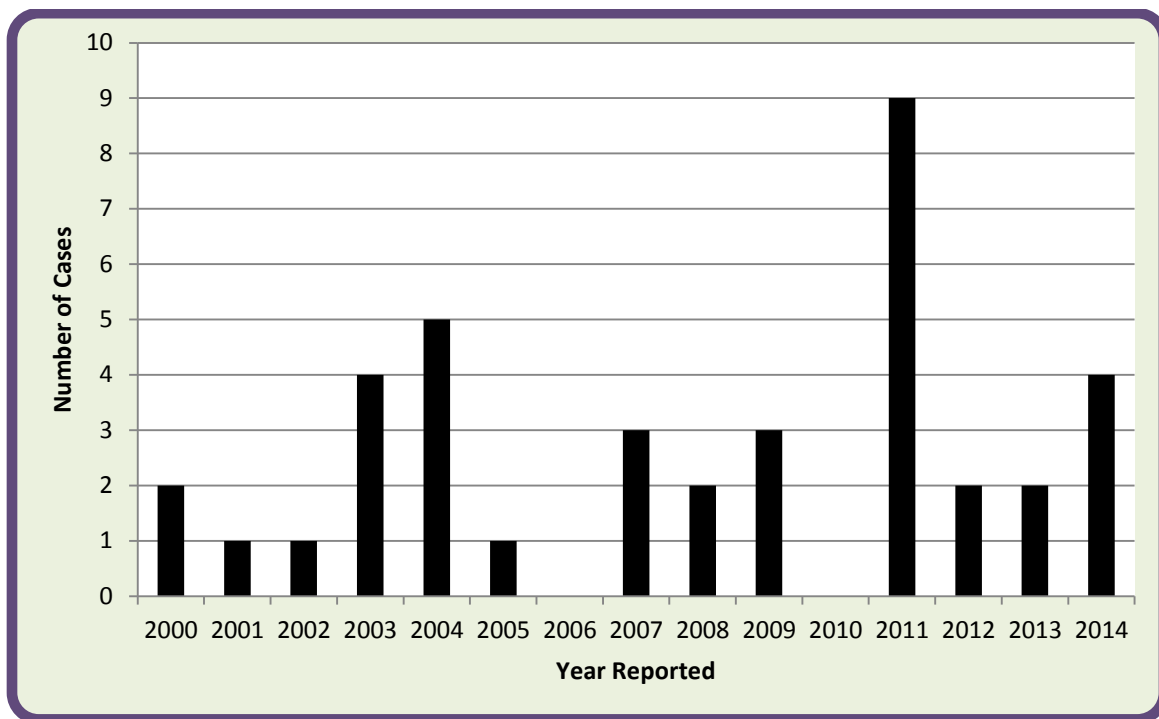
Legionellosis

Legionellosis is a bacterial infection caused by *Legionella pneumophila*. The disease is transmitted through the air from a soil or water source. All studies to date have shown that the organism cannot be spread from person-to-person. Outbreaks occur following the exposure of many individuals to a common source of *Legionella pneumophila* bacteria in the environment.

An estimated 8,000-18,000 cases occur each year in the United States, but only a fraction of these are reported. Most legionellosis cases are sporadic; 23% are nosocomial (hospital acquired) and 10%-20% can be linked to outbreaks.

During 2014, there were **four** cases of legionellosis reported in Davis County.

Legionellosis Cases, Davis County, 2000-2014



2014 Disease Highlights:

Davis County receives an average of one to two cases of legionellosis each year. It is important for public health to identify a source of the infection before an outbreak occurs. Often, the source remains unknown. Aerosolizing of water, such as showers, humidifiers, swamp coolers, and spas, provide a good mechanism for transmission. Healthy individuals, when exposed, typically do not develop disease. However, those who are immunocompromised are at higher risk. Two of the cases reported in Davis County in 2014 had pre-existing medical conditions that made them more susceptible. The other confirmed cases both acquired their infections out-of-state. Fortunately, no cases were fatal.

Middle East Respiratory Syndrome (MERS)

Middle East Respiratory Syndrome (MERS) is viral respiratory illness first reported in Saudi Arabia in 2012. It is caused by a coronavirus called MERS-CoV. Most people who have been confirmed to have MERS infection developed severe acute respiratory illness. They had fever, cough, and shortness of breath. About 30% of people confirmed to have MERS infection have died.

To date, all MERS cases have been linked to countries in and near the Arabian Peninsula. This virus has spread from ill people to others through close contact, such as caring for or living with an infected person. However, there is no evidence of sustained spreading in community settings.

It still remains unknown where the virus originated. However, it likely came from an animal source. In addition to humans, MERS has been found in camels in Qatar, Oman, Egypt and Saudi Arabia, and a bat in Saudi Arabia. Camels in several other countries have also tested positive for antibodies to MERS, indicating that the camels were previously infected with MERS or a closely related virus. Humans may have become infected after contact with camels, although more information is needed to determine the possible role that camels, bats, and other animals play in the transmission of MERS.

During 2014, **no** cases of MERS were reported to Davis County. However, Davis County investigated four suspect cases. All four cases were ruled out.

2014 Disease Highlights:

In May 2014, CDC confirmed two imported cases of Middle East Respiratory Syndrome (MERS) in the United States (Florida and Indiana). Both individuals were healthcare providers who lived and worked in Saudi Arabia prior to returning to the U.S. Davis County was notified of two residents who traveled on the same plane as one of the confirmed cases. Both residents were quarantined until further testing and evaluation could be performed. The testing for MERS was negative and the two individuals were released from quarantine. Four additional residents were reported to Davis County as suspect MERS. All four individuals had recently traveled from the Middle East and developed symptoms consistent with MERS infection upon returning to the United States. These residents were immediately isolated and close contacts evaluated for signs and symptoms. Testing was performed on some of the cases – which were negative. All four cases were eventually ruled out.

***Staphylococcus aureus* with Resistance (VRSA) or Intermediate Resistance to Vancomycin (VISA)**

VISA and VRSA are specific types of antimicrobial-resistant staph bacteria. While most staph bacteria are susceptible to the antimicrobial agent vancomycin, some have developed resistance. VISA and VRSA cannot be successfully treated with vancomycin because these organisms are no longer susceptible to vancomycin. To date, all VISA and VRSA isolates have been susceptible to other Food and Drug Administration (FDA) approved drugs. There is concern, however, that the possibility of an extremely-resistant bacteria could emerge from a case of VISA/VRSA.

VISA and VRSA infections are extremely rare. To date, there have been 16 cases of VISA and six cases of VRSA reported in the United States.

During 2014, there was **one** case of VISA reported in Davis County.

2014 Disease Highlights:

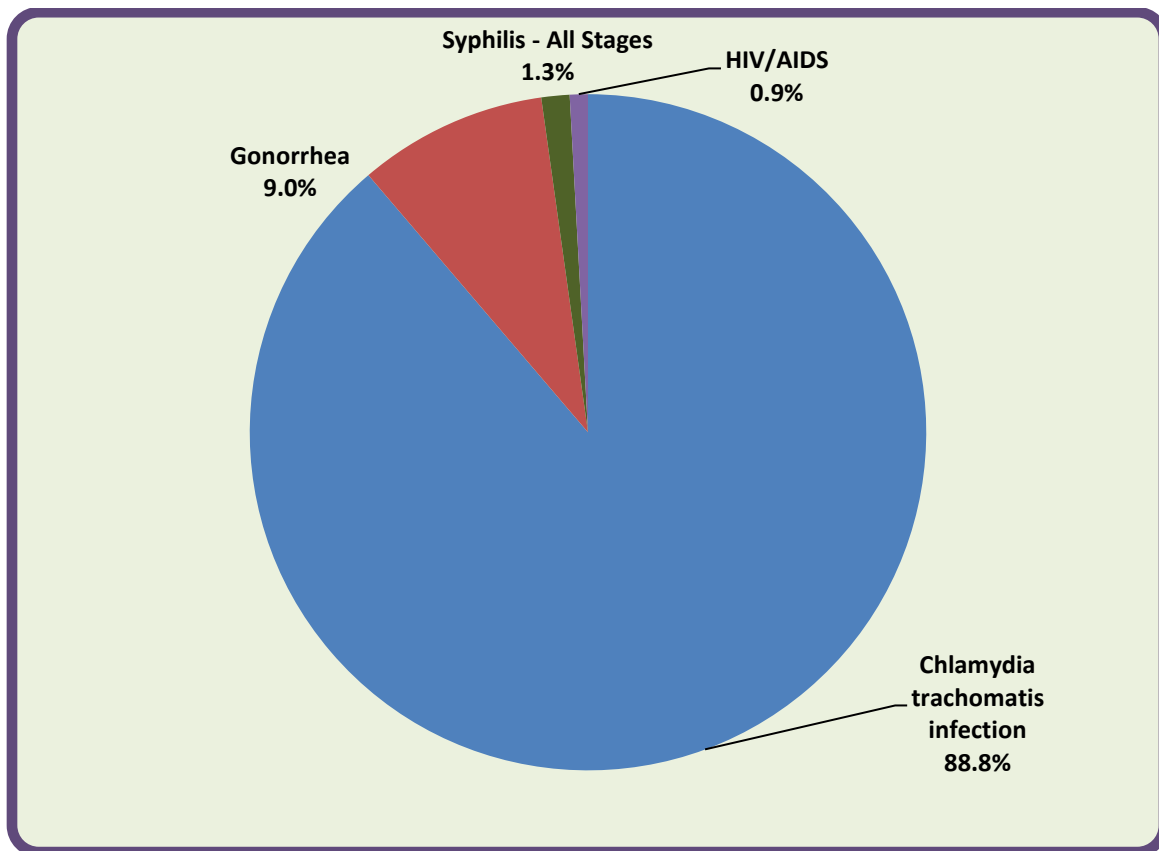
Davis County Health Department investigated one case of VISA during 2014. The patient had a significant health history and had previously had cultures reporting *Staphylococcus aureus* with resistance to methicillin (MRSA). The patient was not residing in a Davis County facility when the infection began. However, the patient was admitted to several hospitals after developing Methicillin-resistant *Staphylococcus aureus* (MRSA) sepsis, which progressed to intermediate resistance to vancomycin (VISA). The involved facilities were aware of the diagnosis and implemented appropriate control measures. No new cases were identified.

Sexually Transmitted Diseases

Sexually transmitted diseases are caused by bacteria, viruses, and other organisms transmitted from one person to another through sexual activity. Bacterial STDs such as chlamydia, gonorrhea, and syphilis are curable – using appropriate antibiotic therapy. However, permanent damage may occur (e.g. pelvic inflammatory disease, sterility), especially if treatment is delayed. Viral STDs such as herpes simplex virus (HSV) and human immunodeficiency virus (HIV) are not curable, but medication is available to improve quality of life by lessening the symptoms. Human papillomavirus (HPV) and Hepatitis B can be treated and frequently cured; some individuals are able to clear the virus themselves. Complications from STDs range from mild/moderate illness to infertility, chronic pain, cancer, and even death. Less invasive testing techniques (e.g. urine testing) have made chlamydia and gonorrhea testing more acceptable and convenient.

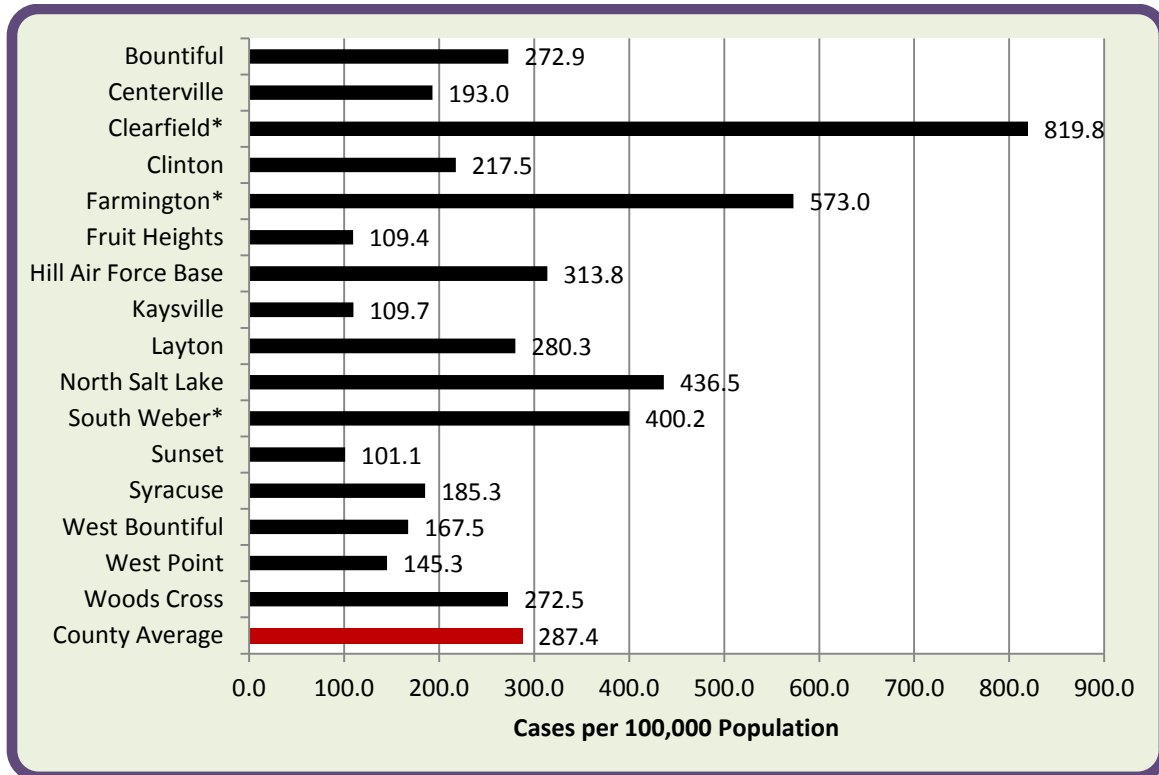
Sexually transmitted diseases reported in Davis County during 2014 include chlamydia, gonorrhea, syphilis, and HIV/AIDS. Chlamydia was the most commonly reported STD with **923** cases, followed by gonorrhea with **94** cases, syphilis with **14** cases, and HIV/AIDS with **nine** cases.

Sexually Transmitted Diseases, Davis County, 2014



Sexually transmitted diseases occurred among residents of every city in Davis County. The average rate in the county was **287.4** cases per 100,000 residents.

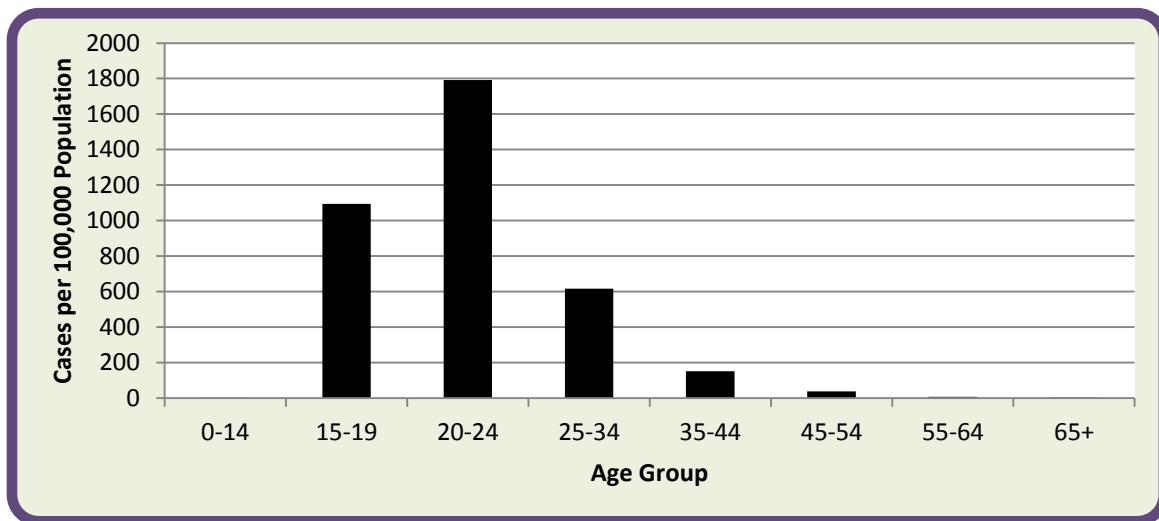
Incidence of all STDs by City, Davis County, 2014



*These cities are impacted by temporary residential establishments (i.e. federal job corps and correctional facilities).

Sexually transmitted diseases were most often reported among women (59.7%) and among 20-24 year olds.

Incidence of all STDs by Age Group, Davis County, 2014



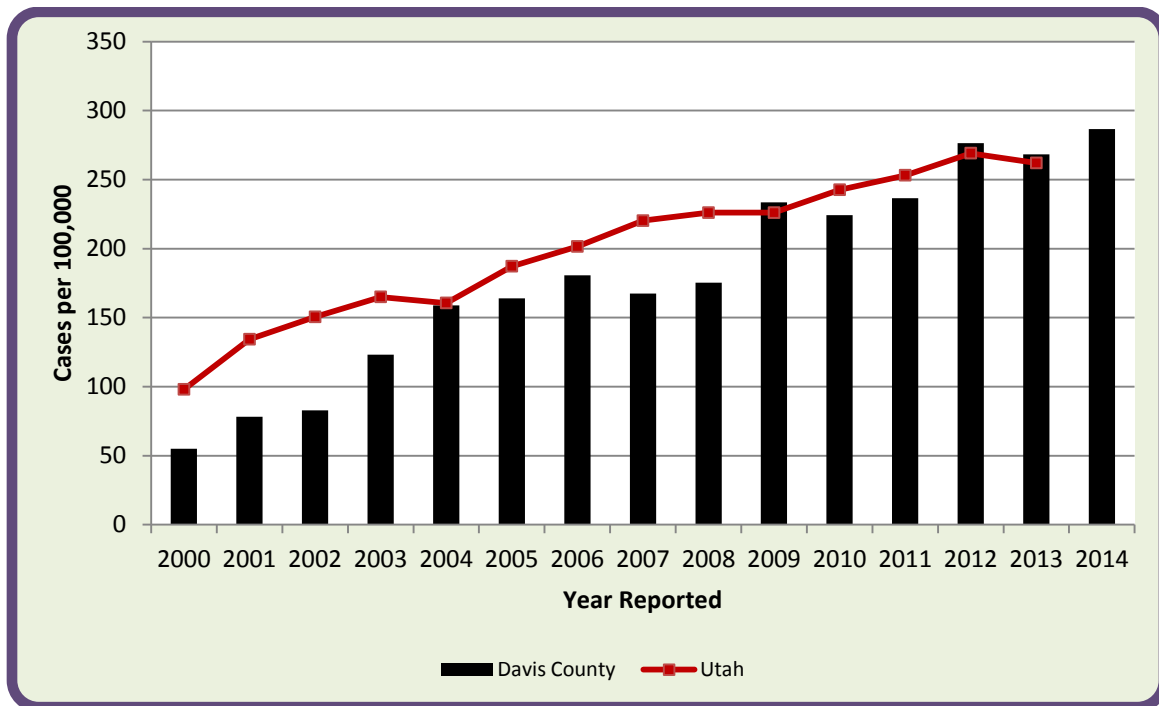
Chlamydia

Chlamydia is a sexually transmitted disease caused by the bacteria *Chlamydia trachomatis*. Chlamydia is one of the most common STDs reported in the United States. The majority of chlamydia infections are asymptomatic. Approximately 75% of females and 50% of males infected with chlamydia do not have obvious symptoms. Serious complications include chronic pain and sterility in both males and females.

Chlamydia and gonorrhea rates have been increasing for the past several years. This is partially due to increased screening of high-risk individuals.

During 2014, there were **923** cases of chlamydia reported in Davis County, a 9.0% increase from the 847 cases reported in 2013.

Incidence of Chlamydia, Davis County & Utah, 2000-2014



2014 Disease Highlights:

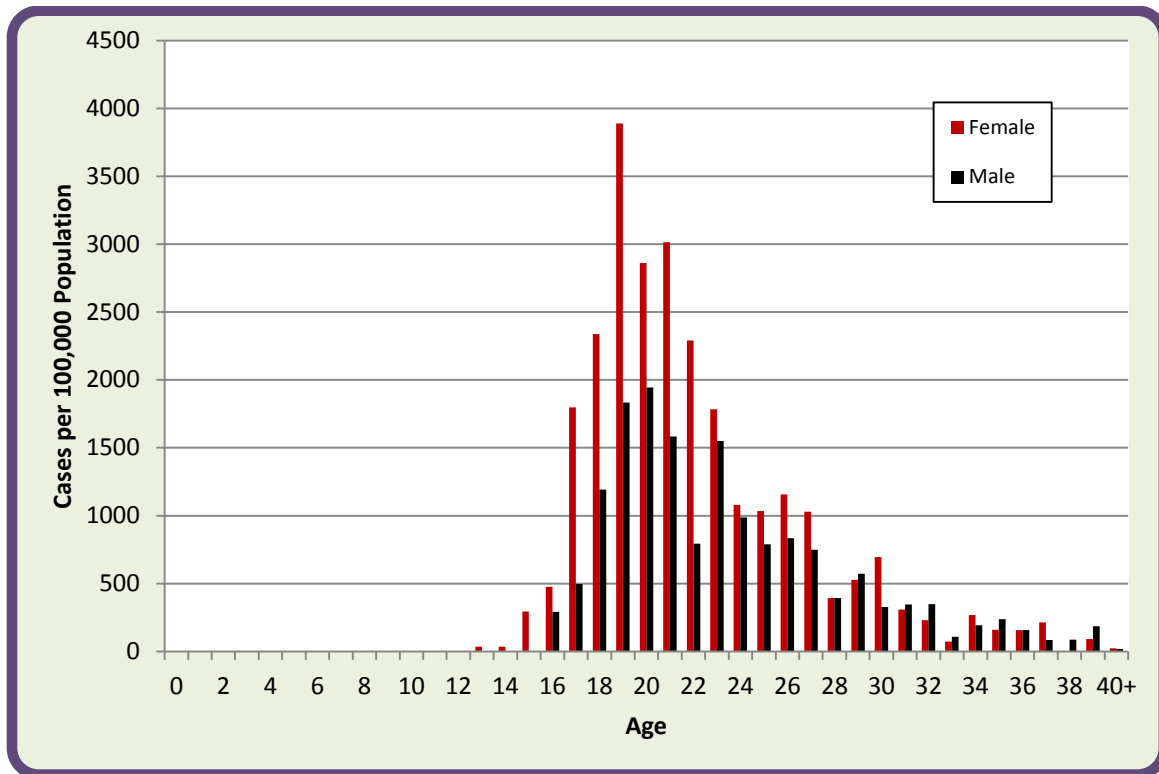
The largest disease burden in Davis County continues to be chlamydia infections. Davis County data shows a steady increase in cases over the past several years. In 2014, there was a 9.0% increase in the number of cases reported. Most concerning to public health is the age group most commonly affected (16-24 year olds). During disease investigation interviews, a number of high-risk behaviors were identified including early initiation of sexual activity, multiple sex partners, unprotected sex with anonymous partners, using drugs/alcohol while engaging in sexual activities, group sex and anal intercourse.

Those infected with chlamydia are frequently asymptomatic. Females are often diagnosed during routine medical visits. Their male partners are typically diagnosed following contact investigations. It is the goal of the health department to locate partners, offer free testing and treatment, provide disease education, and assist in the development of a risk-reduction plan. Re-infections occur when appropriately treated infected individuals engage in sexual activity with their untreated partners.

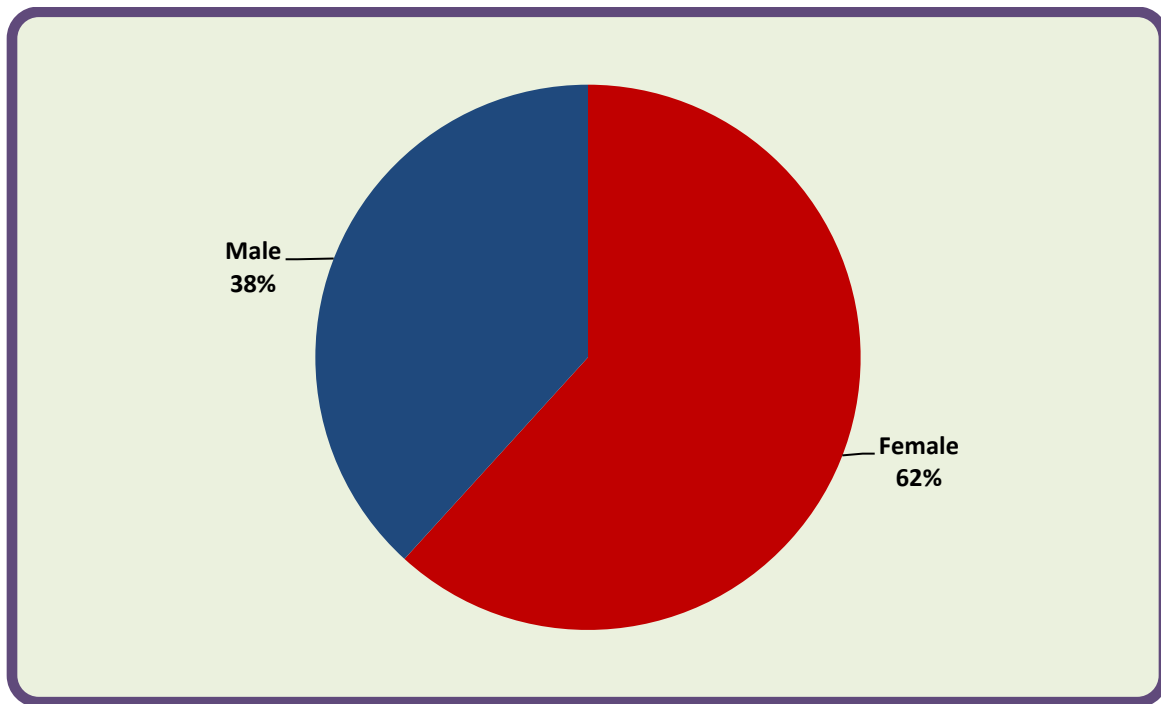
Because the majority of infected individuals have no symptoms of an STD, it is important for public health to encourage the medical community to routinely test sexually active patients, especially those under the age of 25. Efforts continued in 2014 to educate medical providers on the 2010 STD treatment guidelines (the most current version) and increase awareness of STD disease trends. New STD treatment guidelines are scheduled to be released this upcoming year. Davis County Health Department will notify providers when new guidelines are available and will highlight any major changes.

Communicable disease and epidemiology staff participate in annual trainings to enhance their knowledge base and counseling skills to identify and educate those infected with or exposed to sexually transmitted diseases.

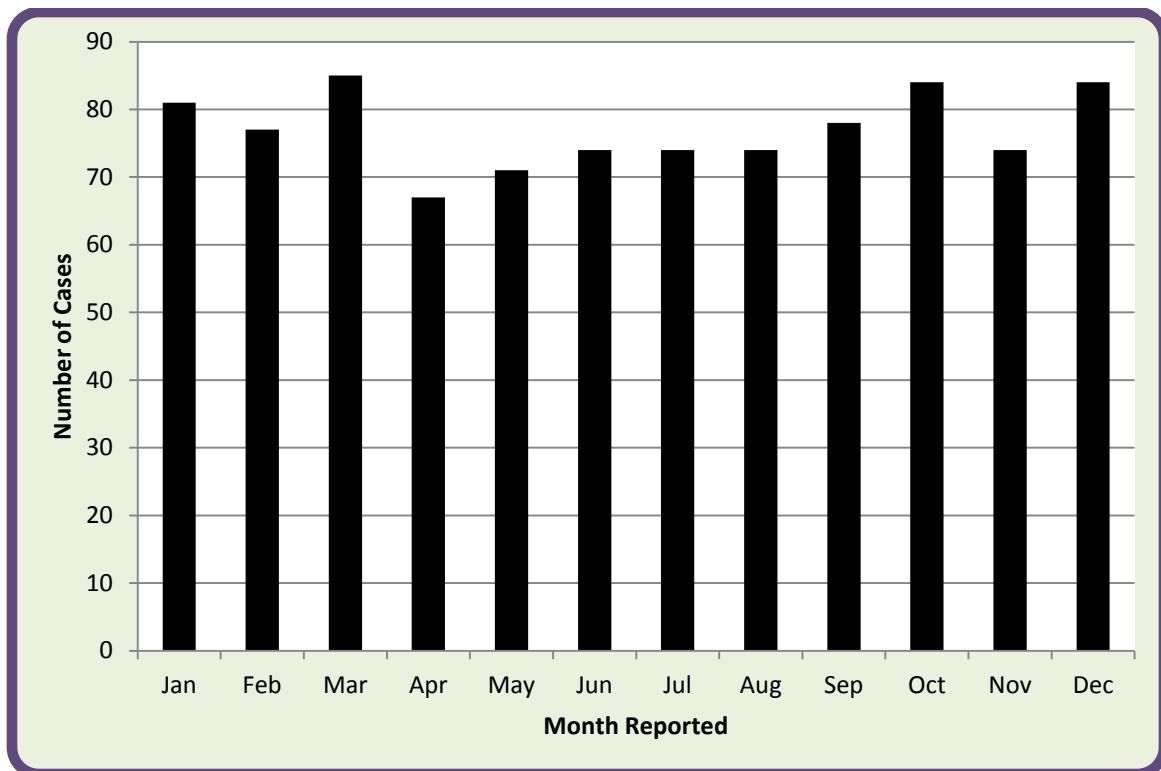
Incidence of Chlamydia by Age and Gender, Davis County, 2014



Chlamydia by Gender, Davis County, 2014



Chlamydia by Month Reported, Davis County, 2014

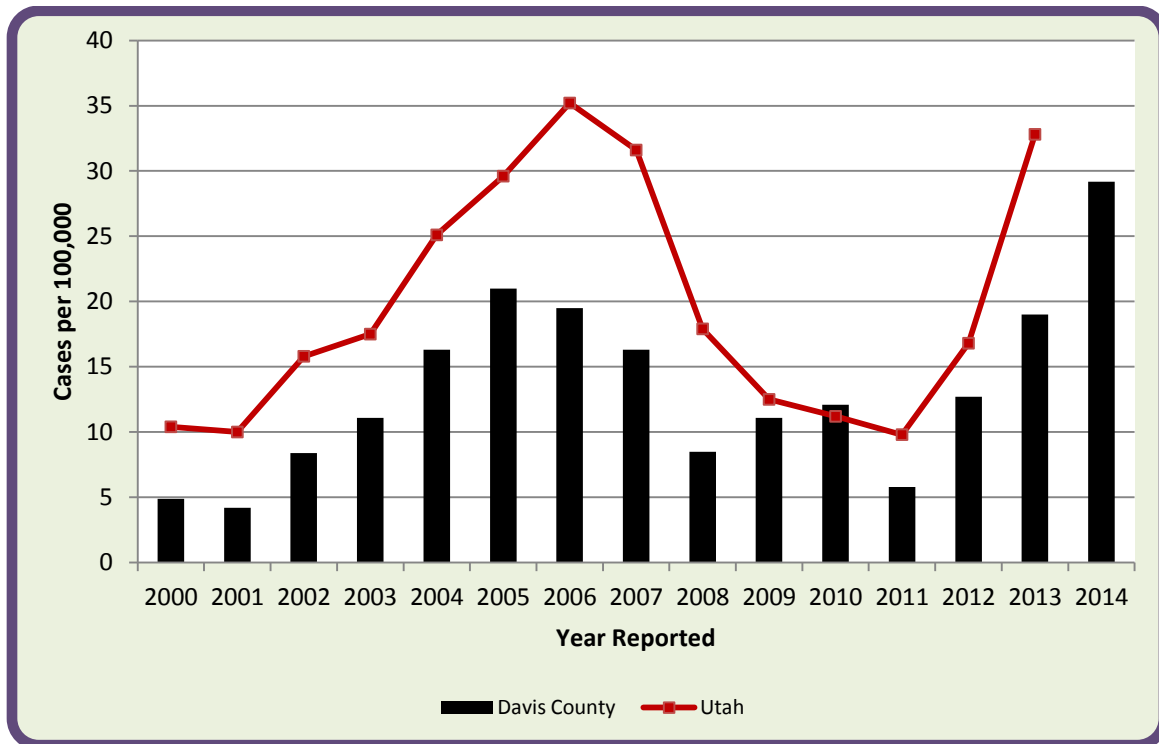


Gonorrhea

Gonorrhea is a sexually transmitted disease caused by the bacteria *Neisseria gonorrhoeae*. Gonorrhea infections are often asymptomatic in women, and sometimes in men. If left untreated, gonorrhea may result in serious complications including chronic pain and infertility/sterility in both males and females.

During 2014, there were **94** cases of gonorrhea reported in Davis County, a 57% increase from the 60 cases reported during 2013.

Gonorrhea Rates by Year, Davis County & Utah, 2000-2014



2014 Disease Highlights:

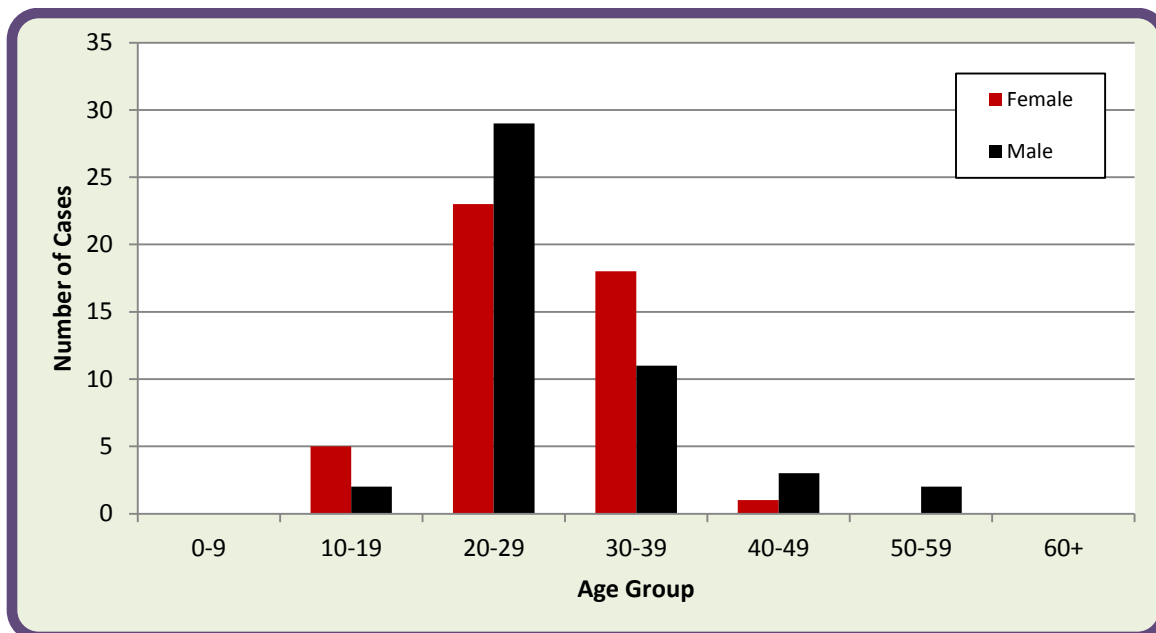
In 2014, Davis County noted a 57% increase in gonorrhea cases from 2013. Like chlamydia, gonorrhea tends to be an asymptomatic infection. Treatment guidelines recommend treating all gonorrhea cases for chlamydia as well, regardless of chlamydia test results. The most frequently used laboratory tests involve a urine sample screened for both gonorrhea and chlamydia. This less-invasive testing process is more appealing to patients and may encourage sexually active individuals to seek testing. Unfortunately, with the increasing trend of anal/oral intercourse, some STDs will be missed by exclusively using the urine test. Medical providers are encouraged to include rectal/ oral swabs in an STD screening for patients that engage in anal and oral intercourse.

In 2014, a workgroup was created in an attempt to identify reasons for the continual increase in cases of gonorrhea. The workgroup developed a survey that was piloted for six months through three local health departments – including Davis County. This survey was incorporated into the established disease investigation process. The data obtained through this survey will be used to guide program activities in 2015. Results from the survey indicate that in Davis County:

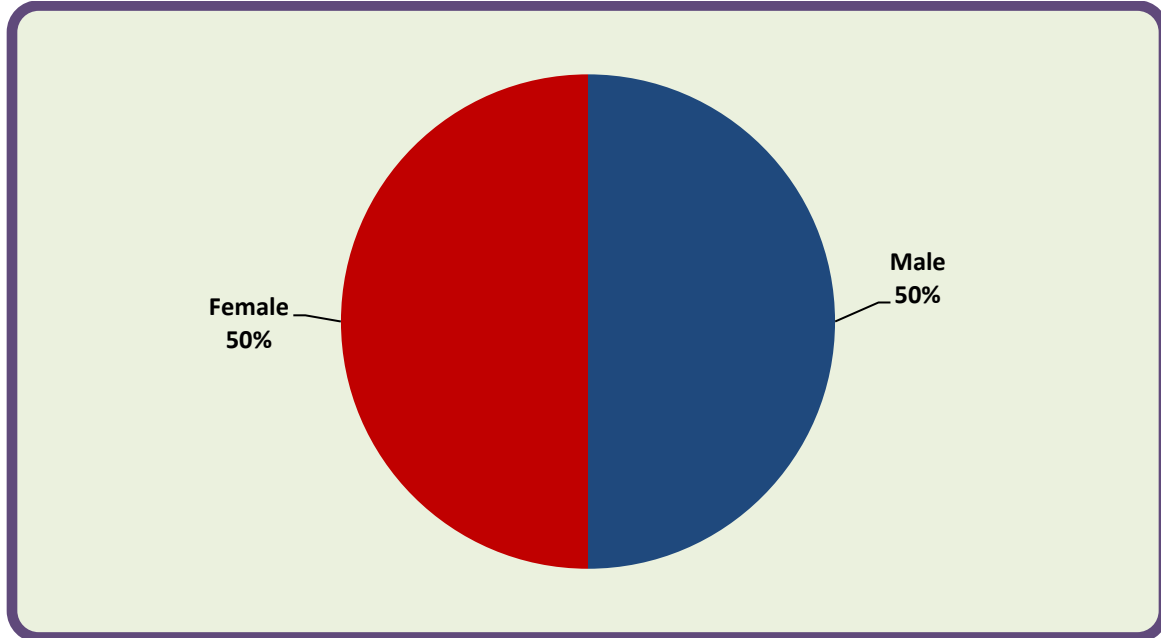
- Males (82.6%) were more likely than females (51.4%) to experience symptoms.
- Males (59.4%) were more likely than females (26.6%) to have casual sex.
- Males (70.6%) were more likely than females (55.4%) to state using drugs and/or alcohol within the last 3 months.
- Females (53.8%) were more likely than males (25.0%) to state being incarcerated or having a sexual partner who was incarcerated during the past 12 months.
- Females (25.0%) were more likely than males (5.9%) to identify themselves as students.

New guidance from CDC recommends a combination therapy of ceftriaxone (Rocephin) and azithromycin or doxycycline to be given on the same day. The Communicable Disease and Epidemiology Division continues to update and educate providers on this important change in guidelines.

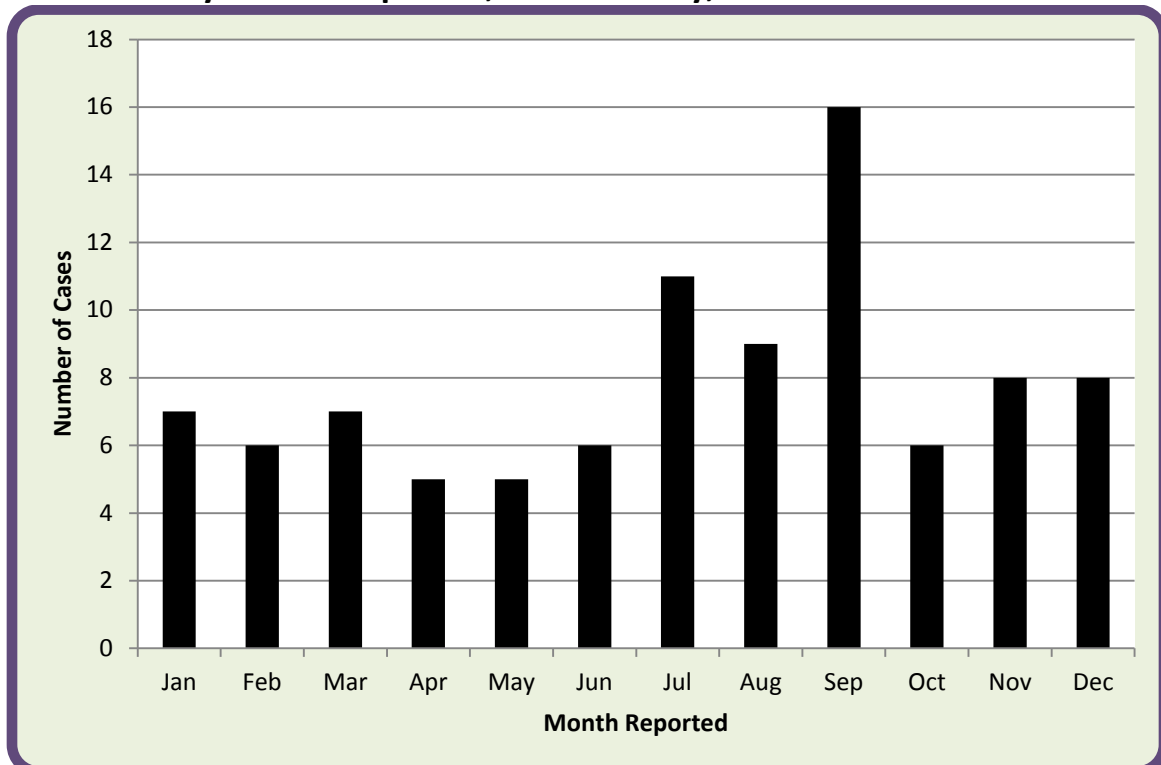
Gonorrhea by Age and Gender, Davis County, 2014



Gonorrhea by Gender, Davis County, 2014



Gonorrhea by Month Reported, Davis County, 2014



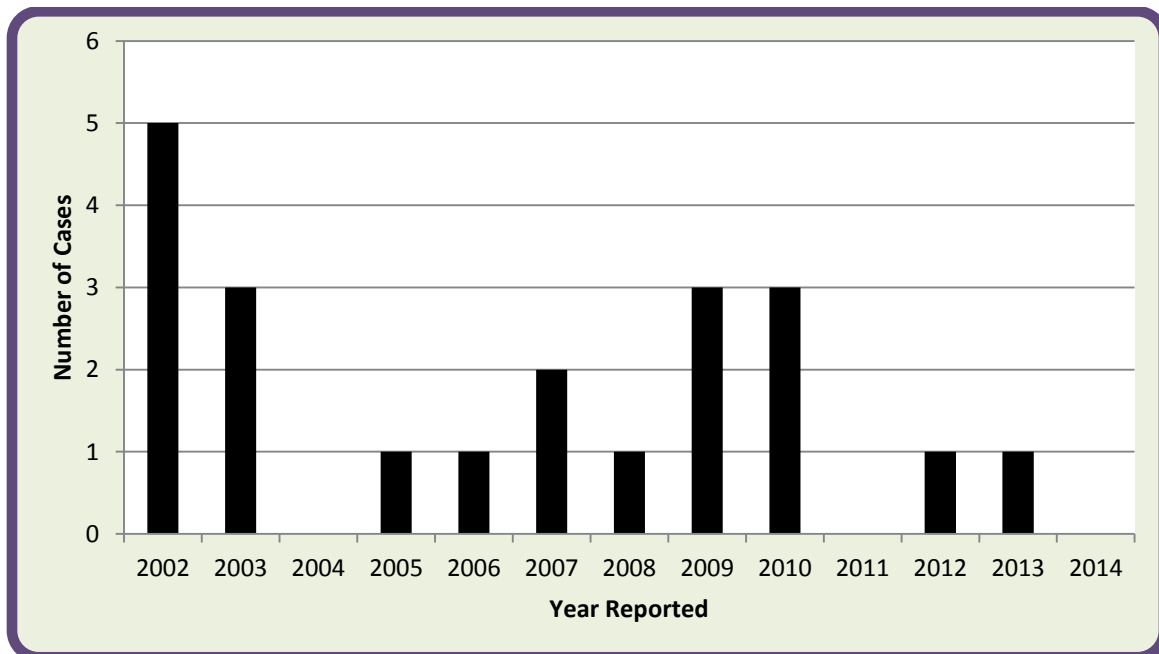
Tuberculosis

Approximately one-third of the world’s population and an estimated 9-14 million people in the United States are infected with *M. tuberculosis*. On average, about 10% of infected individuals will develop active tuberculosis disease at some point in their lives. In 2013, 9 million people worldwide became sick with TB disease and there were approximately 1.5 million TB related deaths. In the United States, there were 9,582 TB cases in 2013 (3.0/100,000) – a 3.6% decline compared to 2012 (3.2/100,000) and the lowest number reported since national reporting began in 1953. Utah had 31 (1.05/100,000) confirmed cases reported in 2014.

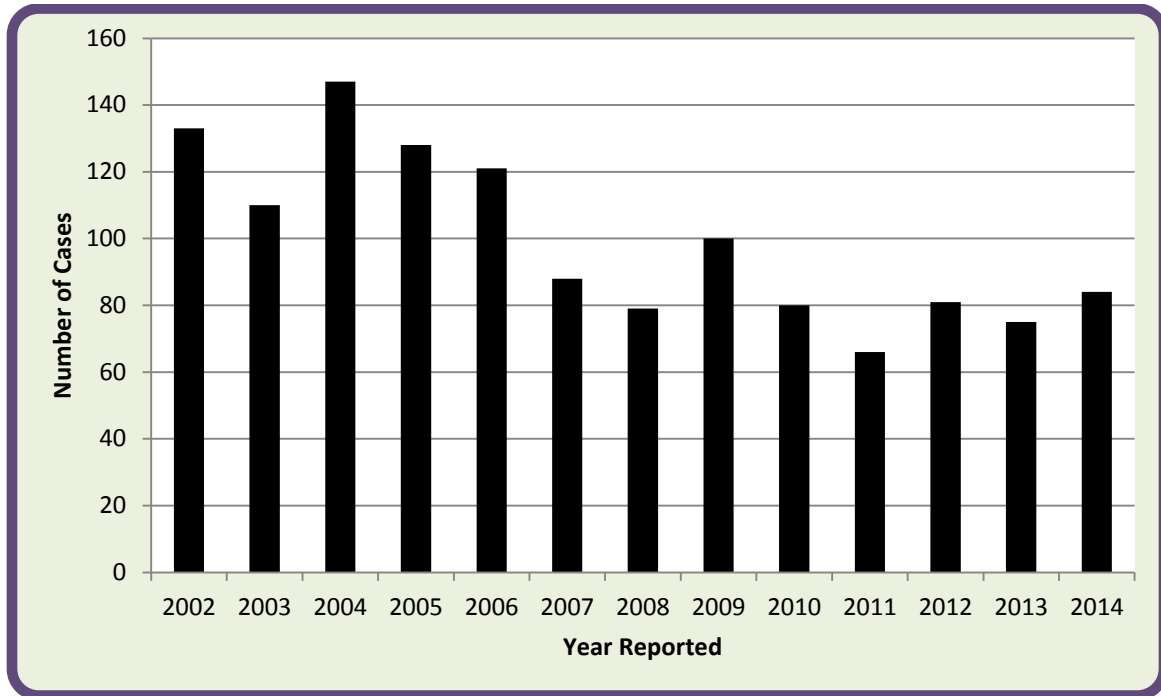
By the early 1980s, TB was considered to be under control and many states and cities redirected TB prevention and control funds to other programs. As a result of this, the country experienced a resurgence of TB, with a 20% increase in cases reported between 1985 and 1992. Many of these were persons with difficult-to-treat drug-resistant TB. This resurgence caused a new look at TB and aggressive prevention/control efforts were initiated. Since the 1992 TB resurgence peak in the United States, the number of TB cases reported annually has decreased. With the introduction of HIV, TB rates remain a constant threat as it is a leading cause of death among people who are infected with HIV. Also, a new virulent strain of TB has been identified, extensively drug-resistant tuberculosis (XDR-TB). This strain is resistant to many of the drugs used to treat tuberculosis and has a high mortality rate.

Davis County had **no new** active tuberculosis disease (ATBD) cases in 2014 and **84** latent tuberculosis infections (LTBI).

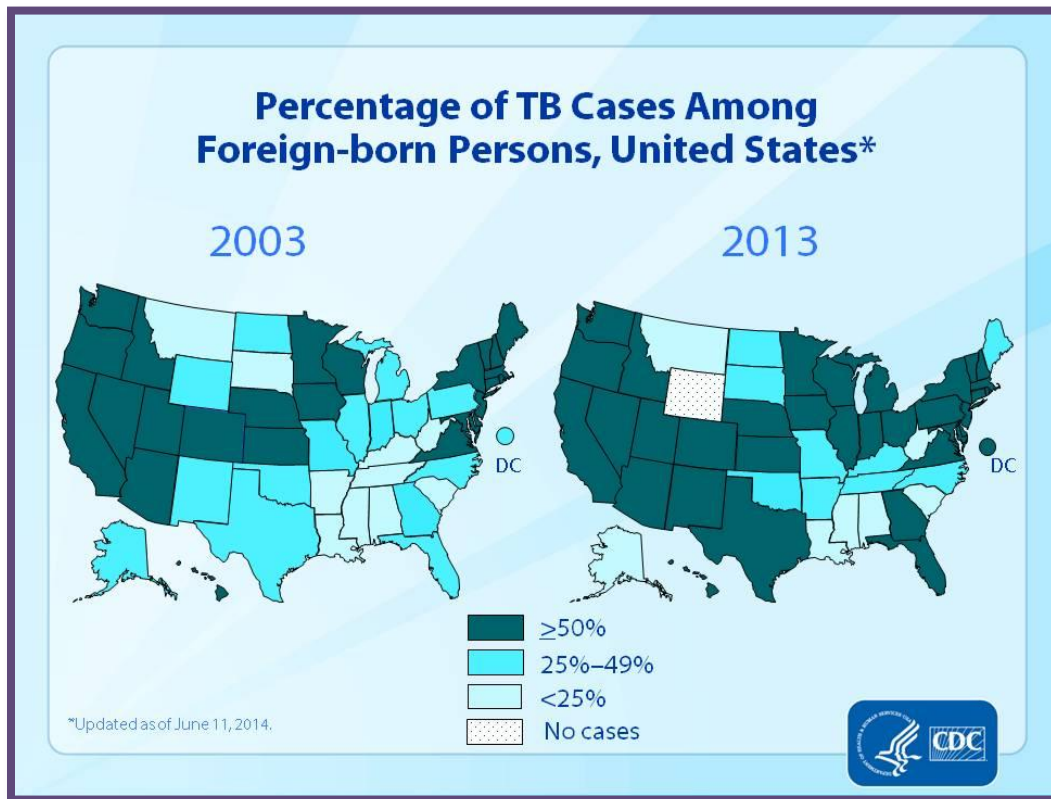
Active Tuberculosis Cases by Year, Davis County, 2002-2014



Latent Tuberculosis Infections (LTBI) by Year, Davis County, 2002-2014



In Davis County, active disease and LTBI are primarily seen in individuals who are foreign-born or have traveled/lived in endemic countries.



Active Tuberculosis Disease (ATBD)

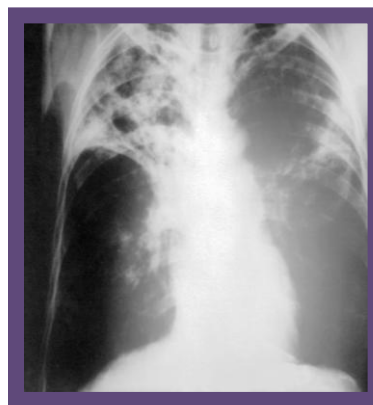
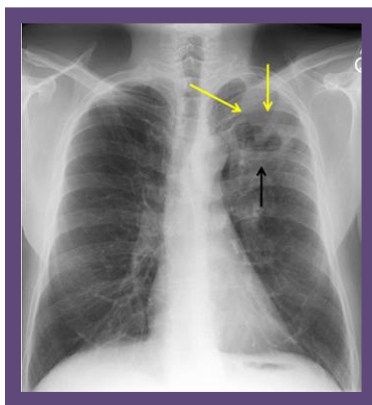
Tuberculosis is caused by a type of bacteria called *Mycobacterium tuberculosis*. The bacteria usually attack the lungs (pulmonary) but may attack any part of the body (extrapulmonary). TB is typically spread through the air when a person with TB disease of the lungs or throat expels tiny airborne particles (droplet nuclei). People nearby may breathe in these particles and become infected. People who have latent TB infection do not feel sick, do not have any symptoms, and cannot spread TB. However they may develop active TB disease at some time in the future. The U.S. experienced a resurgence of ATBD between 1985 and 1992, when the number of TB cases increased by 20%. Early detection and treatment of ATBD is essential to control the spread of the disease and to prevent outbreaks.

In 2014, Davis County had **no new** cases of active tuberculosis.

2014 Disease Highlights:

On average, Davis County investigates two cases of active tuberculosis a year. In 2014, there were no new active TB cases reported. Both pulmonary and extra-pulmonary TB typically require six months of treatment. Management of active tuberculosis cases requires close collaboration between several agencies including local health departments, medical providers, Utah Department of Health, Utah Public Health Laboratory and a commitment by the infected individual.

Patients with infectious pulmonary tuberculosis, which is of most concern for public health, are isolated until sputum sample tests indicate the individual is no longer infectious. To ensure drug treatment compliance, medication is administered under Directly Observed Therapy (DOT). Because DOT can seem personally invasive to the patient, strategies to promote a less intrusive and more flexible schedule are implemented whenever possible. These include bi-weekly/tri-weekly treatments, home visits, and video-conferencing.



Latent Tuberculosis Infection (LTBI)

Latent tuberculosis infection is a condition in which TB bacteria are alive but inactive in the body. People with LTBI have no symptoms, cannot spread TB to others, and usually have a positive skin test reaction or interferon gamma release assay (blood test). Development into active disease occurs in about 10% of those who do not receive treatment for LTBI.

Davis County Health Department provided **1060** tuberculin skin tests to the public in 2014. However, these numbers only account for a small percentage of all TB tests performed in the community.

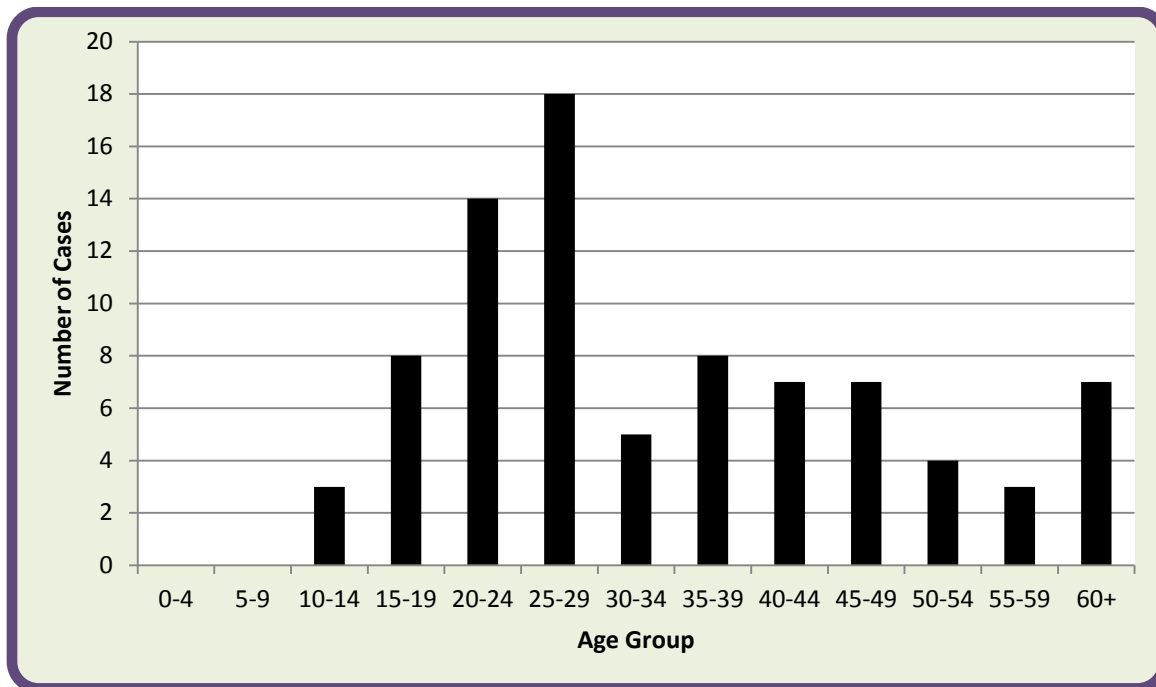
2014 Disease Highlights:

With the low incidence of active tuberculosis disease in Davis County and Utah as a whole, the largest disease burden for tuberculosis falls under LTBI. During 2014, Davis County managed **84** clients with LTBI, with an average of **32** LTBI patients per month. Treatment of LTBI reduces the risk that latent TB will progress to active disease and is essential to the control and elimination of tuberculosis disease. Case management includes initial testing to rule out active disease and ensuring appropriate treatment of the infection. The majority of individuals who receive LTBI treatment in Davis County are foreign-born or returning LDS missionaries who served missions in endemic countries. Typically, treatment for LTBI consists of daily antibiotic therapy for nine months. Individuals are monitored throughout therapy, but DOT is not necessary. In October 2012, use of a new LTBI treatment recommended by CDC was implemented in Utah. This new regimen is a combination of two drugs, administered by DOT once weekly for 12 doses. It is recommended for persons age 12 or older who are otherwise healthy, but who also meet a certain set of criteria.

Davis County receives referrals for suspect active/latent tuberculosis from various medical facilities and providers. Screening tests consist of a tuberculin skin test (TST) or in-vitro serological test (e.g. Quantiferon-Gold). Those with positive test results are often referred to the health department for evaluation and treatment. LTBI is not a reportable condition, but free or low-cost services are available for the community.

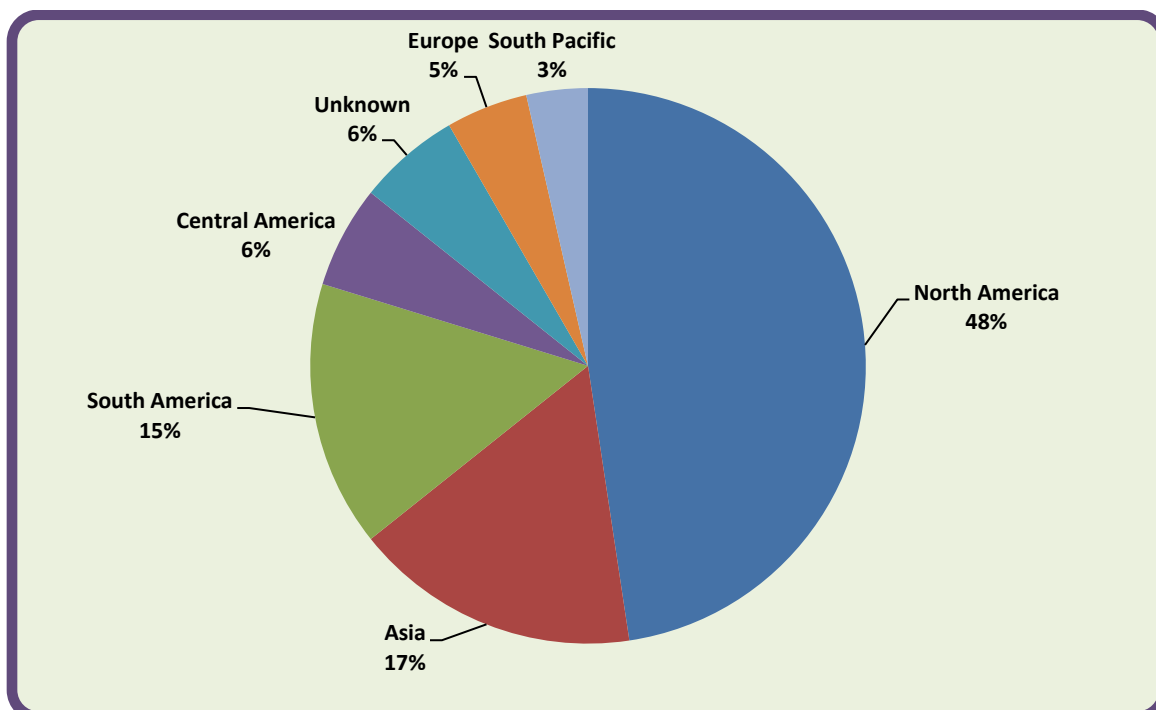


LTBI by Age Group, Davis County, 2014



In Davis County, ATBD and LTBI are primarily seen in individuals who are foreign-born or have traveled/lived in endemic countries.

LTBI by Place of Birth, Davis County, 2014



Program Highlights

During 2014, several program activities were implemented to address disease trends and enhance community education.

STD/HIV Program Highlights:

- The Communicable Disease and Epidemiology Division was awarded grant funding in 2012 to conduct STD (HIV, chlamydia, gonorrhea) and Hepatitis C screening in the incarcerated population. The Davis County jail collaborated with DCHD to fulfill grant activities. The grant was funded for three years and ended in December of 2014. The grant focused on new admissions to the jail facility in an effort to identify the baseline infection rate of entering inmates. Incoming inmates were tested prior to moving into an established housing unit to begin their sentences. The testing was an “Opt-Out” process – therefore, inmates signed declinations if they elected not to be tested. Those who made bail before being booked into jail custody were not included in the screening.

As an extension of the grant, the Communicable Disease and Epidemiology Division was able to expand STD and Hepatitis C screening opportunities to clients of Davis Behavioral Health (DBH) beginning in 2013. Many clients in this facility are individuals with high-risk behaviors who also have recently been or are currently under court-ordered treatment/care. Routine outreach clinics were conducted at two DBH locations within Davis County. This extension of the grant was successful in identifying new infections within the incarcerated population that would have otherwise not been detected – especially Hepatitis C.

In 2014, the following results were noted:

- **1,617 Davis County** inmates/DBH clients were screened
 - 515 females
 - 1,102 males
- **122** (8%) tested positive for Hepatitis C
- **60** (4%) tested positive for chlamydia
- **25** (2%) tested positive for gonorrhea
- **5** (<1%) tested positive for HIV

Risk behaviors identified among participants included: injection drug use, unprotected sex while intoxicated or high on drugs, the exchange of sex for drugs or money, group sex, and sexual activity with an anonymous partner. Upon release from the jail, inmates were offered a packet which contained STD/HIV educational literature, condoms, testing locations, and a donated Deseret Industries voucher for \$20.00. Those who tested positive for any of the four diseases were given additional information in their packet related to treatment options and linkage to care locations.

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- **School District STD Education:** To help address the STD disease burden among adolescents, DCHD continued a partnership with the Davis School District (DSD) to provide STD/HIV education in the secondary schools. Davis County is one of the few local health departments that offer this service. The presentation was created in collaboration with the curriculum department at DSD and was approved by the board for teaching within the junior high and high school settings. In 2014, 66 presentations by health department staff were provided, reaching approximately 2,541 students in grades 8, 10, and 11. For high school students, abstinence pamphlets were provided with STD/HIV facts and locations for STD testing. A modified version of the presentation is offered to the junior high age group. Students are given information on how to access the Davis County Health Department STD Hotline number – which is staffed by a nurse Monday-Friday (8:00am – 5:00pm).

Surveys are provided to teachers and students at the secondary schools to help assess satisfaction of the presentations. The results of the survey have been highly rated with many expressing appreciation for the services provided. A “Train-the-Trainer” course on the approved STD/HIV presentation was provided to several school district teachers in an effort to standardize the presented materials, update and increase the knowledge base of district educators, and expand the pool of trained professionals.

- **Community Outreach Education:** DCHD partners with the two local Job Corps Centers (Clearfield and Weber-Basin) to provide STD education to students in their facilities. Classes are taught weekly at the Clearfield Job Corps Center and monthly at the Weber-Basin location. For the year 2014, the following results were noted:
 - **49** presentations were conducted
 - **1025** students participated in the presentations
 - **541** (53%) of the students who participated were of various ethnic minorities

The STD/HIV presentation was also offered to various entities within the county upon request.

- Access to STD testing has been noted as a barrier by those who are sexually active and at risk. As a result, DCHD partners with Midtown Community Health Center – Davis to offer free/low-cost screening to residents through their clinic. Two options have been available to the community:
 - **Free STD screening clinic:** This is a walk-in clinic where individuals can access STD screening Monday – Friday (8:00am – 5:00pm). Individuals are provided educational materials on STD/HIV and offered testing (no physical exam performed). Those testing positive are reported to the health department for further investigation and treatment. Testing supplies and medications are provided by the health department. Midtown provides a medical assistant who is responsible for the collection of specimens.

During 2014, approximately **592** clients received testing through the free clinic. Davis County identified **87** positive chlamydia, **three** gonorrhea, and **ten** syphilis infections—an STD infectivity rate of roughly 17%.

- Low-cost STD examination and testing: Individuals who are symptomatic can receive STD services through the Midtown clinic. Clients are given an appointment to see a medical provider, obtain a physical examination and are tested for chlamydia, gonorrhea, syphilis and HIV. Additional tests are available for an added fee. Testing is provided by Midtown. If test results are positive, Midtown treats the patient with medication provided by the health department and reports the case for further investigation. In 2014, **80** clients were tested by Midtown through this program.
- Individuals who test positive for any of the reportable STDs (chlamydia, gonorrhea, syphilis, HIV, and chancroid) are interviewed to identify exposed sexual contacts. Contacts are located, tested/treated by the health department at no charge. In 2014, approximately **152** individuals were seen in the Davis County contact clinic. Of those, **65** tested positive for chlamydia (43%) and **five** tested positive for gonorrhea (3%). Of the 34 who were tested for syphilis, **eight** (24%) were positive. In addition, **none** (0%) of the 18 who tested for HIV had positive results. Contacts to positive cases are at high risk of acquiring infection and the data reiterates the importance of contact tracing.

Traditional HIV testing may take up to 10 days for return of results. To decrease the wait time, Davis County conducts free rapid HIV clinics throughout the year, often in conjunction with national HIV and STD events. Results are available within 15-20 minutes. Those performing the tests are trained on giving positive test results and provide important resources to infected clients.

Tuberculosis Program Highlights:

- Residents who have developed active tuberculosis need to receive appropriate treatment for their disease. Failure to comply with the established treatment regimen can result in the development of drug resistance. To prevent this from occurring, treatment must be administered under directly observed therapy (DOT). This requires a health department staff member to observe the patient taking their medication daily or when possible, twice/thrice-weekly. This process can make it difficult for the clients to maintain normal day-to-day activities and can incur travel costs to the patient and/or health department staff. To address this issue, Davis County offers clients a video-conferencing option where those with a history of compliancy can be observed taking their medication via the internet through applications such as Skype or FaceTime. The tuberculosis control nurse conducts periodic face-to-face encounters to ensure that any possible treatment side effect is recognized. Video conferencing will only be considered for individuals who display responsible behaviors and are at low risk for complications.

Overall Division Highlights:

- The Communicable Disease and Epidemiology Division website remains a valuable resource for the community.

http://www.daviscountyutah.gov/health/communicable_disease/default.cfm

Visitors to the website can access program specific information, as well as links to other important websites. Materials are available for each of the programs within the Communicable Disease and Epidemiology Division:

- Epidemiology (surveillance data)
- STD/HIV Program
- Tuberculosis Control Program
- Infectious Disease Program

The website also offers information specific to healthcare professionals and medical providers. Within this section are reporting guidelines, including the communicable disease rule for Utah and links to disease data for Davis County. Health education, public health emergency preparedness, Boy Scout Public Health Merit Badge, and Emergency Medical Services (EMS) information are also included on the website and provide quick and easy access to resources provided by the Communicable Disease and Epidemiology Division.

- The “Ask-A-Nurse” email system is routinely utilized by the public for answers to communicable disease issues. This system is monitored daily by health professionals who can provide information on health issues pertaining to infectious diseases or other reportable conditions. An email link is found on each page of the Communicable Disease and Epidemiology web pages or can be directly accessed at: Ask-A-Nurse@daviscountyutah.gov.
- During 2014, the Communicable Disease and Epidemiology Division participated in additional program activities designed to enhance the Division’s ongoing goals:
 - **Healthcare Associated Infections (HAI) Grant**: Davis County continued to receive funding to assist in the identification and control of healthcare associated infections. In 2014, HAI outbreaks were detected and control efforts were implemented smoothly in part due to a partnership between public health and the private healthcare systems. DCHD continues to work closely with the medical community on HAI issues and provide healthcare partners with updated information on new and emerging infections.

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- **EMS Program:** OSHA Standard – 29 CFR 1910.1030 mandates that all employees considered at risk for bloodborne pathogen (BBP) exposure receive exposure training and have annual updates. In an effort to assist the Davis County Sheriff’s Office (DCSO) and other Emergency Medical Services (EMS) agencies within Davis County, the DCHD provides bloodborne pathogen training once a month. This class is free of charge. The class is also available on-site for a nominal fee.

Senate Bill 19: “Disease Testing of Individuals Exposed to Bloodborne Pathogens” is a law to protect Workers Compensation benefits for EMS workers who contract HIV, Hepatitis B (HBV) or Hepatitis C (HCV) from an on-the-job exposure. In conjunction with the BBP training, DCHD also provides baseline testing for the DCSO and other EMS agencies within Davis County. To be protected under the EMS law, employees must be tested at start of employment and again in 3-6 months.

- **BioSense Grant:** Davis County Health Department continued grant activities related to the implementation of the BioSense surveillance system. This surveillance tool provides public health with real-time data regarding the health status of the community. BioSense pulls information on emergency department visits and hospitalizations from multiple sources, which provides users the ability to confidentially track health issues as they evolve.

In 2014, BioSense syndromes were used to track the presence of Enterovirus D-68, influenza-like illnesses, acute gastrointestinal illnesses, and respiratory illnesses. The Communicable Disease Epidemiologist is alerted by BioSense when emergency department visits and hospitalizations for identified symptoms reach a certain threshold. Data from these alerts are analyzed to look for clusters of illness or diseases of concern. In 2014, UDOH worked with IASIS and MountainStar hospital facilities to onboard their systems for electronic reporting and should be successfully submitting data to BioSense in 2015. The participation of these additional facilities will improve BioSense’s ability to provide a more comprehensive picture of the health status of Davis County.

- **Internship Program:** The Communicable Disease and Epidemiology Division maintains an internship program for public health interns to gain work experience in the public health field. During 2014, the Communicable Disease and Epidemiology Division partnered with Westminster College Public Health Program. A group of students were given access to de-identified Davis County disease data that supported their capstone project, providing them with hands-on research experience.
- **Ebola Preparedness Efforts:** With the introduction of the Ebola virus into the United States, the Communicable Disease and Epidemiology Division made strides in preparing and planning for cases in Davis

County. Manpower hours were solely dedicated to ensuring 24/7 reporting and response coverage. Staff were updated and re-certified in response activities. Testing of the reporting and response system was conducted and improvements were implemented. Davis County participated in an Ebola statewide table top exercise, along with several local community partners. This exercise was intended to help identify gaps in the existing response plans and improve partnerships between community agencies that may be involved and/or affected by the introduction of an Ebola case into Davis County. Ebola Monitoring Events (the monitoring of returning travelers from West Africa by public health) continue to occur in the community and will remain in place until the outbreak in West Africa is contained.

- **Public Health Accreditation:** Davis County Health Department has been working towards becoming an accredited public health system. In preparation for this achievement, the divisions within the health department were challenged to develop a 5-year strategic plan. The Communicable Disease and Epidemiology Division identified eight strategies to work on over the next five years. Accomplished objectives for 2014 included:
 - Training staff in Mental Health First Aid
 - Development of a depression/suicide screening tool to be used in the STD clinic and with LTBI clients in 2015
 - Participation on the county suicide workgroup (Davis HELPS)
 - Implementation of a public health awareness campaign focusing on specific illnesses (vaccine-preventable diseases, respiratory infections, food safety, STD awareness, chicks/reptile diseases, and recreational water diseases)
 - Implementation of improved internal communication methods
 - Division support of the department wellness program

The eight division strategies are in alignment with the Community Health Improvement Plan (CHIP) and the State Health Improvement Plan (SHIP), as well as the Department five year strategic goals.

- **Animal Control Collaboration:** In 2013, a county regulation was approved by the Davis County Board of Health which helped standardize the process of rabies control and prevention in Davis County.

The Communicable Disease and Epidemiology Division, in collaboration with Davis County Animal Control, developed a human rabies exposure reporting system which has facilitated a more timely and efficient process for both agencies. The health department evaluates and monitors all reported human exposures and assists in the facilitation of post-exposure prophylaxis when recommended. In 2014, **333** human exposures were reported. This collaboration is an example of a successful partnership between Animal Control and public health that other counties in Utah may consider using.

Appendix A – Reportable Diseases

REPORTABLE DISEASES

UTAH LAW REQUIRES THAT THE FOLLOWING CONFIRMED AND SUSPECTED DISEASES BE REPORTED TO YOUR LOCAL HEALTH DEPARTMENT OR THE UTAH DEPARTMENT OF HEALTH **IMMEDIATELY BY TELEPHONE**

Davis County Health Department Disease Reporting Line: **(801) 525-5220**

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> • Anthrax • Botulism • Cholera • Diphtheria • <i>Haemophilus influenzae</i> (invasive) • Hepatitis A • Measles (Rubeola) • Meningococcal disease • Plague | <ul style="list-style-type: none"> • Poliomyelitis (paralytic) • Rabies (human and animal) • Rubella • Severe Acute Respiratory Syndrome (SARS) • Smallpox • <i>Staphylococcus aureus</i> with resistance (VRSA) or intermediate resistance | <p>(VISA) to vancomycin, isolated from any site</p> <ul style="list-style-type: none"> • Tuberculosis • Tularemia • Typhoid (cases and carriers) • Viral hemorrhagic fever • Yellow Fever • Unusual Diseases or Outbreaks of any kind |
|---|---|---|

UTAH LAW REQUIRES THAT THE FOLLOWING DISEASES BE REPORTED TO YOUR LOCAL HEALTH DEPARTMENT OR THE UTAH DEPARTMENT OF HEALTH WITHIN **3 WORKING DAYS AFTER IDENTIFICATION.**

Davis County Health Department Disease Reporting Line: **(801) 525-5220**
Or FAX **(801) 525-5210**

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> • <i>Acinetobacter</i> species with resistance or intermediate resistance to carbapenem from any site • Acquired Immunodeficiency Syndrome (AIDS) • Adverse event resulting after smallpox vaccination • Amebiasis • Arbovirus infection, including Saint Louis encephalitis and West Nile virus infection • Babesiosis • Botulism, infant • Brucellosis • Campylobacteriosis • Chancroid • Chickenpox • <i>Chlamydia trachomatis</i> infection • Coccidioidomycosis • Colorado tick fever • Creutzfeldt-Jakob disease and other transmissible human spongiform encephalopathies • Cryptosporidiosis • <i>Cyclospora</i> infection • Dengue fever • Echinococcosis • Ehrlichiosis (human granulocytic, human monocytic, or unspecified) • Encephalitis | <ul style="list-style-type: none"> • <i>Escherichia coli</i> with resistance or intermediate resistance to carbapenem from any site • Giardiasis • Gonorrhea (sexually transmitted and ophthalmia neonatorum) • Hansen's disease (leprosy) • Hantavirus pulmonary syndrome • Hemolytic Uremic Syndrome (post-diarrheal) • Hepatitis B (cases and carriers) • Hepatitis C (acute and chronic infection) • Hepatitis (other viral) • Human Immunodeficiency Virus (HIV) infection • Influenza-associated hospitalization • Influenza-associated death in a person less than 18 years of age • <i>Klebsiella</i> species with resistance or intermediate resistance to carbapenem from any site • Legionellosis • Listeriosis • Lyme disease • Malaria • Meningitis (aseptic, bacterial, fungal, parasitic, protozoan and viral) • Mumps • Norovirus (formerly called Norwalk-like virus) infection • Pertussis | <ul style="list-style-type: none"> • Poliovirus infection (nonparalytic) • Psittacosis • Q Fever • Relapsing fever (tick-borne or louse-borne) • Rubella (congenital syndrome) • Salmonellosis • Shiga toxin producing <i>Escherichia coli</i> (STEC) infection • Shigellosis • Spotted fever rickettsioses (including Rocky Mountain spotted fever) • Streptococcal disease (including <i>Streptococcus pneumoniae</i> and Groups A, B, C, and G streptococci isolated from a normally sterile site) • Syphilis (all stages and congenital) • Tetanus • Toxic-Shock Syndrome (staphylococcal or streptococcal) • Trichinosis • Vibriosis |
|--|---|--|



Davis County Health Department – revised May 2013

Appendix B – Davis County Demographics

Davis County Demographics – 2014

Population: 322,094

Age Group	
Less than 1 year	5,567
1 – 14 years	86,105
15 – 24 years	46,899
25 – 44 years	90,625
45 – 64 years	63,945
65 – 84 years	25,460
More than 85 years	3,493

Gender	
Male	162,025
Female	160,069

Race	
White	299,066
Black	4,579
American Indian or Alaskan Native	2,100
Asian	6,286
Native Hawaiian or Pacific Islander	2,214
2 or More Races	7,849

Ethnicity	
Hispanic or Latino (of any race)	28,380

Source: Retrieved January 2015 from Utah Department of Health, Center for Health Data, Indicator-Based Information System for Public Health. Website: <http://ibis.health.utah.gov/>.

Population by City *	
Unincorporated County	366
Bountiful	43,023
Centerville	16,624
Clearfield	30,467
Clinton	20,924
Farmington	21,599
Fruit Heights	5,595
Hill Air Force Base	3,310
Kaysville	28,876
Layton	70,790
North Salt Lake	17,017
South Weber	6,525
Sunset	5,137
Syracuse	25,775
West Bountiful	5,374
West Point	9,936
Woods Cross	10,756
Total	322,094

*Population by city was only available for 2013.

Source: Population estimates by city for 2013 were obtained from the U.S. Census Bureau. Website: http://www.census.gov/popest/data/cities/totals/2013/files/SUB-EST2013_49.csv. The Hill Air Force Base estimate is for 2010 and was obtained from the U.S. Census Bureau, American Fact Finder: <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

Appendix C – Analytic Methods

Information retrieved during investigations of reported infectious disease cases is maintained in TriSano – a secure, online database that allows epidemiologists and infectious disease workers to access case information statewide. Davis County Health Department exported data acquired for cases reported during 2014 into Microsoft Excel 2010 for further analysis. Descriptive statistics were calculated in Excel.

Population estimates by city were only available for 2013. These estimates were obtained from the U.S. Census Bureau at http://www.census.gov/popest/data/cities/totals/2013/files/SUB-EST2013_49.csv in January 2015. The population estimate for Hill Air Force Base was only available for 2010 and was obtained by searching the Air Force Base’s zip code (84056) through the U.S. Census Bureau’s American Fact Finder at <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

Population estimates by age group, gender, race, and ethnicity were available for 2013. These estimates were retrieved in January 2015 from the Utah Department of Health’s Indicator-Based Information System for Public Health (IBIS-PH) available at <http://ibis.health.utah.gov>.

All incidence rates were calculated in Excel and are expressed as the number of cases reported in 2014 per 100,000 people. The incidence rates of all sexually-transmitted diseases (STDs) by city were similarly calculated, after controlling for age. This was done to account for the increased prevalence of STDs among the young adult population.

