

Communicable Disease Report 2015

Davis County Health Department
Communicable Disease & Epidemiology Division



Acknowledgments

Prepared by Davis County Health Department

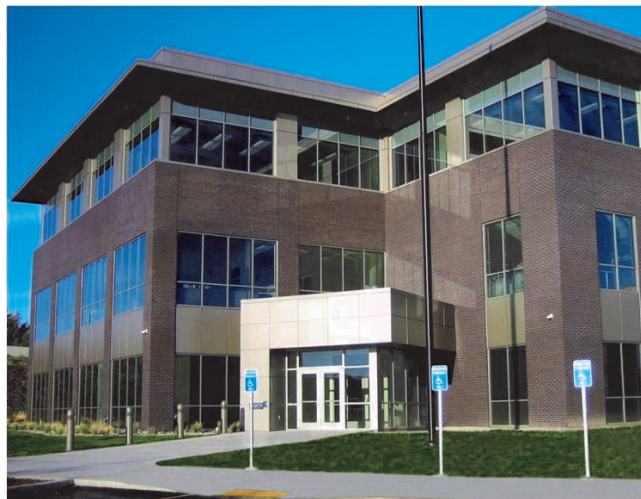
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Executive Summary

This annual communicable disease surveillance report summarizes all communicable diseases reported in Davis County in 2015. 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 2015 was the Hepatitis C (HCV) outbreak involving two hospitals in Northern Utah. In July 2015, an individual tested positive for HCV and was reported to public health for investigation. No behavioral risks for transmission were identified during the individual's disease investigation interview. It was determined that this case had been newly infected, due to a history of a recent negative test. The case did have two recent interactions with the healthcare system (a dental office and a hospital ER) that could have resulted in a HCV exposure. Site visits to the facilities were conducted and the index case's medical records were reviewed to identify high risk procedures. A search for corrective actions on healthcare providers' licenses was also conducted. Neither the dental office nor the ER site visits identified lapses in infection prevention and control practices. At the ER, the index case received intravenous pain medication. Review of ER healthcare provider licenses revealed a nurse, who had provided care to the index case, had been dismissed due to drug diversion activities. The nurse was a Davis County resident. The nurse was interviewed and Hepatitis C testing was performed. The nurse tested positive for HCV and had the same genotype (2b) as the original case. Per her Division of Occupational and Professional Licensing (DOPL) records, the nurse had been previously employed at a Davis County hospital and had also diverted medication while also employed there. Public Health worked with both facilities to contact all individuals who may have been exposed to HCV. A total of 7,217 potentially exposed patients were identified. Both hospitals sent out notifications to these individuals, offering education on Hepatitis C and free testing. The investigation is ongoing and final results of the outbreak will not be available until March or April 2016.

1. Gonorrhea cases continued to be reported in higher than expected numbers, although the case count for 2015 (87) was slightly lower than in 2014 (94). An increase in reported gonorrhea cases was also noted across the state of Utah, with the Wasatch Front accounting for approximately 92% of the cases reported in 2015. There were 1346 cases of gonorrhea reported in Utah during 2015. Of those reported in Davis County, disease interviews identified men who have sex with men (MSM), multiple sex partners, anonymous partners, incarceration and substance abuse as the most common risk factors. It was also noted that during 2015, more infected individuals stated participating in "swinger" activities - which has not been significant in past years.
2. Davis County investigated several cases of *Salmonella* Poona that were part of a national outbreak. A total of 61 cases were reported in the state of Utah - Davis County had ten of those cases. Statewide data show that 59% of the reported infections were female and the cases ranged in age from less than one to 77 years old - eleven cases were hospitalized. Investigations of the disease found that a significant amount of infected individuals had eaten cucumbers. Trace back efforts located imported cucumbers as a likely source of infection. The cucumbers were recalled, which resulted in a significant drop in new cases. However, additional infections continue to be reported. The Centers for Disease Control and Prevention (CDC) and state health departments continue to investigate other sources of transmission.
3. Pertussis once again impacted citizens of Davis County in 2015. There were 72 cases of pertussis reported, a 38.5% decrease when compared to 2014 (117). Disease investigations noted several contacts of the reported cases (including household members) also displayed symptoms consistent with pertussis. Community outbreaks also occurred. One outbreak involved students on a school drill team. During the period of

Executive Summary

communicability, members of the drill team participated in competitions which involved overnight stays and remained in congregate settings for extended periods of time. The affected drill team was provided education and prophylactic treatment. Those who were symptomatic were excluded from school and other activities until completion of antibiotic treatment.

4. During 2015, a large multi-state outbreak of measles was linked to a theme park in California. The initial cases were identified in California in mid-December 2014, while the first Utah cases were diagnosed in Utah County in early January 2015. Multiple venues were identified where community exposure could have occurred. As a result, all local health departments were on alert for possible cases within their jurisdictions. Davis County had several suspect cases reported, but none were confirmed. At least 125 cases have been associated with this outbreak.
5. Health departments across the nation are being impacted by new and emerging diseases presenting in the United States. Since March 2014, West Africa has experienced the largest outbreak of Ebola in history. When the first imported case was identified in the United States in September 2014, efforts were quickly initiated to develop plans to address this disease at a local level. One such control measure included monitoring recently returned travelers from West Africa for a 21-day period to ensure early identification of disease symptoms. Davis County continued to monitor returning travelers during 2015. None of the Davis County residents who underwent monitoring developed symptoms and all were cleared. On January 14, 2016, the World Health Organization declared the Ebola outbreak in West Africa over, but cautioned of an ongoing risk of re-emergence. One day later, an additional case was identified in Sierra Leone.
6. Middle East Respiratory Syndrome (MERS) presented in a new geographical area in 2015. In May 2015, an outbreak of MERS was detected in South Korea after a traveler returning from the Arabian Peninsula was confirmed with the virus. A total of 186 cases, including 33 deaths, have been associated with this outbreak. This has been the largest outbreak outside of the Arabian Peninsula since it was first discovered in 2012. Suspect cases of MERS were reported to Davis County Health Department in travelers returning from South Korea and areas near the Arabian Peninsula. All suspect cases were isolated, evaluated and subsequently tested negative for the disease. South Korea has now been added as a location where MERS transmission can occur.
7. Chikungunya was reported in two individuals residing in Davis County in 2015. This mosquito-borne illness was newly found in the Americas, specifically the Caribbean, in 2013. Since then, this viral illness has been detected in over 45 countries including the United States. Disease investigation of the two Davis County cases identified recent travel to areas known to be endemic to chikungunya.
8. The 2014-15 influenza season (October 2014 - May 2015) was one of the most severe seasons Davis County has had in the last few years. This most likely occurred because the predominant circulating strain of influenza drifted from the strain in the vaccine. A total of **140** hospitalized-influenza cases were reported, a dramatic increase from the **85** cases reported during the 2013-14 season. The current influenza season (October 2015 - May 2016) has been mild thus far. Both influenza A and B have been circulating in Davis County, with type B being the predominant strain. Due to the milder start of the 2015-16 season, minimal hospitalizations have been reported. If this trend continues, a very mild season can be anticipated. Influenza typically peaks in the months of January and February.

Introduction

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 Division 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 (CD/Epi) is organized into four main program areas: STD/HIV, Tuberculosis Control, Infectious Disease, and Disease Surveillance.

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 trained 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 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)

Introduction

- 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 (R386-702). Prompt reporting of confirmed and suspect cases helps ensure necessary control and preventive 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 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

- Anthrax
- Botulism
- Cholera
- Diphtheria
- *Haemophilus influenzae* (invasive)
- Hepatitis A
- Measles (Rubeola)
- Meningococcal disease
- Plague
- Poliomyelitis, paralytic and nonparalytic
- Rabies (human and animal)
- Rubella (including congenital syndrome)
- Severe Acute Respiratory Syndrome (SARS)
- Smallpox
- *Staphylococcus aureus* with resistance (VRSA) or intermediate resistance (VISA) to vancomycin, isolated from any site
- 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**

- *Acinetobacter* species with resistance or intermediate resistance to carbapenem from any site
- Acquired Immunodeficiency Syndrome (AIDS)
- Adverse event resulting after smallpox vaccination
- Amebiasis
- Anaplasmosis
- Arbovirus infection, including Saint Louis encephalitis and West Nile virus infection
- Babesiosis
- Botulism, infant
- Brucellosis
- Campylobacteriosis
- Chancroid
- Chickenpox
- *Chlamydia trachomatis* infection
- Coccidioidomycosis
- Colorado tick fever
- Creutzfeldt-Jakob disease and other transmissible human spongiform encephalopathies
- Cryptosporidiosis
- *Cyclospora* infection
- Dengue fever
- Echinococcosis
- Ehrlichiosis (human granulocytic, human monocytic, or unspecified)
- Encephalitis
- *Escherichia coli* 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 (acute, chronic and perinatal)
- 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
- *Klebsiella* species with resistance or intermediate resistance to carbapenem from any site
- Legionellosis
- Leptospirosis
- Listeriosis
- Lyme disease
- Malaria
- Meningitis (aseptic, bacterial, fungal, parasitic, protozoan and viral)
- Mumps
- Mycobacteria other than tuberculosis
- Norovirus, outbreaks only
- Pertussis
- Psittacosis
- Q Fever (Coxiella infection)
- Relapsing fever (tick-borne or louse-borne)
- Salmonellosis
- Shiga toxin producing *Escherichia coli* (STEC) infection
- Shigellosis
- Spotted fever rickettsioses (including Rocky Mountain spotted fever)
- Streptococcal disease (including *Streptococcus pneumoniae* 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)
- Trichinellosis
- Vibriosis



Methods

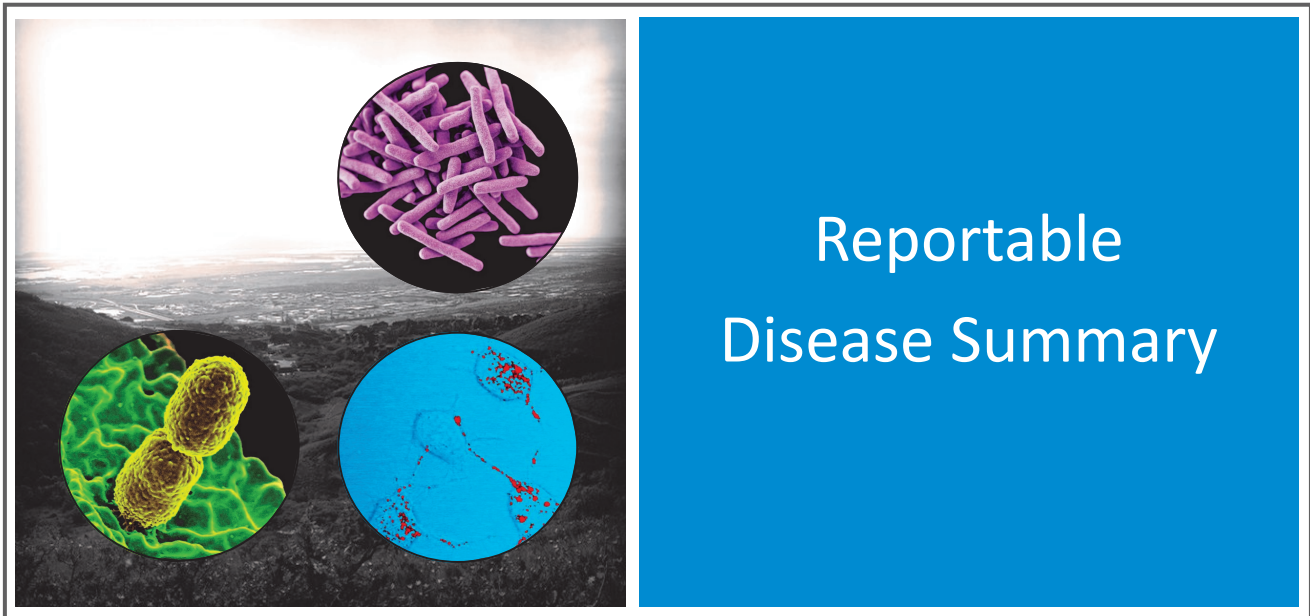
Information retrieved during investigations of reported infectious disease cases is maintained in UT-NEDSS/EpiTrax—a secure, online database that allows epidemiologists and infectious disease workers to access case information statewide. Davis County Health Department exported data acquired for cases reported during 2015 into Microsoft Excel 2010 for further analysis. Descriptive statistics were calculated in Excel.



Population estimates by city were only available for 2014. These estimates were obtained from the U.S. Census Bureau at http://www.census.gov/popest/data/cities/totals/2014/files/SUB-EST2014_49.csv in January 2016. 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 2014. These estimates were retrieved in January 2016 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 2015 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.



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 and 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.

Davis County Health Department received a total of **1,755** disease reports during 2015, less than the 1,937 disease reports received in 2014.

Over half (56.9%) of the diseases reported were sexually transmitted diseases, followed by vaccine-preventable diseases (10.9%), enteric diseases (12.0%), other diseases (8.6%), invasive diseases (6.2%), tuberculosis infections (5.1%) and vectorborne/zoonotic diseases (<1%) (see Figure 1).

Cases were most often reported among females (53.0%) and among 20-29 year-olds (see Figure 2). Sexually transmitted diseases had a significant impact on the 20-29 year old age group. Statistically, females are more impacted by sexually transmitted diseases.

Figure 1. Diseases Reported by Type, Davis County, 2015

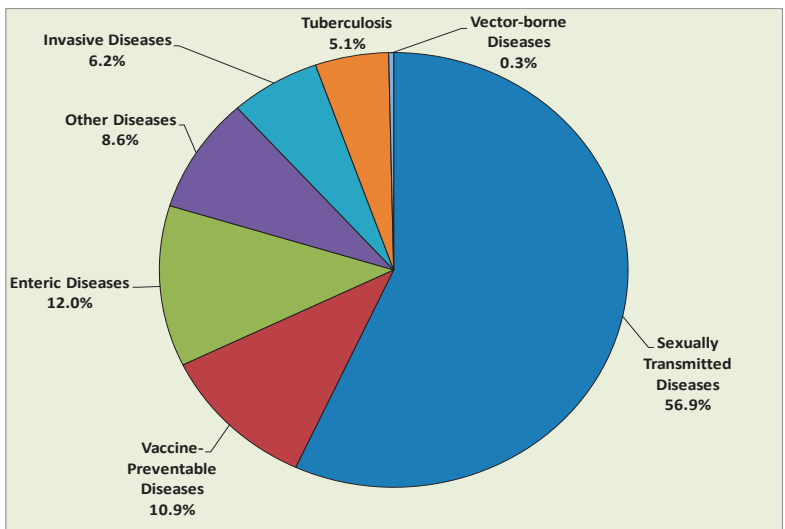
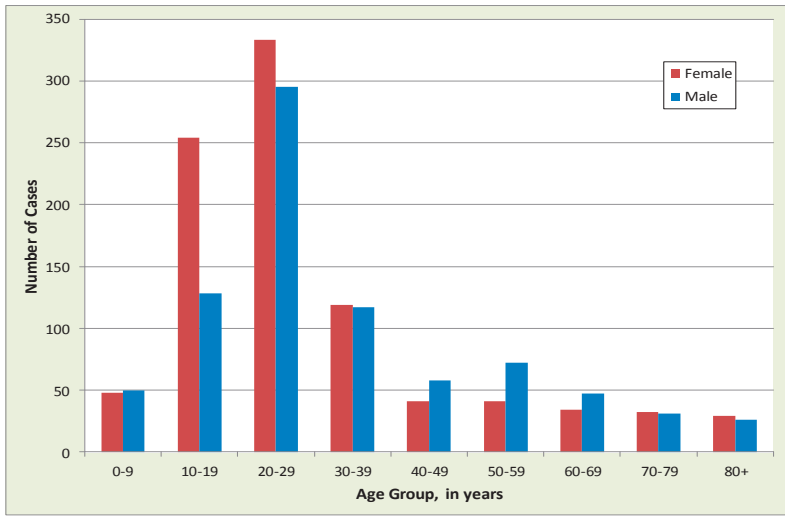
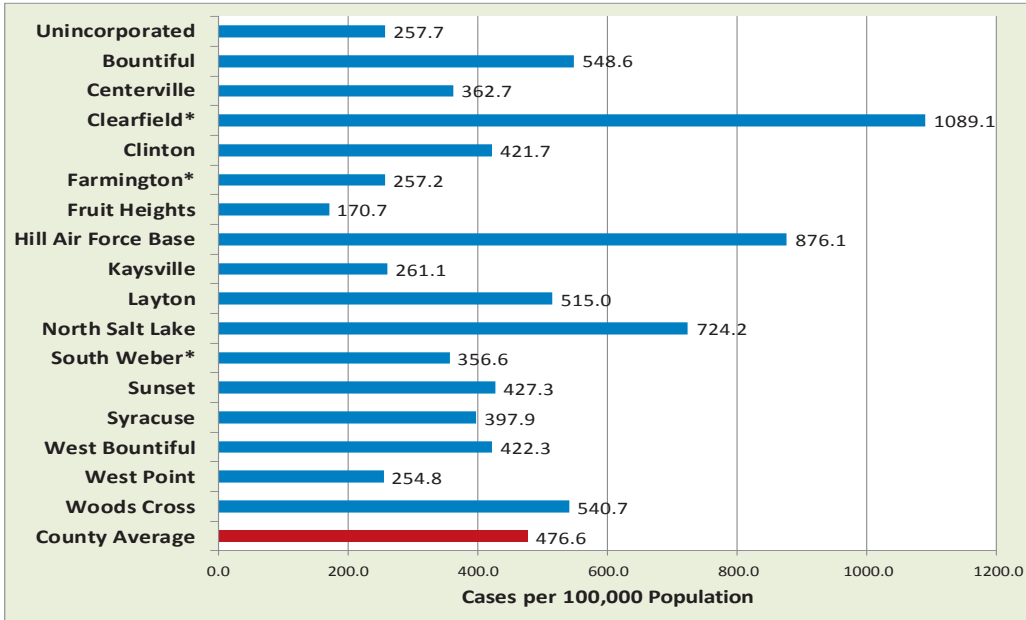


Figure 2. Disease Reports by Age Group and Gender, Davis County, 2015



Reportable Disease Summary

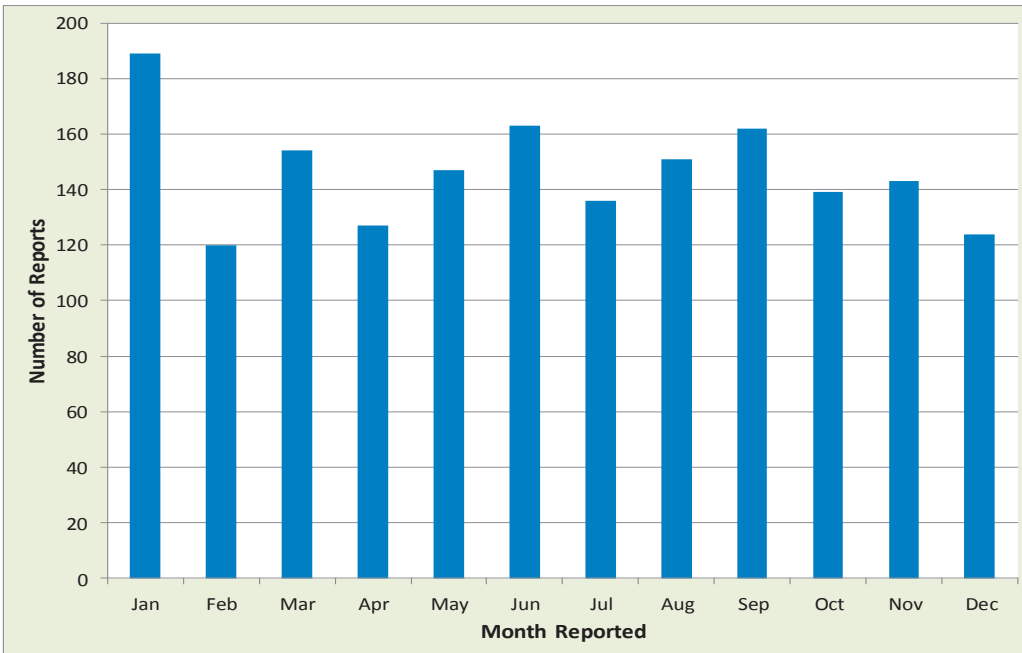
Figure 3. Incidence of All Reportable Diseases, Davis County, 2015



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 (see Figure 3). Tuberculosis data are not included because most infections were acquired outside of Davis County.

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

Figure 4. Disease Reports by Month, Davis County, 2015



The disease burden in Davis County normally stays consistent throughout the year (see Figure 4). January 2015 had slightly more diseases reported. This is most likely due to the increased number of cases reported during the 2014-15 influenza season. In 2015, an average of 146 diseases were reported each month.

Top 20 Diseases

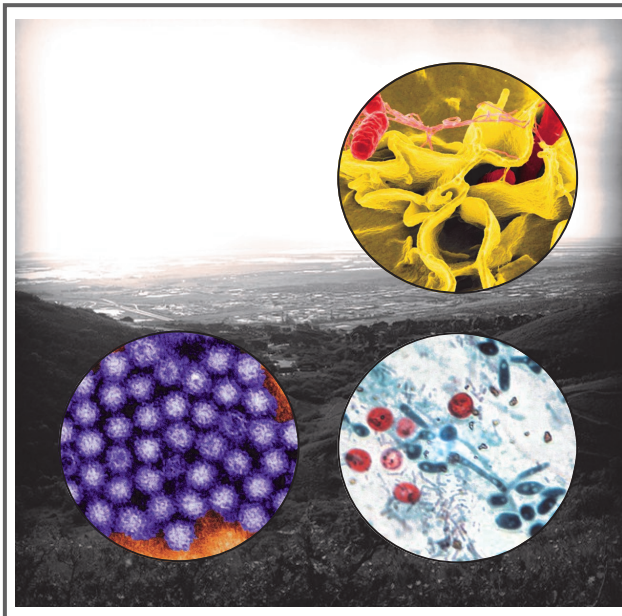
Table 1. Frequently Occurring Diseases in Davis County, 2015

Rank	Disease	Number of Cases
1	Chlamydia	886
2	Hepatitis C, acute & chronic	132
3	Tuberculosis, latent infection	89
4	Streptococcal disease, invasive	89
5	Gonorrhea	87
6	Influenza, hospitalized	83
7	Pertussis	72
8	Salmonellosis	58
9	Campylobacteriosis	46
10	Cryptosporidiosis	26
11	Hepatitis B, acute & chronic	22
12	Shigellosis	21
12	Norovirus	21
14	Shiga toxin-producing <i>E. coli</i> (STEC)	18
15	Giardiasis	17
16	Chickenpox	15
17	Viral/Aseptic Meningitis	14
17	Syphilis	14
19	HIV/AIDS	11
20	Carbapenem-Resistant Enterobacteriaceae (CRE)	9

Diseases Reported by Year, 2010 - 2015

Table 2. Diseases Reported by Year, Davis County, 2010 - 2015

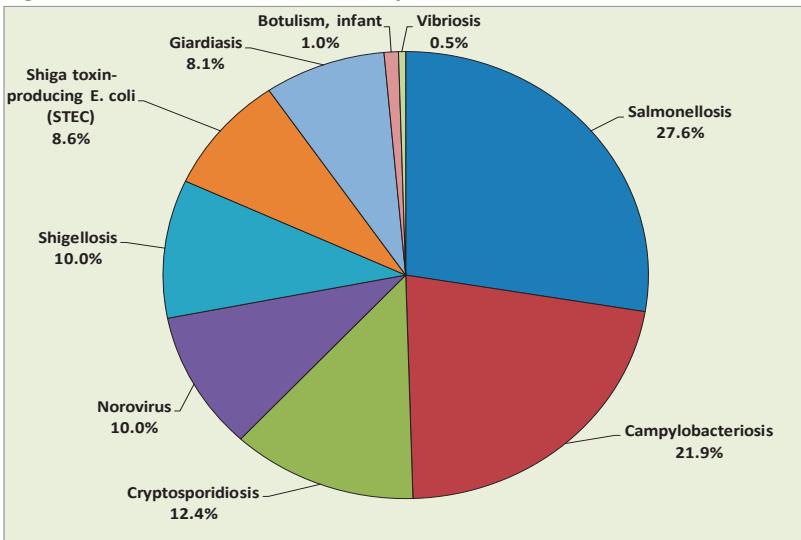
Disease	2010	2011	2012	2013	2014	2015	5 Yr Ave (2010 – 14)
Amebiasis	1	1	0	1	0	0	0.6
Botulism, infant	0	1	3	0	1	2	1.0
Brucellosis	0	1	1	0	0	0	0.4
Campylobacteriosis	19	33	36	43	71	46	40.4
Carbapenem-Resistant Enterobacteriaceae (CRE)	*	*	2	3	7	9	4.0
Chickenpox	62	42	37	39	33	15	42.6
Chikungunya	*	*	*	*	*	2	*
Chlamydia	702	739	862	847	923	886	814.6
Coccidioidomycosis	1	2	9	3	3	4	3.6
Creutzfeldt-Jakob Disease (CJD)	0	1	1	0	2	1	0.8
Cryptosporidiosis	22	19	46	33	14	26	26.8
Dengue Fever	1	0	1	1	0	0	0.6
Encephalitis	1	1	1	0	0	2	0.6
Giardiasis	31	23	37	29	20	17	28.0
Gonorrhea	38	18	40	60	94	87	50.0
<i>H. influenzae</i> , invasive disease	0	3	1	3	4	2	2.2
Hansen's Disease (Leprosy)	0	0	0	0	1	0	0.2
Hemolytic Uremic Syndrome (HUS)	0	1	0	0	0	0	0.2
Hepatitis A	2	3	1	3	2	0	2.2
Hepatitis B, acute & chronic	24	26	21	24	42	22	27.4
Hepatitis C, acute & chronic	71	150	196	189	189	132	159.0
Hepatitis E	0	0	0	0	0	1	0.0
HIV/AIDS	9	4	11	4	9	11	7.4
Influenza, hospitalized	11	43	43	82	130	83	61.8
Legionellosis	0	9	2	2	4	4	3.4
Listeriosis	2	0	1	2	1	0	1.2
Lyme Disease	0	1	4	3	5	1	2.6
Malaria	1	0	0	0	0	2	0.2
Meningitis, aseptic/viral	9	9	16	10	21	14	13.0
Meningitis, bacterial & other	2	2	1	2	4	2	2.2
Meningococcal disease	0	1	0	1	1	0	0.6
Mumps	1	0	0	0	0	0	0.2
Norovirus	7	20	6	20	27	21	16.0
Pertussis	28	25	139	104	117	72	82.6
Q fever, chronic	0	0	0	1	0	0	0.2
Salmonellosis	21	39	19	49	33	58	32.2
Shiga toxin-producing <i>E. coli</i> (STEC)	15	12	12	12	9	18	12.0
Shigellosis	4	1	1	0	3	21	1.8
Spotted Fever Rickettsiosis	0	0	0	0	1	1	0.2
<i>Staphylococcus aureus</i> with intermediate-resistance to vancomycin (VISA)	0	1	0	0	1	0	0.4
Streptococcal disease, invasive	74	57	78	73	67	87	69.8
Syphilis – all stages	13	11	21	20	14	14	15.8
Toxic-Shock Syndrome	7	1	2	0	1	2	2.2
Tuberculosis, active disease	3	0	1	1	0	0	1.0
Tuberculosis, latent infection	80	66	81	75	84	89	77.2
Vibriosis	0	0	0	0	0	1	0.0
West Nile Virus infection	1	1	0	0	0	0	0.4
Total	1,263	1,367	1,734	1,739	1,938	1,755	1608.2



Enteric Diseases

Enteric infections enter the body through the mouth and intestinal tract and are usually spread through contaminated food and water or by contact with vomit or feces.

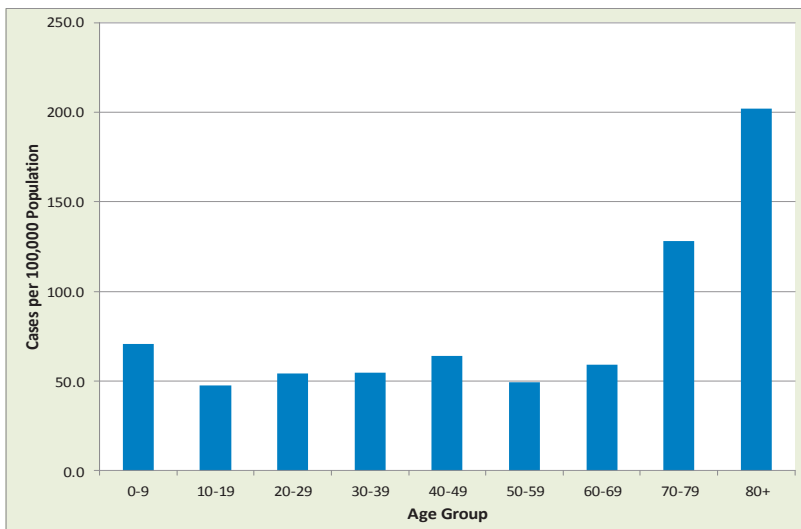
Figure 5. Enteric Diseases, Davis County, 2015



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 **210** enteric disease cases reported during 2015. Salmonellosis was the most frequently reported enteric disease with **58** cases (27.6%), followed by campylobacteriosis with **46** cases (21.9%), cryptosporidiosis with **26** cases (12.4%), norovirus with **21** cases (10.0%), shigellosis with **21** cases (10.0%), Shiga toxin-producing *E. coli* (STEC) with **18** cases (8.6%), giardiasis with **17** cases (8.1%), infant botulism with **2** cases (<1%), and vibriosis with **1** case (<1%) (see Figure 5).

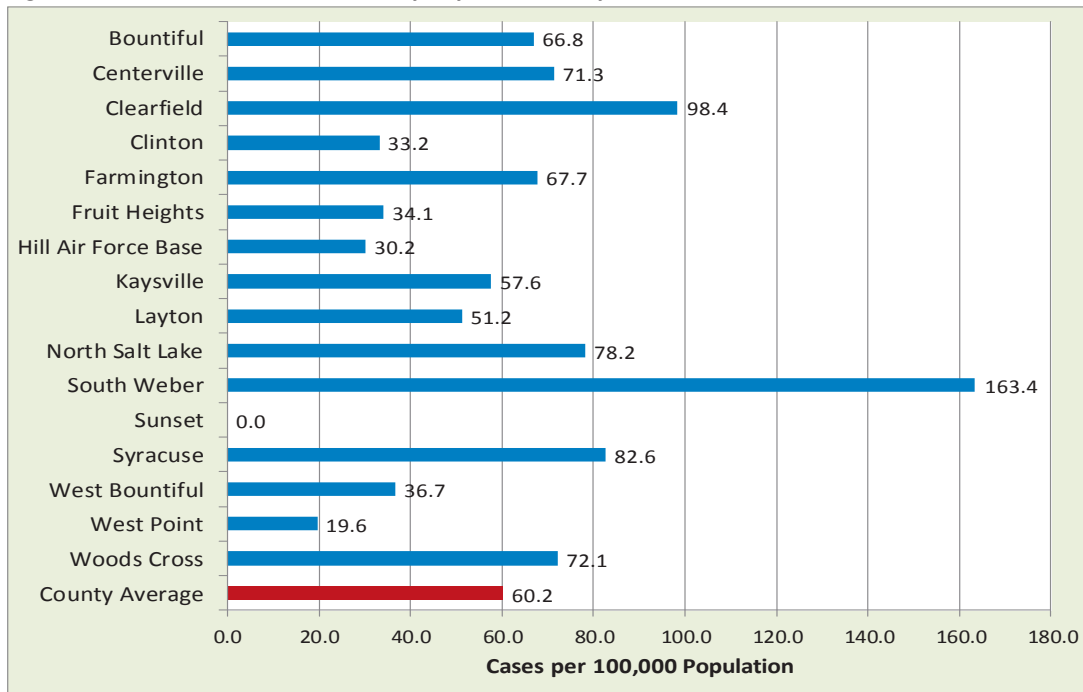
Figure 6. Incidence of Enteric Diseases by Age Group, Davis County, 2015



Over half of the cases were males (52.4%) and rates of illness were highest among those ≥ 80 years of age (see Figure 6). Enteric illnesses are often common among the elderly and other susceptible groups, including children and the immunocompromised.

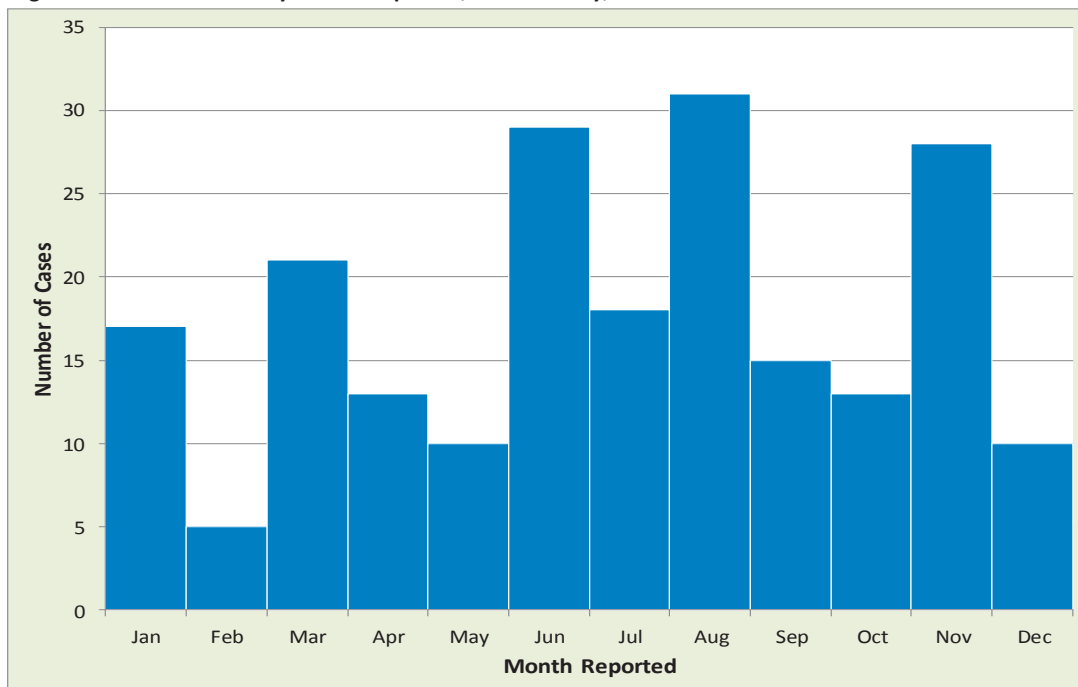
Enteric Diseases

Figure 7. Incidence of Enteric Diseases by City, Davis County, 2015



Enteric diseases were reported among residents of every city within Davis County, except Sunset. The rate by city varied, but the average rate of enteric diseases was 60.2 per 100,000 residents (see Figure 7). South Weber had the highest rate of enteric illnesses (163.4 per 100,000 residents) which may be due to a cluster of shigellosis that was identified in early 2015.

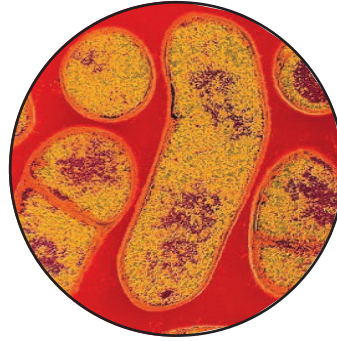
Figure 8. Enteric Disease by Month Reported, Davis County, 2015



Enteric disease are reported year-round, but a higher incidence is usually noted during the summer months (see Figure 8). In 2015, enteric illnesses peaked during August, but were elevated during several months of 2015.

Botulism

Foodborne botulism is a food poisoning caused by a toxin produced by the bacteria, *Clostridium botulinum*. Foodborne botulism occurs after eating food containing the toxin. The 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. Foodborne botulism produces symptoms that affect the nervous system, including blurred or double vision, general weakness, poor reflexes, difficulty swallowing, dry mouth, drooping of the upper eyelids, dilated pupils, constipation, and sometimes death.



Clostridium botulinum, the bacteria responsible for producing the toxin that causes botulism.

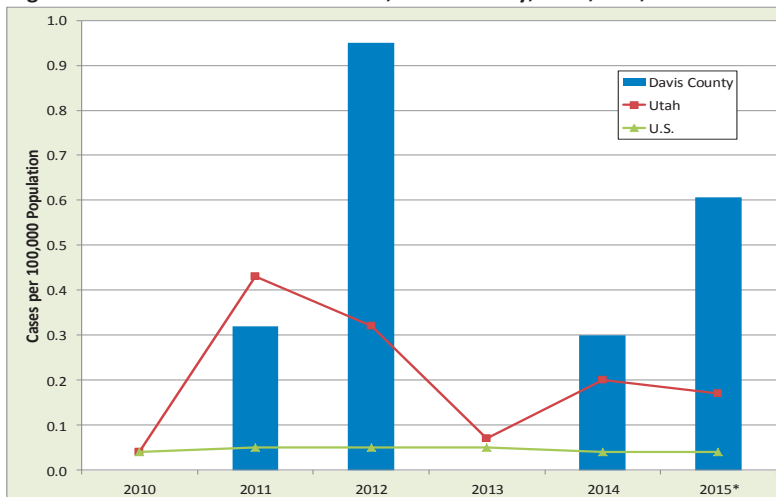
Infant botulism is a disease caused when the *Clostridium botulinum* toxin is produced in the intestines of very young children after becoming infected by the bacteria. Children who get infant botulism are generally younger than six months old. The spores of *Clostridium botulinum* are common in soil, 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 145 cases of botulism are reported each year. Of these, approximately 15% are foodborne, 65% are infant botulism, and 20% are wound botulism. Outbreaks of foodborne botulism involving two or more persons occur most years and are usually caused by eating contaminated home-canned foods. Most wound botulism cases are associated with black-tar heroin injection, especially in California.

During 2015, there were **two** cases of infant botulism and **no** cases of foodborne or wound botulism reported in Davis County (see Figure 9). The cases of infant botulism were not associated with the consumption of honey or corn syrup. However, both cases had exposure to dust or soil.

Figure 9. Incidence of Infant Botulism, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

2015 Highlights

There were two cases of infant botulism and no cases of foodborne or wound botulism in Davis County in 2015.

The cases of infant botulism were not associated with the consumption of honey or corn syrup.

On average, Davis County has had higher rates of infant botulism in the past few years when compared to Utah and the United States.

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 recognized outbreaks. Active surveillance through CDC indicates that about 14 cases are diagnosed each year for every 100,000 persons in the population. Many more cases go undiagnosed or unreported, and campylobacteriosis is estimated to affect over 1.3 million persons every year.



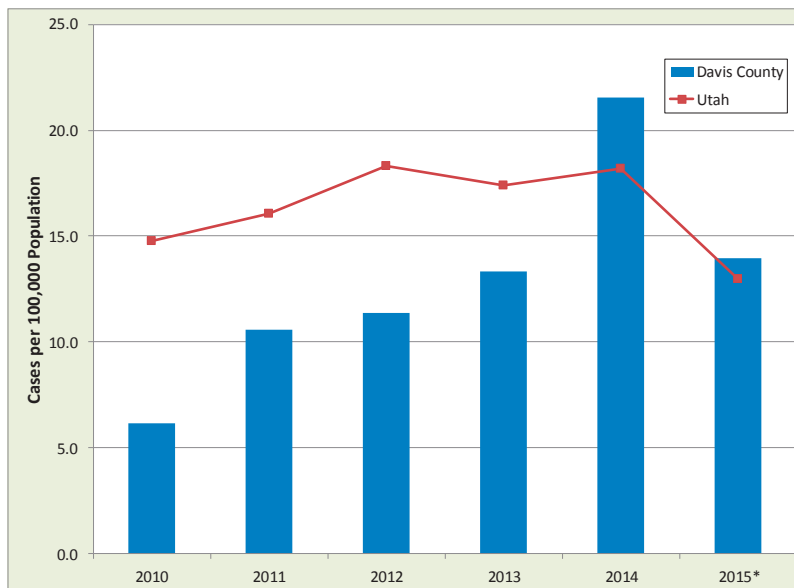
Campylobacter, one of the most common bacterial causes of diarrheal illness in the United States.

During 2015, there were **46** cases of campylobacteriosis reported in Davis County. Davis County Health Department investigated a cluster of campylobacteriosis during the summer of 2015 (see Figure 10).

Several cases of campylobacteriosis were detected in a Davis County city that coincided with a contaminated culinary water system. Secondary and culinary water lines were inadvertently cross-connected in a newly-constructed neighborhood. Davis County Health Department worked with the city to chlorinate and flush city water systems and performed daily water sampling until coliform and *E. coli* levels were appropriate.

When compared with the state of Utah, Davis County usually has low rates of campylobacteriosis (see Figure 10). In more recent years, however, Davis County has risen above the state's rate. This is most likely due to outbreaks of campylobacteriosis in Davis County that were linked to raw milk during 2014 and contaminated culinary water in 2015.

Figure 10. Incidence of Campylobacteriosis, Davis County, Utah, 2010-2015



*Utah 2015 data is provisional.

2015 Highlights

There were **46** cases of *Campylobacter* infection reported in Davis County in 2015.

A cluster of *Campylobacter* infections was investigated in June 2015. These illnesses coincided with an accidental cross-connection of secondary and culinary water lines in a newly-constructed neighborhood.

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, cryptosporidiosis 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.



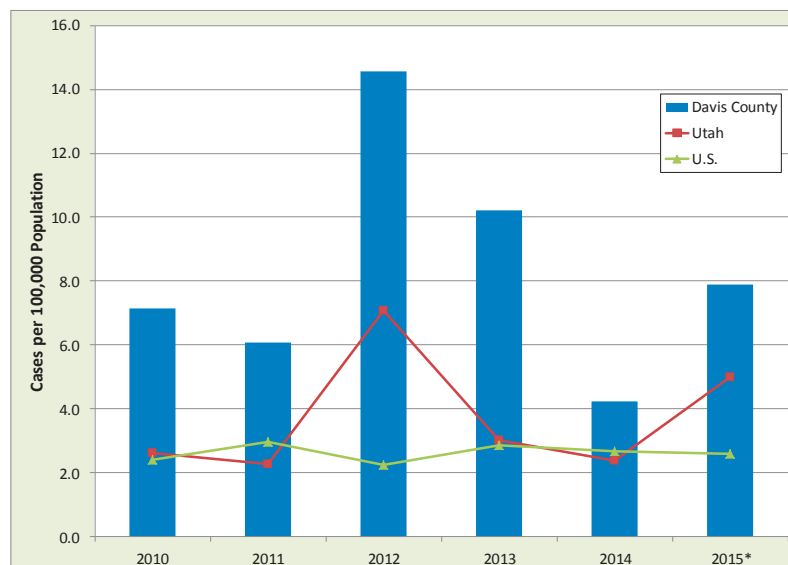
This micrograph of a direct fecal smear is stained to detect *Cryptosporidium*, a protozoan parasite.

During 2015, Davis County had **26** confirmed cases of cryptosporidiosis - an 86% increase from 2014 when only 14 cases were reported (see Figure 11). No clusters of illness were identified. Common exposures reported by cases included animal exposure, recreational water exposure, and international travel.

Near the end of 2014, several laboratories changed their testing procedures for cryptosporidiosis. In the past, cryptosporidiosis had been a singular test, but the procedure now tests for both giardiasis and cryptosporidiosis. As a result, an increased number of specimens were tested for cryptosporidiosis. This may be a possible explanation for the increased number of cases in Davis County this year.

Historically, Davis County has had higher rates of cryptosporidiosis when compared to Utah and the United States (see Figure 11). However, no cluster or outbreaks of illness due to cryptosporidiosis have been identified in Davis County since 2007. In 2007, Utah experienced one of the largest cryptosporidiosis outbreaks in the United States with over 3,500 cases statewide, including nearly 300 in Davis County. These cases were largely associated with public swimming pools. Cases have diminished since that time due to the implementation of new control measures, including installation of UV light filters in several Davis County pool systems and effective public service announcements.

Figure 11. Incidence of Cryptosporidiosis, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

2015 Highlights

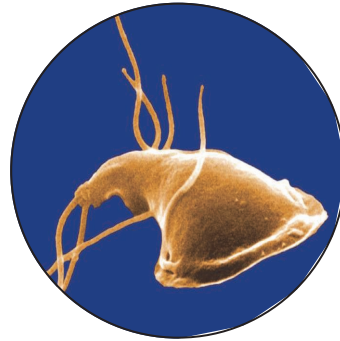
There were **26** cases of cryptosporidiosis reported in Davis County in 2015.

Common exposures included animal exposure, recreational water exposure, and international travel.

Historically, Davis County has had higher rates of cryptosporidiosis when compared to Utah and the United States.

Giardiasis

Giardiasis is caused by *Giardia lamblia*, a microscopic parasite that causes diarrheal illness. *Giardia* is found on surfaces or in soil, food, or water that has been contaminated with fecal matter from infected humans or animals. Humans and other mammals (especially beavers, dogs, and cats) are reservoirs and shed the organism in their stool.



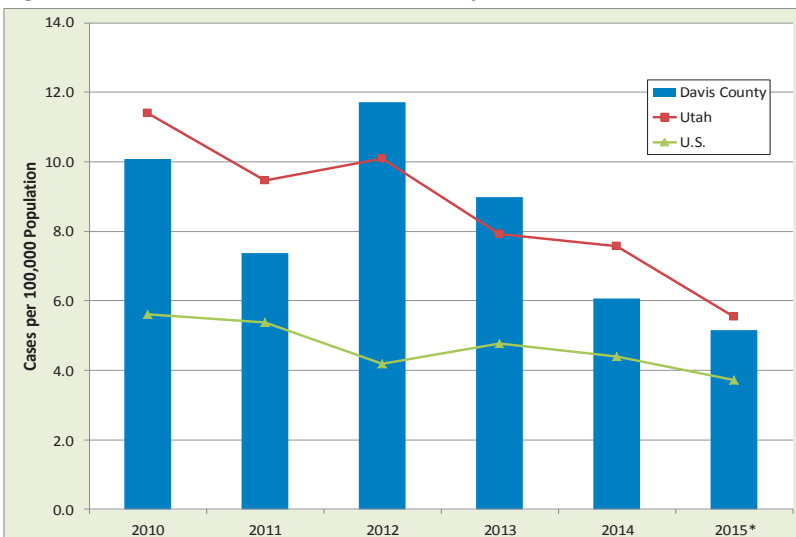
Giardia is a microscopic parasite that causes the diarrheal illness known as giardiasis.

Giardia is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it tolerant to chlorine disinfection. While the parasite can be spread in different ways, water (either drinking water or recreational water) is the most common mode of transmission.

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 2015, there were **17** cases of giardiasis reported in Davis County, a 15% decrease from the 20 cases reported in 2014 (see Figure 12). No outbreaks of giardiasis were investigated in Davis County during 2015. However, common exposures reported by cases included recreational water exposure, outdoor exposure, and international travel. In Utah (including Davis County), cases of giardiasis typically peak in the summer and early fall months, coinciding with more outdoor recreation and potential exposures to *Giardia lamblia*.

Figure 12. Incidence of Giardiasis, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

When compared to the state of Utah, Davis County traditionally has lower rates of giardiasis (see Figure 12). Davis County Health Department continues to conduct disease surveillance to identify cases and/or clusters, determine the source of infection, and prevent further transmission.

2015 Highlights

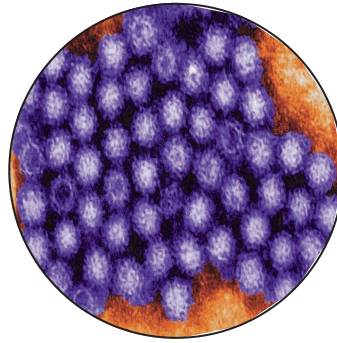
There were **17** cases of giardiasis reported in Davis County in 2015.

Common exposures include recreational water exposure, outdoor exposure, and international travel.

When compared to the state of Utah, Davis County traditionally has lower rates of giardiasis.

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 fecal-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 19-21 million cases of acute gastroenteritis due to norovirus infection occur each year. Norovirus is the leading cause of foodborne illness in the United States and is responsible for about 50% of foodborne disease outbreaks due to known agents.



Norovirus is a very contagious virus. You can get norovirus from an infected person, contaminated food or water or by touching contaminated surfaces.

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 outbreaks are not identified. 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 confirm a diagnosis.

During 2015, there were **21** confirmed cases of norovirus reported in Davis County, including one outbreak in a long-term care facility.

In November 2015, 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 few specimens from ill patients for laboratory confirmation. One of the specimens returned with positive results for norovirus GII. DCHD’s infectious disease nurse and Environmental Health food bureau manager visited the facility to discuss appropriate isolation/control measures and disinfection procedures. In total, 19 of 138 (13.8%) residents were affected. DCHD conducted daily surveillance at the facility through December 2015. No additional cases were reported.

2015 Highlights

A total of 21 cases of norovirus were reported in Davis County during 2015.

One cluster of norovirus was investigated during 2015 in a long-term care facility. A total of 19 residents were affected.

Norovirus is the leading cause of foodborne illness in the United States.

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. CDC estimates that approximately 1.2 million illnesses due to *Salmonella* occur in the United States every year. 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.



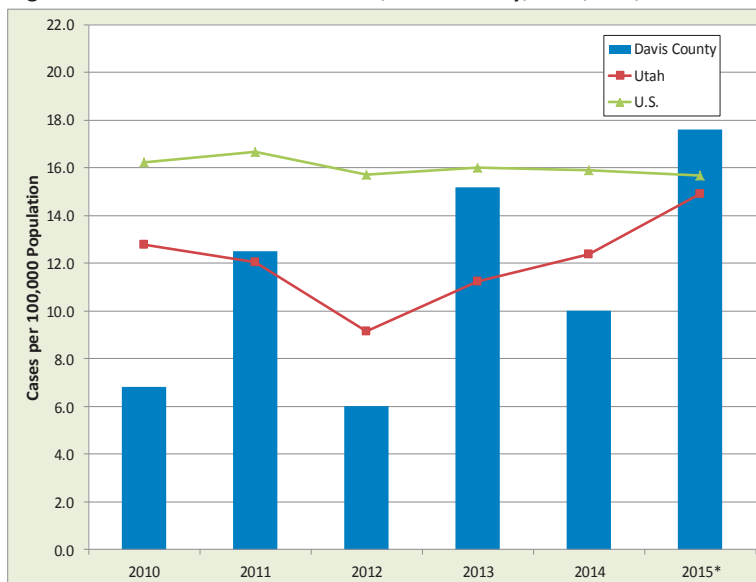
Salmonella is a bacteria that was discovered by an American scientist named Dr. Salmon and has been known to cause illness for over 125 years.

During 2015, there were **58** cases of salmonellosis reported in Davis County, a 76% increase from 33 cases reported in 2014 (see Figure 13). Several clusters of salmonellosis were identified in 2015. These are discussed in more detail below.

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 2015 (see Table 3). *Salmonella* Poona also had a significant presence in Davis County in 2015. Additional serotypes were reported in 2015, but were not as common. The number of cases of salmonellosis among Davis County residents by serotype is shown in Table 3.

Figure 13. Incidence of Salmonellosis, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

2015 Highlights

There were **58** cases of salmonellosis reported in Davis County in 2015.

Salmonella Enteritidis was the most commonly reported strain.

An outbreak of *Salmonella* Poona was linked to imported cucumbers and has infected over 800 individuals from 38 states, including 10 cases in Davis County.

Salmonellosis

Table 3. Salmonellosis Serotypes, Davis County, 2015

Serotype	Number of Cases (%)
Enteritidis	24 (41.4%)
Poona	10 (17.2%)
Typhimurium	4 (6.9%)
Serovar I 4, [5], 12:i:-	3 (5.2%)
Infantis	2 (3.4%)
Newport	2 (3.4%)
Anatum	1 (1.7%)
Brandenburg	1 (1.7%)
Derby	1 (1.7%)
Durban	1 (1.7%)
Durham	1 (1.7%)
Heidelberg	1 (1.7%)
Kentucky	1 (1.7%)
Muenchen	1 (1.7%)
Oranienburg	1 (1.7%)
Tennessee	1 (1.7%)
Virchow	1 (1.7%)
Weltevreden	1 (1.7%)
Unknown	1 (1.7%)
Total	58 (100.0%)

A few clusters of salmonellosis were investigated in Davis County during 2015.

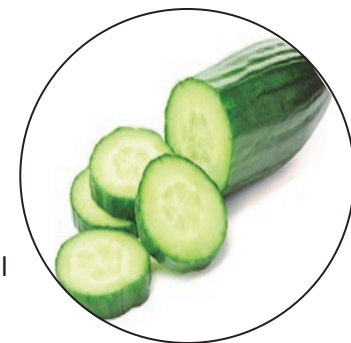


Salmonella Enteritidis

A cluster of *Salmonella* Enteritidis was identified in Davis and Salt Lake counties during November 2015. A total of four cases were linked to food items from the same food truck that is licensed to serve in both counties. After interviewing those who were ill, scrambled eggs were identified as a possible source of infection. Salt Lake County Health Department inspected the commissary facility, but found the company had recently changed from using shell eggs to a frozen egg product. Salt Lake County Health Department submitted food samples for testing, but all were negative for *Salmonella*. Traceback efforts to identify the source of their shell eggs have not located an implicated product to date. No additional cases have been reported since December 2015.

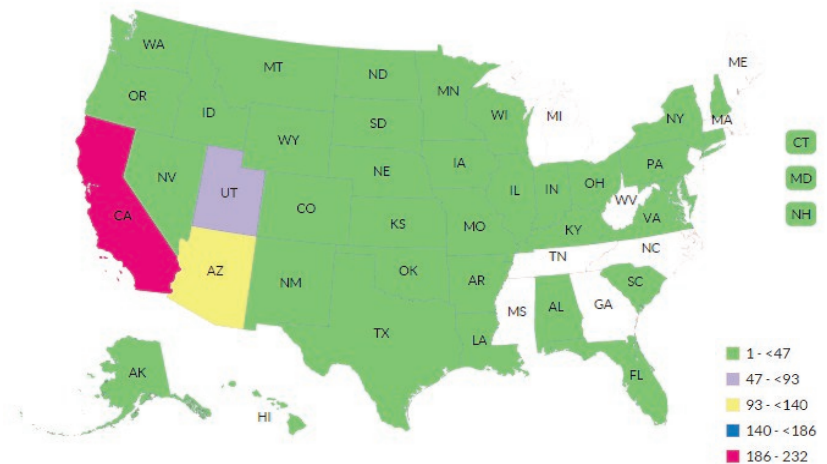
Salmonella Poona

A multistate outbreak of *Salmonella* Poona was identified during the summer of 2015. Epidemiologic, laboratory, and traceback investigations have identified cucumbers imported from Mexico as a likely source of the infection. Thus far, 838 individuals from 38 states have been confirmed with the outbreak strains of *Salmonella* Poona (see Figure 14). Although the number of cases in this outbreak have declined substantially since the summer, infections of *Salmonella* Poona are still occurring. CDC and state health departments continue to investigate additional sources of illness.



Davis County had six confirmed and four probable cases that were associated with this outbreak. Of the confirmed cases, 4 (67%) reported eating cucumbers.

Figure 14. People infected with *Salmonella* Poona, by state of residence, 2015



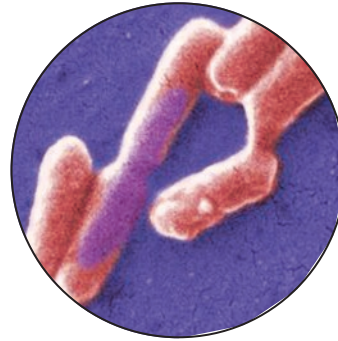
Shiga Toxin-Producing *Escherichia coli* (STEC) Infection

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 2015, there were **18** cases of STEC infection reported in Davis County, an increase of 100% from the 9 cases reported in 2014 (see Figure 15). The most common strain reported in Davis County was O26 with 8 cases (see Table 4). Other strains identified included O157:H7, O5:non-motile, O103, and O111 (see Table 4).



E. coli bacteria normally live in the intestines of people and animals. Most *E. coli* are harmless and actually are an important part of a healthy human intestinal tract.

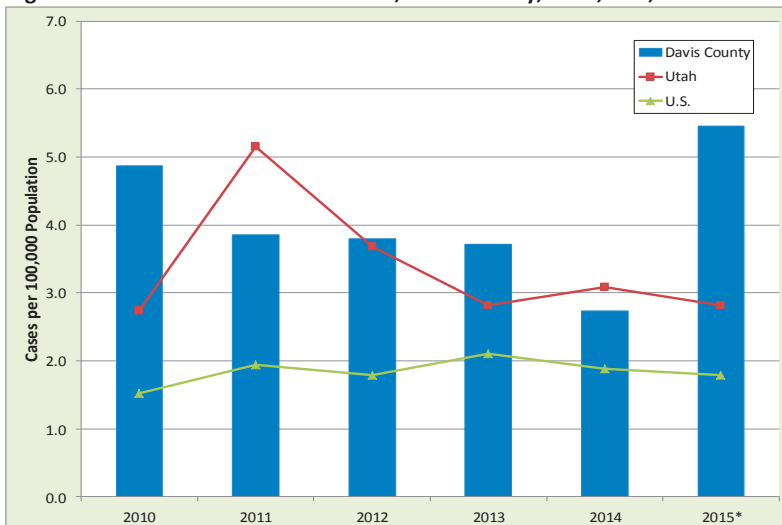
2015 Highlights

There were **18** cases of STEC infection reported in Davis County in 2015.

Common exposures include animal exposure, out-of-state travel, recreational water exposure, and drinking secondary/untreated water.

A multi-state cluster of *E. coli* O157:H7 was linked to Costco rotisserie chicken salad. Utah has five confirmed cases, but no Davis County cases.

Figure 15. Incidence of STEC Infections, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

Only three of the cases were hospitalized and no HUS or deaths were reported. Possible exposures reported by patients included animal exposure, out-of-state travel, recreational water exposure, and drinking secondary/untreated water.

Shiga Toxin-Producing *Escherichia coli* (STEC) Infection

Table 4. Shiga Toxin-Producing *E. coli* Serotypes, Davis County, 2015

Serotype	Number of Cases (%)
O26	8 (44.4%)
O157:H7	5 (27.8%)
Unknown	2 (11.1%)
O5:non-motile	1 (5.6%)
O103	1 (5.6%)
O111	1 (5.6%)
Total	18 (100.0%)

Figure 16. People infected with *E. coli* O157:H7, by state, as of December 18, 2015

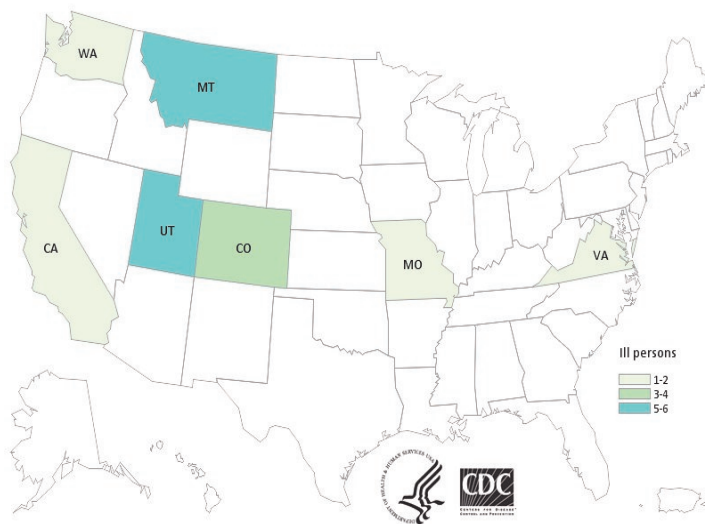
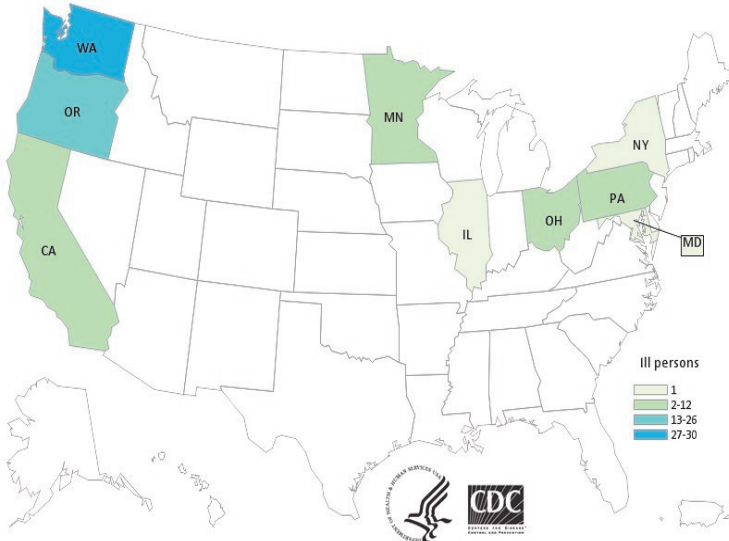


Figure 17. People infected with *E. coli* O26, by state, as of December 18, 2015



Although no Davis County cases were associated with any national or state STEC clusters during 2015, Utah (including Davis County) was involved in investigative efforts related to STEC infection.

E. coli O157:H7

A national outbreak of *E. coli* O157:H7 was identified in November 2015. Nineteen people from seven states were linked to this outbreak, including five cases from Utah (see Figure 16).



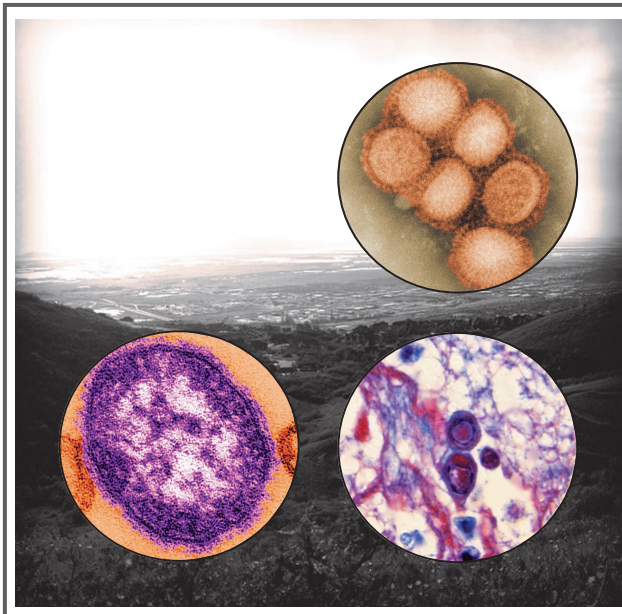
Epidemiologic evidence collected during the investigation suggested that rotisserie chicken salad made and sold in Costco in several states was the likely source of the outbreak. The suspected food item was removed from all stores in the United States. No additional cases related to this outbreak have been reported since December 2015.

E. coli O26

A national outbreak of *E. coli* O26 was identified in October 2015. A total of 53 people from 9 states have been linked to this outbreak (see Figure 17).



At this time, no cases have been identified in Utah. The investigation has not identified a specific food linked to the illness, but epidemiologic evidence available at this time suggests that a common meal item or ingredient served at Chipotle Mexican Grill restaurants in several states is a likely source of the outbreak. The restaurant is assisting public health officials to review how food items are distributed and served at the locations where ill people ate. The investigation is ongoing, however no new cases have been reported since December 2015.

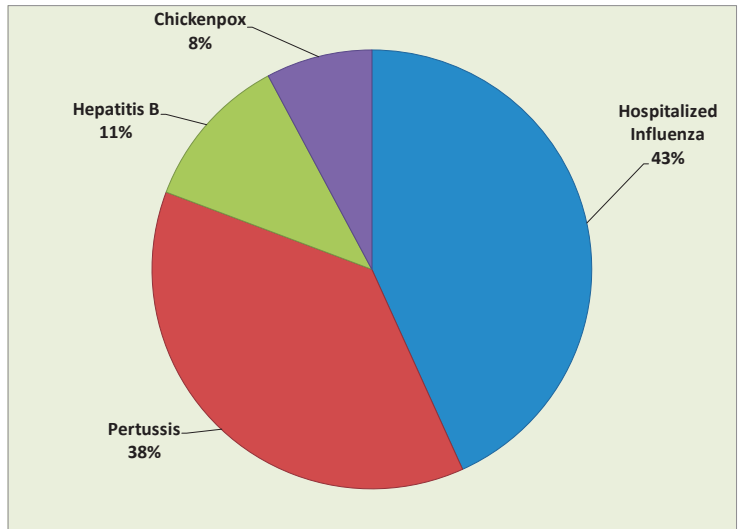


Vaccine-Preventable Diseases

Vaccine-preventable diseases are infectious diseases for which an effective preventive vaccine exists.

Vaccine-Preventable Diseases (VPDs) are diseases that are preventable through the use of immunizations. Historically, many VPDs 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.

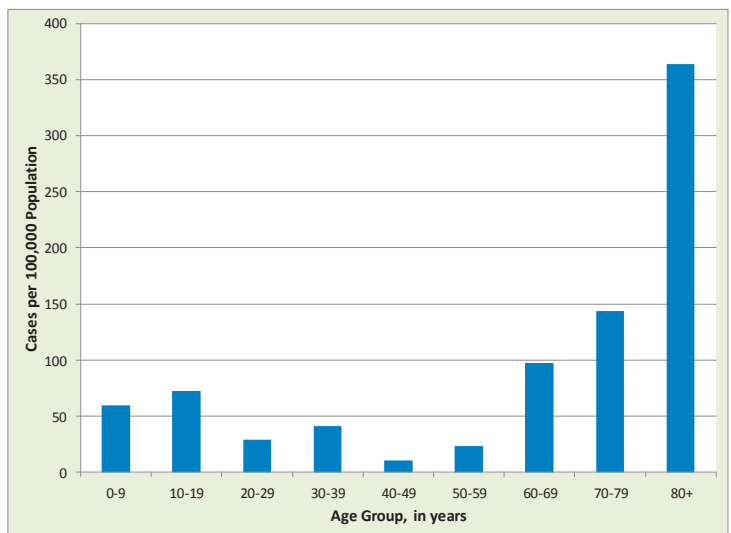
Figure 18. Vaccine-Preventable Diseases, Davis County, 2015



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

In 2015, hospitalized influenza was the most commonly reported VPD with **83** cases (43.0%). Pertussis was the next most common disease in this category with **72** cases (37.3%), followed by Hepatitis B with **23** cases (11.9%), and chickenpox with **15** cases (7.8%) (see Figure 18).

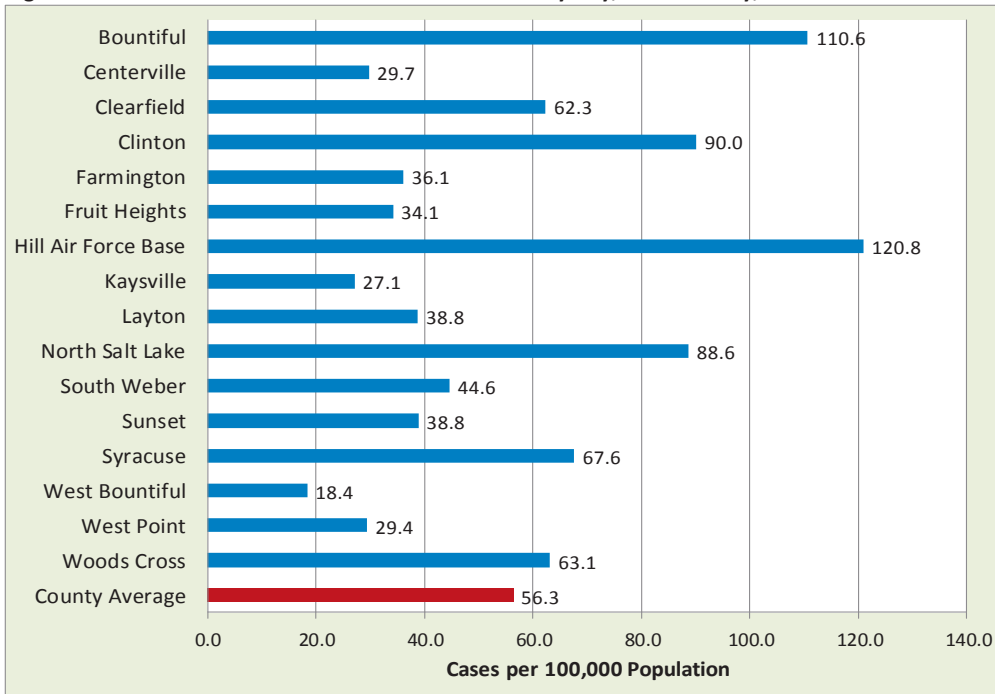
Figure 19. Incidence of VPDs by Age Group, Davis County, 2015



The incidence of vaccine-preventable diseases is highest among the elderly and children (see Figure 19). Influenza especially affected the elderly population this season.

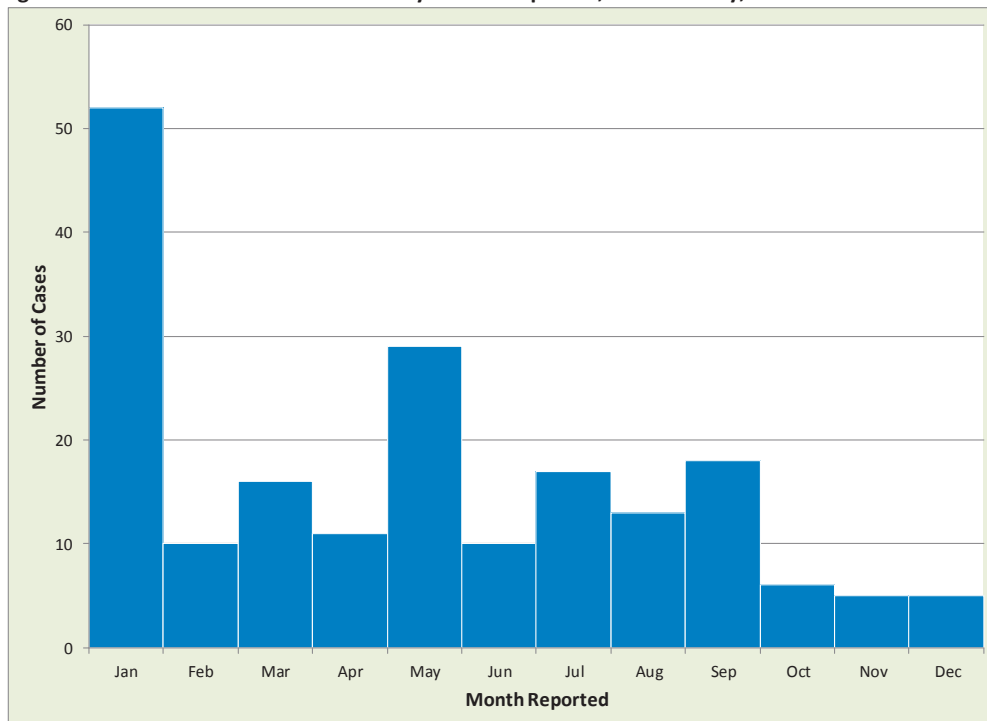
Vaccine-Preventable Diseases

Figure 20. Incidence of Vaccine-Preventable Diseases by City, Davis County, 2015



Vaccine-preventable diseases occurred in residents throughout the county (see Figure 20). The average rate of vaccine-preventable diseases was 56.3 cases per 100,000 residents.

Figure 21. Vaccine-Preventable Disease by Month Reported, Davis County, 2015



Vaccine-preventable diseases (particularly pertussis and chickenpox) are usually reported more frequently during the school year (see Figure 21). However, influenza season typically peaks during January or February. Due to the intensity of the 2014-15 influenza season, a significant jump in VPDs in January 2015 can most likely be attributed to the increased number of hospitalized influenza cases reported in Davis County (see Figure 21).

Hepatitis B (Acute and Chronic Infections)

Hepatitis B is a vaccine-preventable disease caused by the Hepatitis B virus (HBV). 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, an estimated 700,000 to 1.4 million persons have chronic Hepatitis B virus infection. Acute HBV infection occurs most commonly among adolescents and adults in the United States.

During 2015, there were **22** cases of Hepatitis B reported in Davis County. All 22 were determined to be chronic infections.

Eight chronic cases were pregnant and were referred to the Perinatal Hepatitis B Program for further interventions (see below). 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 Prevention 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 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, 25-50% become chronically infected. The risk drops to 6-10% when a person is infected over 5 years of age.

In 2015, eight women were followed through DCHD's Perinatal Hepatitis B Prevention Program.



The mission of the Perinatal Hepatitis B Prevention Program is to increase identification and treatment of women, their infants, and household contacts that are positive for the hepatitis B virus.

2015 Highlights

There were **23** cases of Hepatitis B reported in Davis County in 2015.

In 2015, eight women were followed through DCHD's Perinatal Hepatitis B Prevention Program.

As many as 90% of infants who acquire HBV infection from their mothers at birth become chronically infected.

Influenza

Influenza is an acute respiratory distress 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.

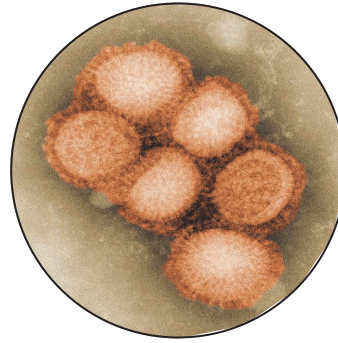
Because of the large number of cases that occur each season, traditional surveillance methods are impractical for influenza. Therefore, the disease is monitored using a variety of mechanisms. One method is through the use of “sentinel sites.” Davis County tracks physician visits for influenza-like illness 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. During the 2014-15 influenza season, four sentinel sites reported data to Davis County Health Department and Utah Department of Health.

Hospitals and other clinics submit specimens for influenza testing/typing to the Utah Public Health Laboratory so that circulating strains can be identified.

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.

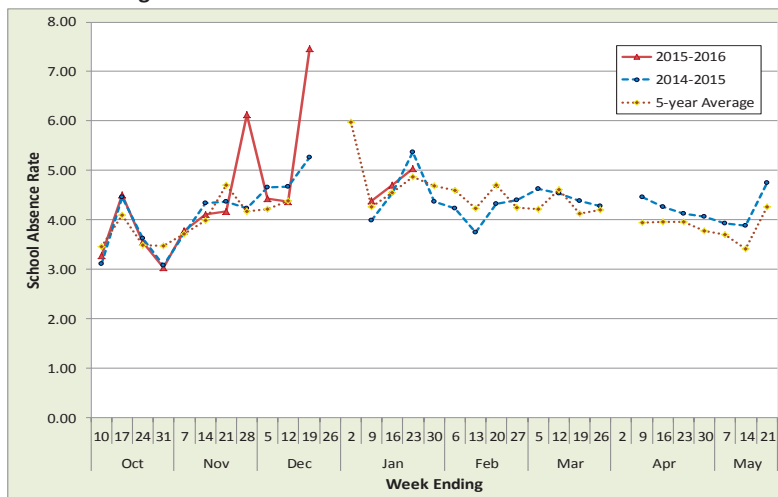
Davis County also partners with Davis School District to monitor elementary school absentee data. When schools experience a higher than expected absentee rate, the district is notified and an investigation is conducted to determine the cause of the excess absences. Increases in absenteeism are often seen as influenza season peaks (see Figure 22).

DCHD publishes a *Weekly Influenza Report* every Thursday during peak influenza season. These reports provide a current view of influenza activity in Davis County, Utah, and the United States. These reports are available on our website at: <http://goo.gl/7P63qq>.



Flu is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness.

Figure 22. Elementary School Absenteeism—Davis County, 2015-16, 2014-15, 5-Year Average



2015 Highlights

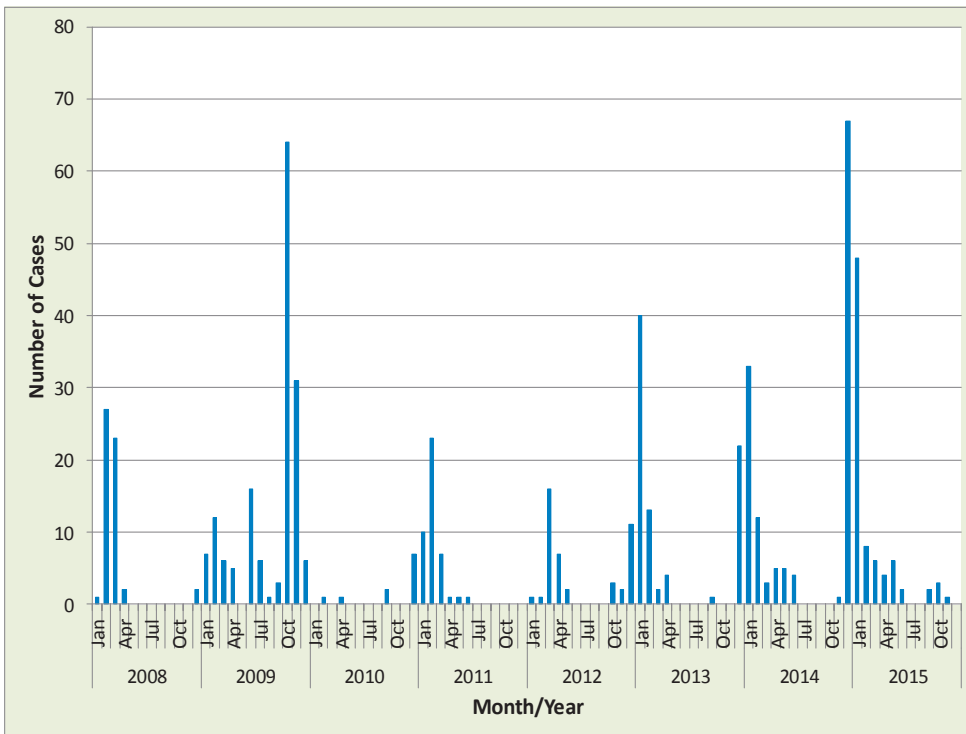
A total of 140 hospitalized-influenza cases were reported during the 2014-15 influenza season.

In the 2014-15 season, the most common circulating virus was influenza A (H3).

The current influenza season appears to be very mild.

Influenza

Figure 23. Hospitalized Influenza Cases by Month, Davis County, 2008-15



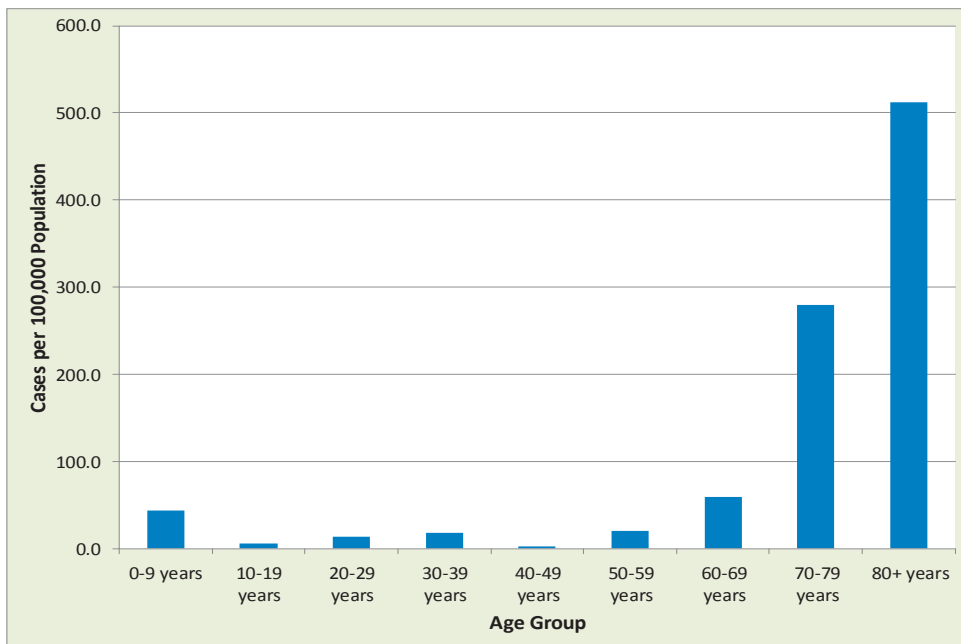
The 2014-15 influenza season (October 2014 - May 2015) was one of the most severe seasons in Davis County (see Figure 23). This may be related to the drift of the circulating strain from the strain in the vaccine. A total of **140** hospitalized-influenza cases were reported during the 2014-15 season, a dramatic increase from the **85** cases reported during the 2013-14 season.

Although influenza cases can occur at any time of the year, influenza viruses thrive during cold weather and cases typically peak in the winter months (January and February). During the 2014-15 influenza season, influenza activity peaked in December and continued to linger at a higher than normal rate (see Figure 23). The most common circulating strain was influenza A (H3).

The very young and very old are the populations most severely affected by influenza infection. These groups had the highest rates of hospitalizations in the 2014-15 influenza season (see Figure 24). Nearly 60% of the hospitalized cases were ≥ 65 years.

The current influenza season (October 2015 - May 2016) has been very mild thus far. Both influenza A and influenza B have been circulating in Davis County, but very few hospitalizations have been reported (see Figure 23).

Figure 24. Incidence of Hospitalized Influenza Cases by Age Group, Davis County, 2014-15 Influenza Season



Measles

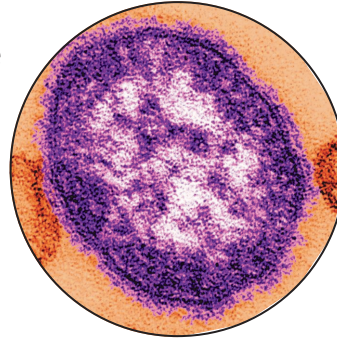
Measles is an acute viral respiratory illness. Although it is one of the most highly infectious diseases known, it is vaccine-preventable. Measles is transmitted by direct contact with infectious respiratory droplets or (less commonly) by airborne spread. Since 1992, the incidence in the United States has been low and indigenous cases are uncommon. Cases of measles continue to occur through importation of the virus from other countries.

In 2015, the United States experienced a large, multi-state outbreak of measles that was linked to a theme park in southern California (see Figure 25). The outbreak likely started from a traveler who became infected overseas with measles, then visited the amusement park while infectious; however, no source was identified. At least 125 cases were linked to this outbreak, including three cases in Utah.

The cases in Utah visited multiple venues where potential community exposures could have occurred. As a result, all local health departments across the state were on alert for possible cases of measles within their jurisdiction.

Fortunately, no cases of measles were confirmed in Davis County; however, Davis County Health Department investigated several suspect cases that were reported during the outbreak. Many of the suspected cases had traveled to the amusement park and had returned with a rash illness. All of these cases were ruled out.

This outbreak served as a helpful reminder to the community to fully vaccinate. During the outbreak, Davis County Health Department nurses answered multiple questions regarding the MMR immunization schedule and helped clients review their families' immunization status.



Measles virus is a highly contagious virus and spreads through the air through coughing and sneezing. It starts with fever, runny nose, cough, red eyes, and sore throat, followed by a rash that spreads over the body.

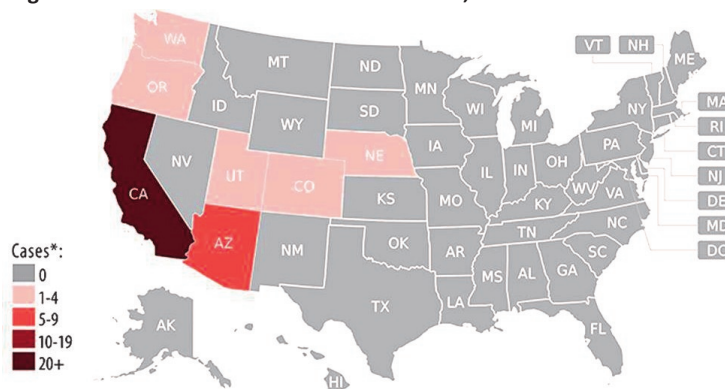
2015 Highlights

A large, multi-state outbreak of measles was linked to an amusement park in southern California in December 2014.

No confirmed cases were identified in Davis County; however, 3 cases were reported in Utah.

The outbreak served as a helpful reminder to fully vaccinate.

Figure 25. U.S. Multi-state Measles Outbreak, 2015



From December 28 to February 13, 2015, 125 people from 7 states [AZ (7), CA (110), CO (1), NE (1), OR (1), UT (3), WA (2)] were reported to have measles and are considered to be part of a large, ongoing outbreak linked to an amusement park in California*.

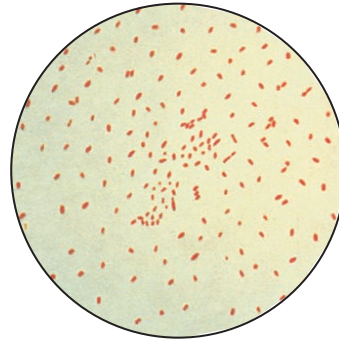
*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



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 2015, there were **72** cases of pertussis reported in Davis County. This corresponds to a 39% decrease in comparison to the 117 cases reported in 2014. Davis County Health Department investigates approximately 84 cases each year (based on a 5-year average), thus 2015 has been a mild year for pertussis.



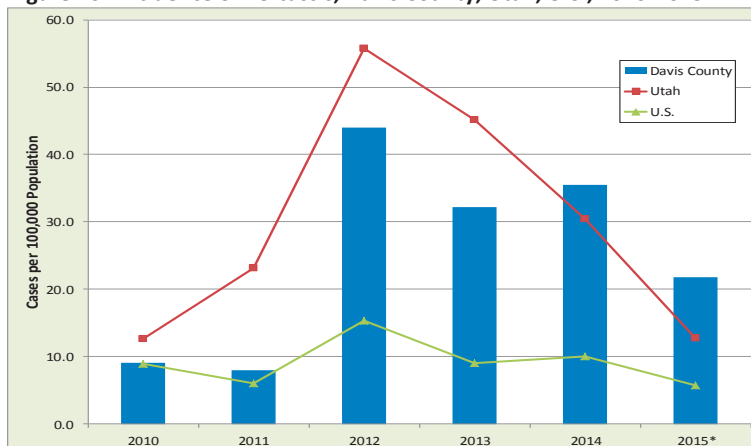
Pertussis is a respiratory illness commonly known as “whooping cough” after the gasping sound a patient makes when they suck in air after a coughing fit.

Declines in pertussis rates were also noted across Utah and the nation (see Figure 26). There were 376 cases of pertussis reported in Utah and the United States saw a 43% decrease in cases of pertussis reported in 2015.

Disease investigations conducted by Davis County Health Department 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 received Tdap vaccine with every pregnancy, preferably given between weeks 27-36. Tetanus vaccination, however, is recommended every 10 years.

Figure 26. Incidence of Pertussis, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

2015 Highlights

There were **72** cases of pertussis reported in Davis County during 2015.

Davis County investigates an average of 84 cases each year. Thus, 2015 could be considered a mild year for pertussis.

One outbreak of pertussis was investigated at a school in connection with an extracurricular dance team.

Pertussis

The age groups most often affected by pertussis are those who are under-vaccinated, including infants/children under five years (because they have not yet completed the full vaccination series) (see Figure 27). Although cases are also common in older children and adults due to waning immunity, illness in these age groups is usually milder and the diagnosis is often delayed or missed.

Cases of pertussis began to rise in March and peaked in May 2015 (see Figure 28) when an outbreak was linked to an extracurricular dance team at a local school. Four students were confirmed with pertussis and had significant contact with all team members during competition trips and tryouts. A total of 25 students and faculty/advisors were exposed. Davis County Health Department worked with Davis School District to notify parents of their student’s exposure and isolate symptomatic individuals until completion of a prophylactic antibiotic or a 21-day incubation period was complete.

In 2015, pertussis cases were reported throughout Davis County (see Figure 29). However, the incidence of disease was highest in Clinton, Syracuse, and Woods Cross. Overall, the average rate of pertussis in the county was 22.3 cases per 100,000 population - a slight decrease from the 30.6 cases per 100,000 population that was reported in 2014.

Figure 27. Incidence of Pertussis by Age Group, Davis County, 2015

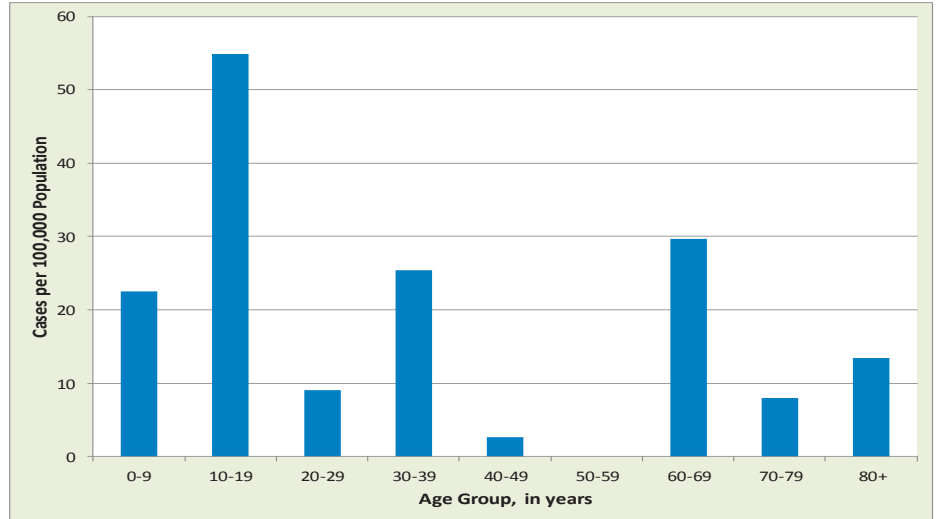


Figure 28. Pertussis by Month Reported, Davis County, 2015

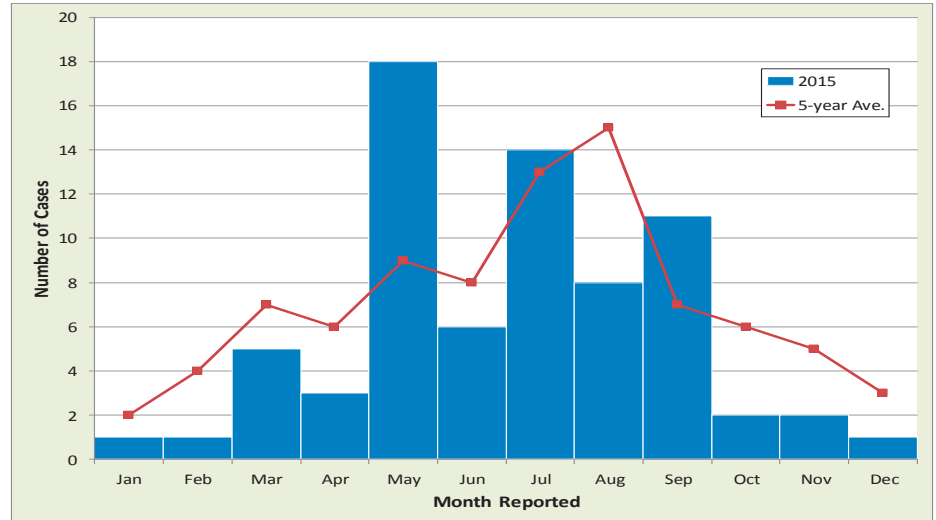
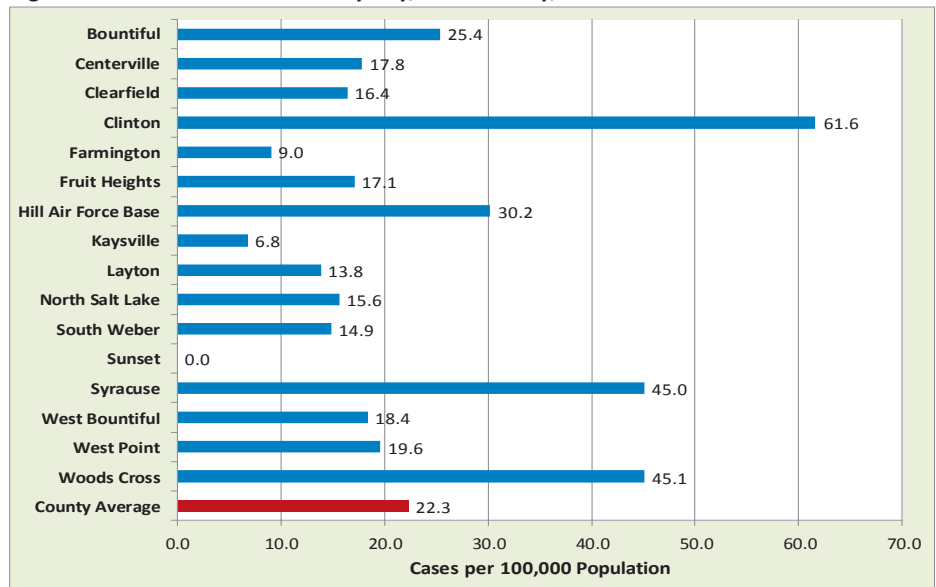


Figure 29. Incidence of Pertussis by City, Davis County, 2015





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. Most of the cases reported in 2015 were acquired outside of Utah and four cases were acquired outside of the United States.

In 2015, there were **6** cases of vectorborne/zoonotic diseases reported in Davis County (see Table 5). Exactly half of the cases of vectorborne/zoonotic disease were female and all were adults.

Table 5. Cases of Vectorborne/Zoonotic Diseases in Davis County, 2015

Disease	Location(s) of Exposure	Suspected Source of Infection	Number of Cases
Chikungunya	Philippines, Thailand Mexico	Mosquito bite	2
Lyme disease	Idaho	Tick bite	1
Malaria	Benin Mali	Mosquito bite	2
Spotted Fever Rickettsiosis	Utah	Tick bite	1

Recent media attention has highlighted on Zika virus. Zika virus is a new and emerging disease that is transmitted to humans primarily through the bite of an infected mosquito. The most common symptoms of Zika virus include fever, rash, joint pain, and conjunctivitis. Currently, outbreaks of Zika have occurred in areas of Africa, Southeast Asia, the Pacific Islands, and the Americas; however, it is possible that the outbreak may spread to other countries. Locally-transmitted Zika virus has been reported in Puerto Rico and cases of Zika have been reported in travelers returning to the United States. The virus can also be transmitted from a pregnant mother to her baby during pregnancy or around the time of birth. Microcephaly and other poor pregnancy outcomes were reported in babies whose mothers were infected with Zika virus while they were pregnant. Additional research is planned to learn more about the risks of Zika virus infection during pregnancy; but until more is known, CDC recommends that pregnant women take special precautions when traveling to countries where Zika virus transmission is ongoing.

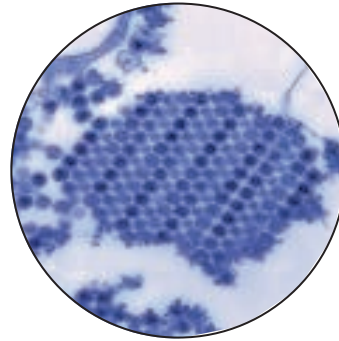
Chikungunya

Chikungunya is an emerging infectious disease in the United States. It is a viral disease that is spread to people by the bite of infected mosquitoes. The most common symptoms of chikungunya virus infection are fever and joint pain. Other symptoms may include headache, muscle pain, joint swelling, or rash.

Although most transmission of chikungunya has occurred among travelers who have recently visited the Caribbean, South America, or the Pacific Islands, locally-acquired cases were identified in the United States in Florida, Puerto Rico, and the Virgin Islands in 2014 (see Figure 30). There is a risk that the virus will be imported to new areas by infected travelers.

There is no vaccine to prevent or medicine to treat chikungunya virus infection. Travelers can protect themselves by preventing mosquito bites by using insect repellent, wearing long sleeves and pants, and staying in places with air conditioning or that use window and door screens.

In 2015, there were **two** cases of chikungunya reported in Davis County. Both cases had traveled internationally during their exposure period and are considered travel-associated cases. Provisional data suggests that no locally-acquired cases were reported in the United States during 2015 (see Figure 31).



Chikungunya virus is transmitted to people by mosquitoes. Most cases are found among travelers to the Caribbean, South America, or the Pacific Islands. However, locally acquired cases have been identified in Florida, Puerto Rico, and the Virgin Islands.

Figure 30. Countries Where Chikungunya Cases Have Been Reported, as of October 20, 2015

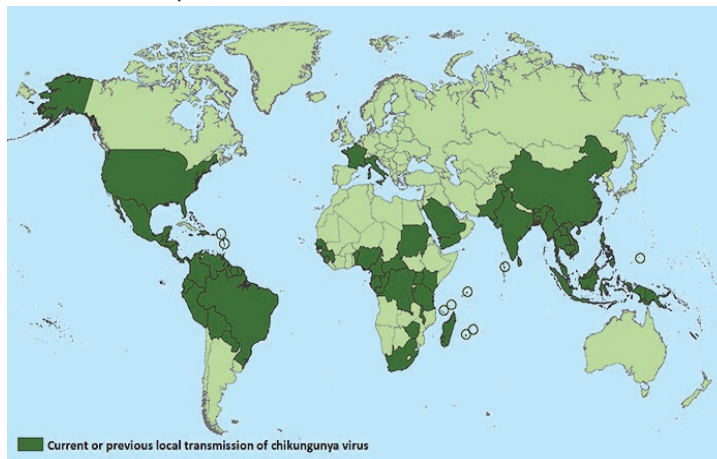
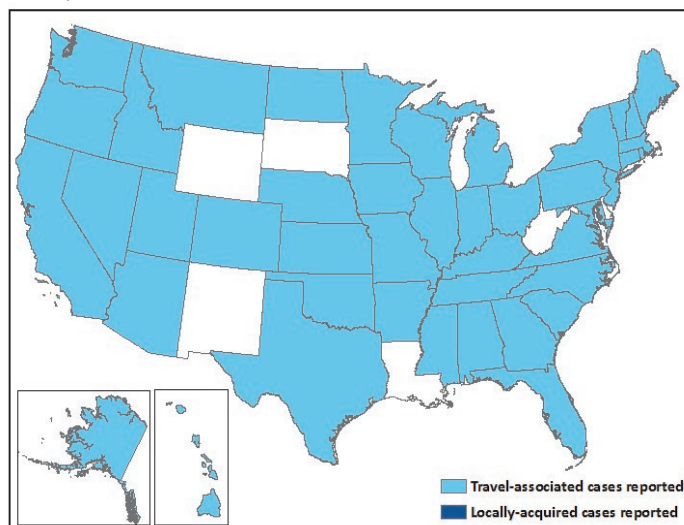


Figure 31. States reporting chikungunya virus disease cases, United States, 2015



2015 Highlights

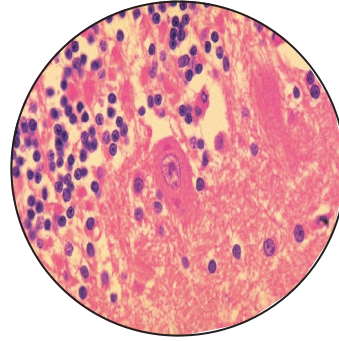
There were **two** cases of chikungunya reported in Davis County during 2015.

Both cases had traveled internationally during their exposure period.

Provisional data suggest that no locally-acquired cases were reported in the United States during 2015.

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.



The rabies virus infects the central nervous system, ultimately causing disease in the brain and death.

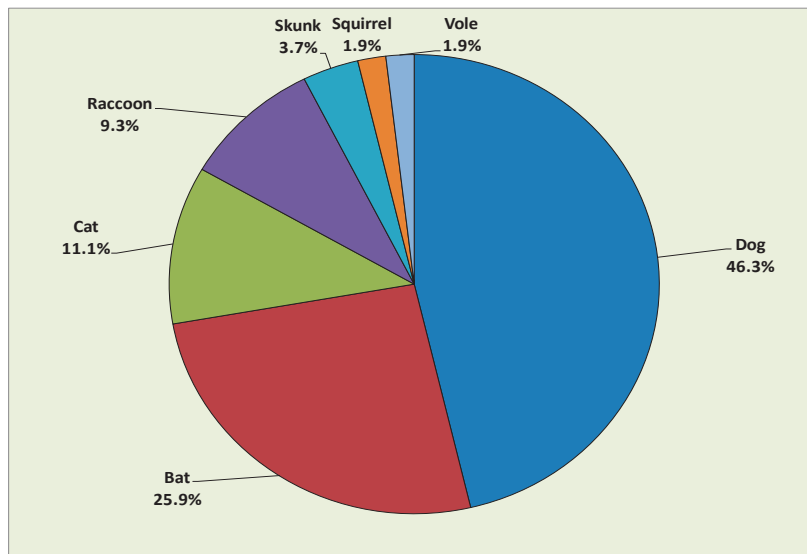
Rabies-related human deaths are very rare in the United States today. Prophylaxis treatment has proven nearly 100% successful, preventing serious illness and mortality in those who are exposed to an at-risk animal. Most human fatalities associated with rabies occur in people who fail to seek medical assistance, usually because they were unaware of their exposure.

The Communicable Disease and Epidemiology Division evaluated 496 individuals who reported an exposure to an “at-risk” animal in 2015. 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 the 47 individuals that were recommended PEP, 16 completed treatment and 22 declined.

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 2015, Davis County Environmental Health Division submitted 53 animals for rabies testing (see Figure 32). Of these, 38 (72%) involved a human exposure and 15 (28%) were animal-to-animal exposures. **Five** bats tested positive for rabies — no other animals were positive. No cases of human rabies were reported.

Figure 32. Animals Tested for Rabies, Davis County, 2015

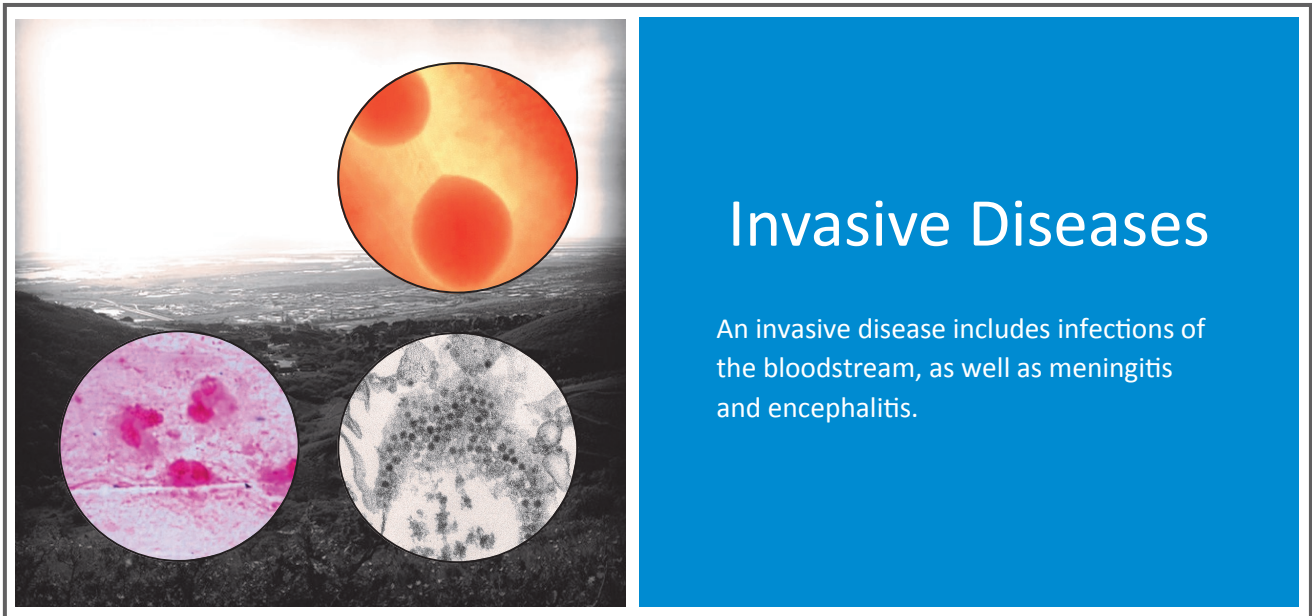


2015 Highlights

A total of 496 individuals who reported an exposure to an at-risk animal were evaluated in 2015.

During 2015, five bats tested positive for rabies.

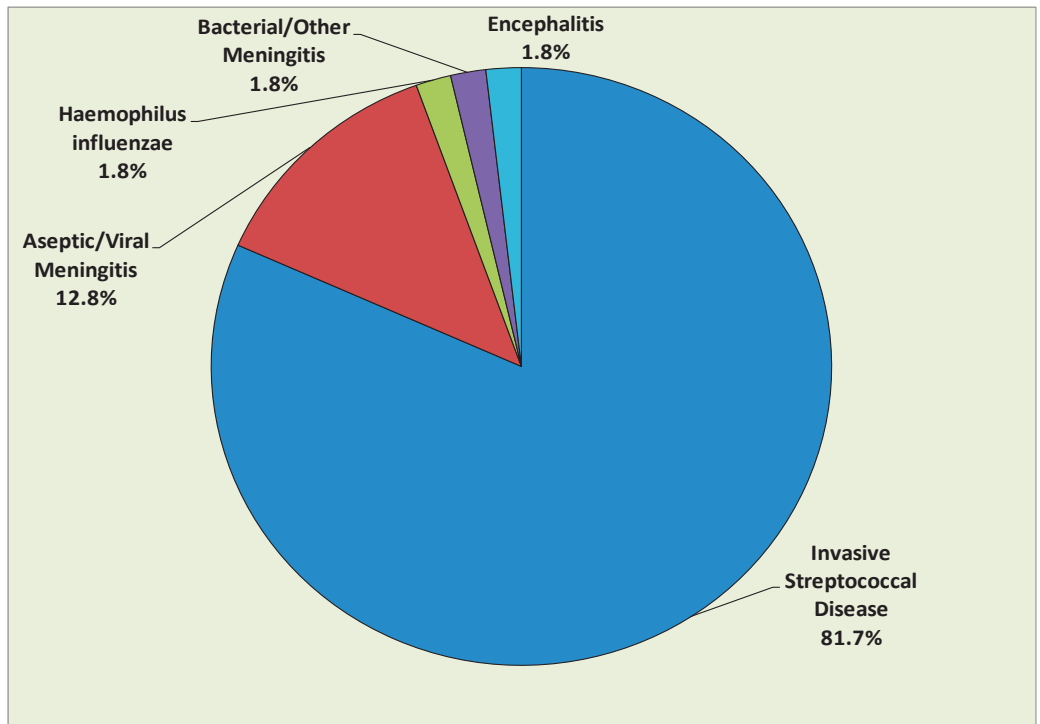
Of the 53 animals submitted for testing, 72% involved a human exposure.



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 2015 were invasive streptococcal infections with **89** (81.7%) cases. These included Group A *Streptococcus*, Group B *Streptococcus*, Group C & G *Streptococcus*, *Streptococcus pneumoniae*, and other streptococcal infections. Aseptic/viral meningitis was the second most common disease in this category with **14** (12.8%) cases, followed by *Haemophilus influenzae* with **2** (1.8%) cases, bacterial/other meningitis with **2** (1.8%) cases, and encephalitis with **2** (1.8%) cases (see Figure 33).

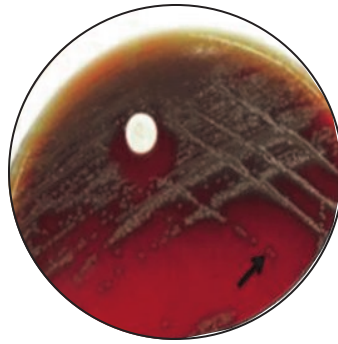
Figure 33. Invasive Diseases, Davis County, 2015



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 *streptococcus*. They can also be found as part of normal human flora. Many people with Group C infections 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 sinus and ear infections. More than 90 types of pneumococcal bacteria exist, but not all are considered to be invasive. Of the strains causing invasive disease, 88% are serotypes included in the 23-valent polysaccharide vaccine (PPSV23). Before the first pneumococcal conjugate vaccine (PCV7) was introduced in 2000, the seven serotypes which it prevents were responsible for over 80% of severe pneumococcal infections among children. Now, the PCV13 vaccine includes the original seven serotypes in PCV7 plus six additional serotypes. The best way to prevent pneumococcal disease is by getting vaccinated.



Most strep infections are relatively mild illnesses such as strep throat, scarlet fever, and impetigo. Occasionally these bacteria can cause severe and life-threatening diseases.

2015 Highlights

In 2015, there were 87 cases of invasive streptococcal infections reported in Davis County.

The majority of cases were due to strains that do not require investigation or public health control measures.

There was a 4.6% case fatality rate due to invasive streptococcal infections in 2015.

Invasive Streptococcal Infections

In 2015, 87 cases of invasive streptococcal infections were reported (see Figure 34). 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. mitis*) (see Table 6).

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 2015, four out of 87 cases were fatal, a case fatality rate of 4.6%. This represents a slight increase from the 4.4% reported in 2014.

Figure 34. Invasive Streptococcal Infections by Month, Davis County, 2015

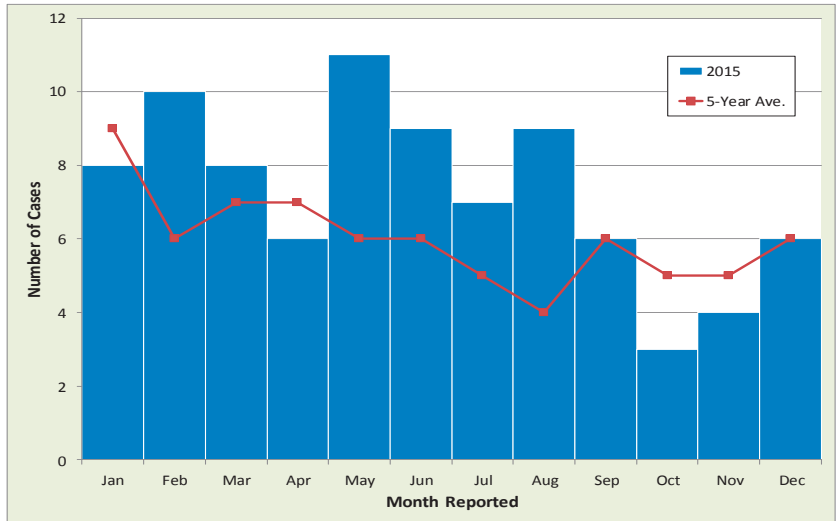
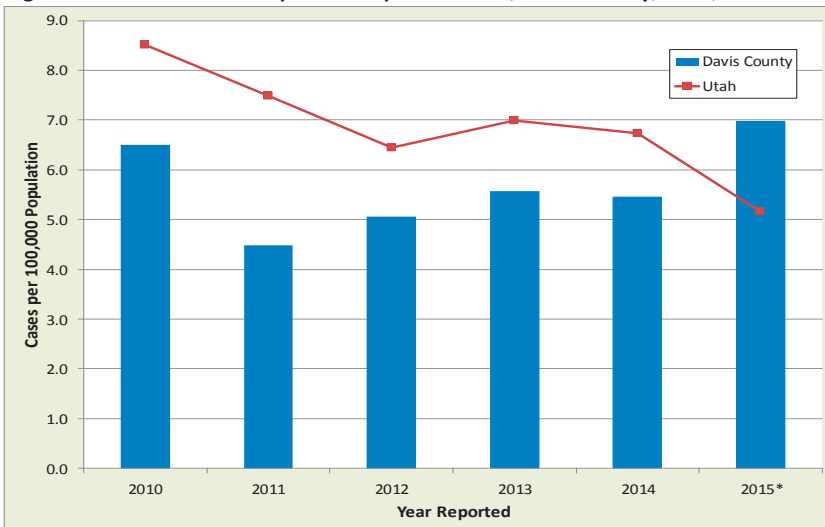


Table 6. Types of Invasive Streptococcus Infections, Davis County, 2015

Type	Number of Cases
Group A <i>Streptococcus</i>	13
Group B <i>Streptococcus</i>	11
Group C and Group G <i>Streptococcus</i>	5
Other <i>Streptococcus</i> (<i>mitis</i> , <i>viridans</i> , etc.)	35
<i>Streptococcus pneumoniae</i>	23
Total	87

Figure 35. Incidence of *Streptococcus pneumoniae*, Davis County, Utah, 2010-2015



Infection with *Streptococcus pneumoniae* is particularly serious. Nationally, incidence in healthy young adults is 3.8 per 100,000, but incidence in those less than 2 years or greater than 64 years is ten times higher. In 2015, two of the 23 (8.7%) *S. pneumoniae* cases in Davis County were fatal. Fortunately, *Streptococcus pneumoniae* rates have been decreasing in Utah since 2010 (see Figure 35).



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), coccidioidomycosis, legionellosis, Creutzfeldt-Jakob Disease (CJD), and Hepatitis E (see Table 7).

Table 7. Other Reportable Disease/Conditions, Davis County, 2015

Disease	Number of Cases
Hepatitis C, acute and chronic	132
Carbapenem-Resistant Enterobacteriaceae (<i>Acinetobacter</i> , <i>Klebsiella</i> , <i>E. coli</i>)	9
Coccidioidomycosis	4
Legionellosis	4
Creutzfeldt-Jakob Disease (CJD)	1
Hepatitis E, acute	1
Total	151



Hepatitis C



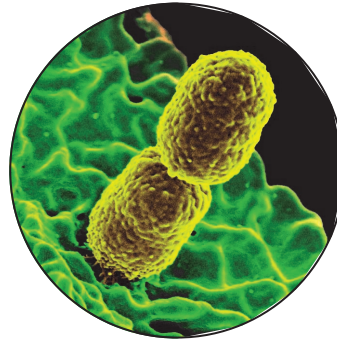
Legionella



Creutzfeldt-Jakob Disease (CJD)

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 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 healthcare facilities throughout the United States.



Klebsiella is a type of Gram-negative bacteria that can cause different types of healthcare-associated infections, including pneumonia, blood infections, wound or surgical site infections, and meningitis.

Utah laboratories and healthcare facilities are required to report the following CREs to the state or local health department:

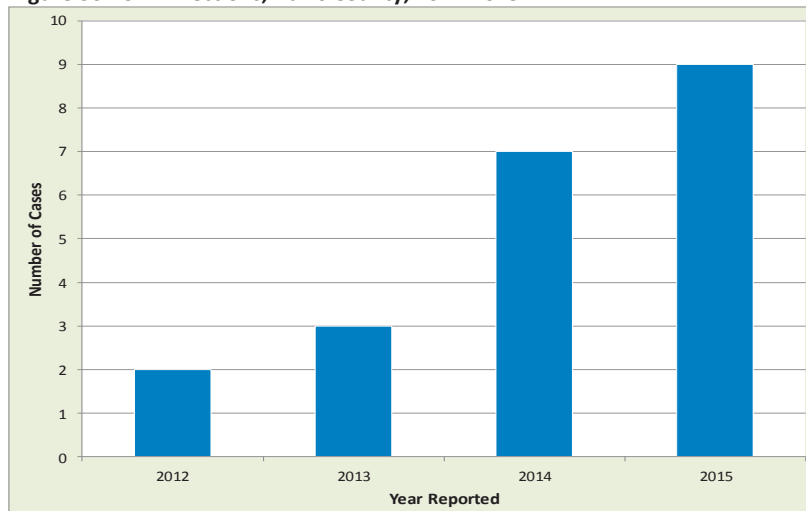
- *Acinetobacter* species with resistance or intermediate resistance to carbapenem (meropenem and imipenem) from any site
- *Escherichia coli* with resistance or intermediate resistance to carbapenem (meropenem, ertapenem, and imipenem) from any site
- *Klebsiella* species with resistance or intermediate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

A total of **nine** CREs (including eight *Acinetobacter* cases and one *Klebsiella* case) were reported to Davis County Health Department during the year (see Figure 36). This

represents a 29% increase from the seven cases reported in 2014. All but one of these patients were at a Davis County healthcare facility when their respective infection was diagnosed. Appropriate control measures were implemented at each facility.

Figure 36. CRE Infections, Davis County, 2012-2015



2015 Highlights

A total of **nine** CREs were reported to DCHD in 2015.

This includes **eight** *Acinetobacter* cases and one *Klebsiella* case.

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.

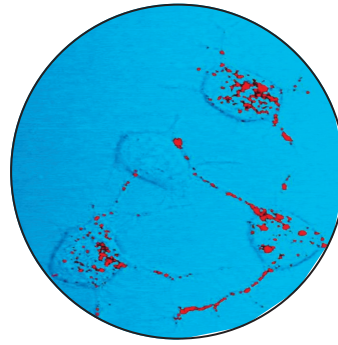
The causative agent of TSEs is believed to be a prion. A prion is an abnormal, transmissible agent that is able to induce abnormal folding of normal cellular prion proteins in the brain, leading to brain damage and the characteristic signs and symptoms of the disease. Prion diseases usually progress 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 one year of onset of illness. It 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 roughly 1 to 2 cases per 1 million population per year. The risk of CJD increases with age. In persons >50 years of age, the annual rate is approximately 3.4 cases per million. Whereas the majority of cases of CJD occur as sporadic disease, a smaller proportion of patients (5-15%) develop CJD because of inherited mutations of the prion protein gene.

CJD is found everywhere in the world, but it is very rare. On average, only one in a million people each year will get this disease. Since 1980, 37 Utahns have died of CJD. This number is not higher than expected.

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 that is required to confirm the diagnosis of CJD. These services are provided free of charge. Specimens collected during the autopsy are submitted to the National Prion Disease Pathology Surveillance Center (NPDPSC) for disease confirmation. These cases are examined individually to aid in the timely detection of new or atypical cases and establish more accurate classifications of prion diseases.

Davis County investigated **one** case of sporadic CJD in 2015. The patient experienced a rapid deterioration, eventually resulting in death. The family chose not to proceed with an autopsy, thus the case could not be confirmed. However, the patient's clinical symptoms and preliminary laboratory work were consistent with CJD. DCHD worked with the mortuary and educated on necessary precautions to take during funeral services.



Classic Creutzfeldt-Jakob Disease is a rare, fatal, degenerative brain disease caused by abnormal, transmissible proteins called prions.

2015 Highlights

Since 1980, 37 Utahns have died of CJD. This number is not higher than expected.

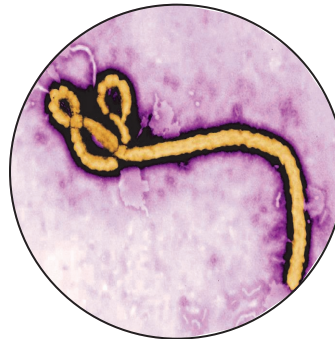
DCHD investigated one probable case of CJD during 2015.

On average, only one in a million people each year will get this disease.

Ebola Hemorrhagic Fever

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*); Taï Forest virus (*Taï 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.



The 2014 Ebola outbreak is the largest Ebola outbreak in history and the first Ebola outbreak in West Africa. This outbreak is the first Ebola epidemic the world has ever known.

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 need to have direct contact with an individual who is experiencing symptoms. Ebola virus is not spread through the air or 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 handle the body during funeral preparations.

The 2014 Ebola epidemic is the largest in history, affecting multiple countries in West Africa (see Figure 37). 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 further spread of Ebola within the United States.

2015 Highlights

The Ebola outbreak in West Africa continues, although cases have significantly diminished.

During 2015, Davis County monitored individuals who had traveled to West Africa for symptoms of Ebola.

Davis County continues to prepare and plan for the possibility of Ebola reaching our community.

Ebola Hemorrhagic Fever

One such precaution was the implementation of screening and monitoring procedures among travelers. All travelers departing from an affected West African country were screened before departure, upon arrival in the United States, and monitored for the next 21 days by the local health department within the jurisdiction of their final destination. Travelers received a CARE (Check And Report Ebola) Kit which included a thermometer, information on Ebola-like symptoms, and phone numbers to contact if they became symptomatic (see Figure 38). Davis County Health Department monitored several travelers during 2015.

Guinea was also declared Ebola-free on December 29, 2015 and has entered a 90-day period of heightened surveillance. After a re-emergence of Ebola virus that had persisted in a previously infected individual, Liberia was declared Ebola-free on January 14, 2016. Sierra Leone was declared Ebola-free on November 7, 2015, but confirmed a new case of Ebola on January 14, 2016. Public health officials acted quickly to complete contact tracing and continue to investigate the origin of this infection. As transmission in these countries continues to decline, monitoring efforts will also be discontinued. However, the World Health Organization cautions that an ongoing risk of reemergence is possible.

Davis County Health Department continues to dedicate numerous hours to planning and preparing for Ebola. In 2015, grant funding was made available to local health departments to prepare an Ebola Virus Disease Operations Plan. This funding provided an opportunity to cross-train an Environmental Health Scientist (who brings a knowledge-base of respiratory protection and HAZMAT skills) in the area of Ebola preparedness. In 2015, efforts focused on collaboration with the medical community, including Emergency Medical Services (EMS). Hospitals across the United States also received funding to increase capabilities to provide assessment and care of suspect cases of Ebola. Current plans are being developed to enhance partnerships with our medical community to ensure viral containment and solid understanding of established roles and responsibilities.

Figure 37. Ebola Outbreak Distribution Map, West Africa, 2013-2015

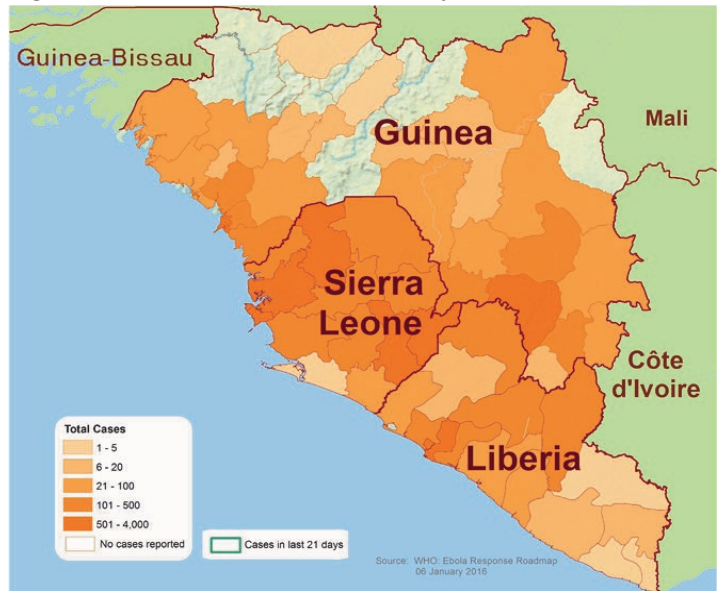


Figure 38. Check And Report Ebola (CARE) Kit for Travelers Arriving in the U.S. from a Country Affected with Ebola



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 Hepatitis C virus (HCV) will recover from the infection. The remaining 75-85% develop chronic infection. Each year 8,000-10,000 people die from the complications of liver disease caused by Hepatitis C.

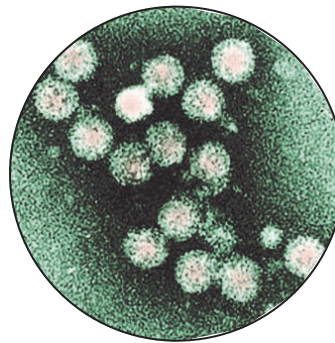
Most of those who develop chronic HCV infection remain asymptomatic for many years. Some experience a range of symptoms including fatigue, headache, joint aches, muscle aches, nausea, jaundice, loss of appetite, and abdominal pain.

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.

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 for 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.

In 2015, Davis County received reports on **132** cases of HCV, a 30% decrease from the 189 cases reported in 2014 (see Figure 39). DCHD facilitated screening for HCV in the incarcerated population from 2012-2014, but did not continue this program in 2015 when the grant concluded. The decline in reported HCV cases can most likely be attributed to this.



Hepatitis C is a bloodborne virus. Today, most people become infected with HCV by sharing needles or other equipment to inject drugs.

2015 Highlights

In 2015, **132** cases of HCV were reported in Davis County.

A drug-diversion event potentially exposed over 7,200 individuals to HCV. DCHD participated in investigative efforts during 2015.

As of mid-January 2016, only 40% of those potentially exposed had received their free HCV screening.

Hepatitis C

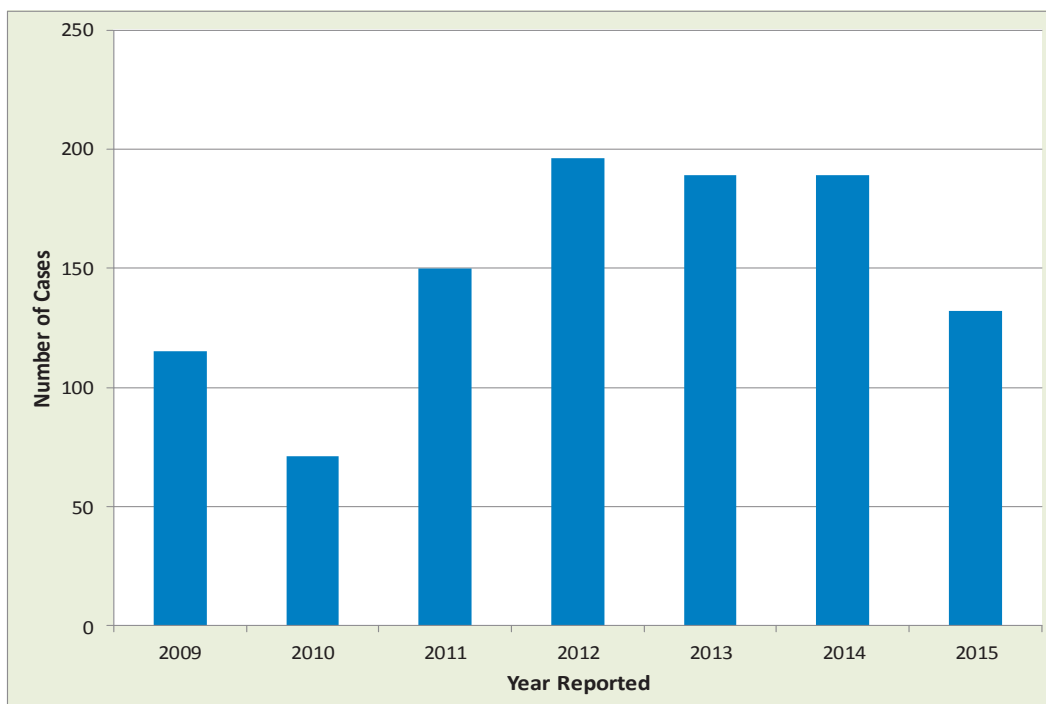
Also during 2015, Davis County Health Department participated in a drug diversion investigation. When prescription medicines are obtain or used illegally, it is called drug diversion.

In July 2015, an individual tested positive for HCV and was reported to public health for investigation. During the investigation, no behavioral risks for transmission were identified. However, the individual had recent interactions with the healthcare system (a dental office and a hospital emergency room) where potential transmission of HCV could have occurred. Investigative efforts identified a healthcare worker at the hospital emergency room who had been dismissed due to drug diversion activities. This same employee had provided care to the index case. Public health interviewed the employee and arranged testing for HCV. The test results were positive and the genotype (2b) matched the index case. Additional investigation activities revealed the healthcare worker was previously employed at another hospital and had admitted to diverting medication while also employed there.



Public health worked with both healthcare facilities to identify over 7,200 individuals that were potentially exposed to HCV while receiving care at either hospital. These individuals were notified of their risk via letter. The letter explained their possible exposure, provided information about HCV, and reviewed steps the individual could take to receive free HCV testing. Those who received a letter from either facility related to this investigation were encouraged to get tested before January 31, 2016.

Figure 39. Hepatitis C Virus Infections, Davis County, 2009-2015



Additional cases have been identified in connection with this investigation. However, exact numbers will not be released until further testing and investigation is completed. As of mid-January 2016, only 40% of those notified had come in for free HCV screening.

Legionellosis

Legionella bacteria can cause Legionnaires' disease or Pontiac fever, collectively known as legionellosis. 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 when individuals are exposed to a common source of *Legionella pneumophila* bacteria in the environment.



Legionellosis is a bacterial infection that may cause mild respiratory illness or pneumonia. It is associated with two distinct illnesses: Legionnaires' disease and Pontiac fever.

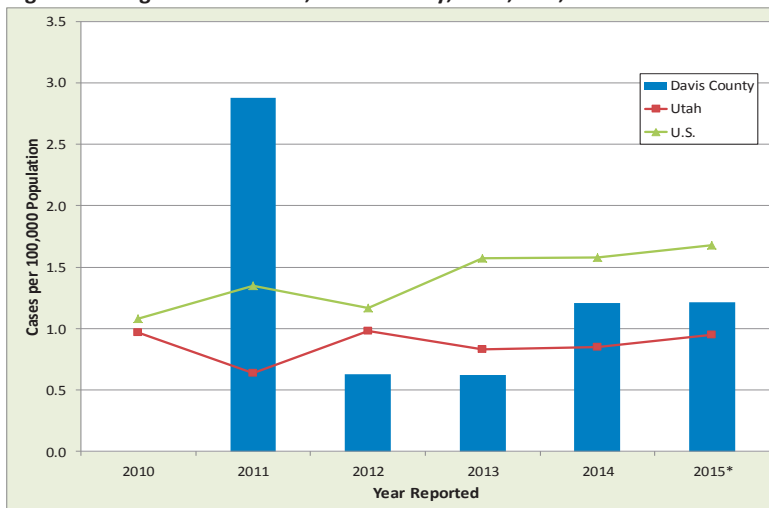
An estimated 8,000-18,000 people need care in a hospital due to Legionnaire's disease each year in the United States. However, many infections are not diagnosed or reported, so this number may be higher. Most legionellosis cases are sporadic; 23% are nosocomial (hospital acquired) and 10-20% can be linked to outbreaks.

During 2015, there were **four** cases of legionellosis reported in Davis County. Davis County receives an average of two to three cases of legionellosis each year (see Figure 40). 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.

The majority of cases reported in Davis County had pre-existing medical conditions that made them more susceptible. Fortunately, none of the cases were fatal.

When compared to Utah, Davis County has similar rates of legionellosis, with the exception of 2011 when an outbreak of legionellosis was investigated in an assisted living facility in Davis County (see Figure 40). Both Davis County and Utah typically have lower rates of legionellosis when compared to the United States.

Figure 40. Legionellosis Cases, Davis County, Utah, U.S., 2010-2015



*Utah and United States 2015 data are provisional.

2015 Highlights

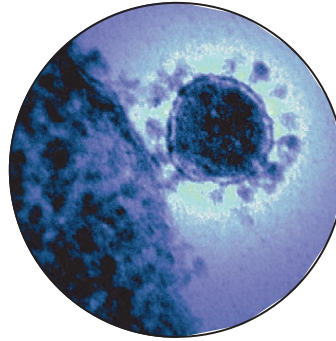
A total of four cases of legionellosis were reported in Davis County during 2015.

Davis County receives an average of two to three cases of legionellosis each year.

The majority of cases in Davis County had pre-existing medical conditions. Fortunately, no cases were fatal.

Middle East Respiratory Syndrome (MERS)

Middle East Respiratory Syndrome (MERS) is a 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, including fever, cough, and shortness of breath. About 30% of people confirmed to have MERS infection have died.



MERS is a viral respiratory illness that is new to humans. Most people infected with MERS-CoV developed severe acute respiratory illness. Many of them have died.

To date, all MERS cases have been linked through travel to or residence in countries in and near the Arabian Peninsula (see Figure 41). The largest known outbreak of MERS outside the Arabian Peninsula occurred in the Republic of Korea in 2015. This outbreak was associated with a traveler returning from the Arabian Peninsula. A total of 186 cases, including 33 deaths, were associated with this outbreak.

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 in 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.

Figure 41. Countries in or near the Arabian Peninsula with MERS, 2015



During 2015, **no** cases of MERS were reported to Davis County. However, Davis County investigated two suspect cases who became ill after traveling to the Arabian Peninsula. One individual was ill enough to be hospitalized in isolation. The other self-isolated at home while laboratory testing was completed. Both patients were ruled out when laboratory results were negative for MERS-CoV.

2015 Highlights

No confirmed cases of MERS were identified in Davis County during 2015.

The largest outbreak of MERS outside the Arabian Peninsula occurred in the Republic of Korea during 2015.

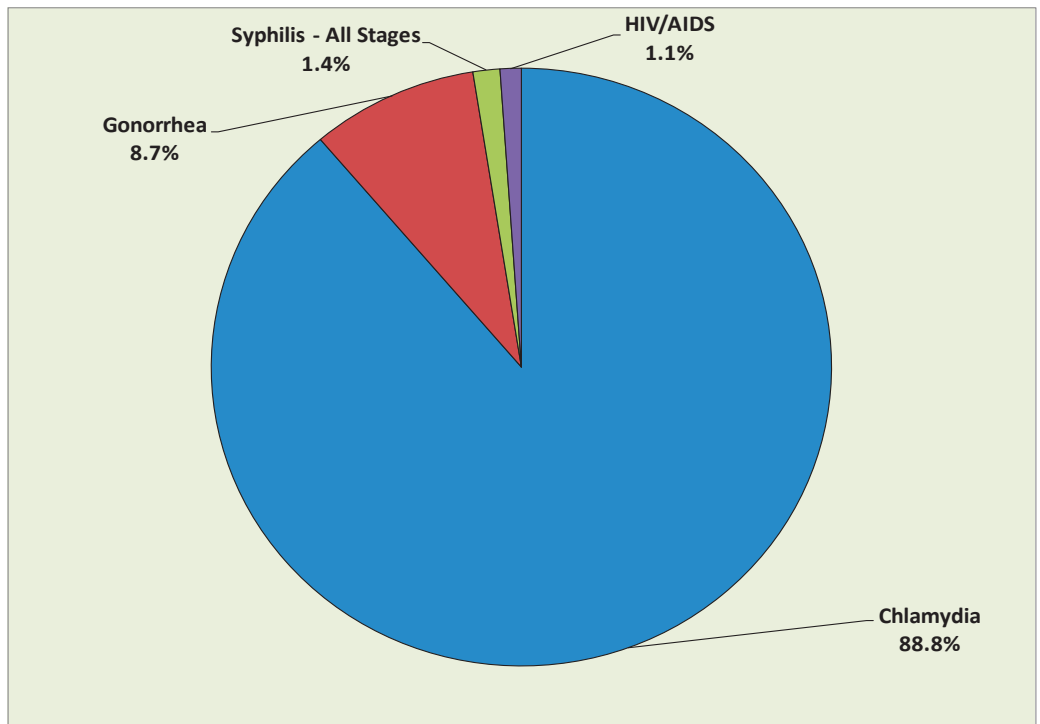
MERS can spread from ill people to others through close contact, such as caring for or living with an infected person.



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, organ damage, meningitis) especially if treatment is delayed. Viral STDs such as herpes simplex virus (HSV) and human immunodeficiency virus (HIV) are not curable. Treatment can reduce viral load (contagiousness) and improve quality of life by decreasing symptoms. 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.

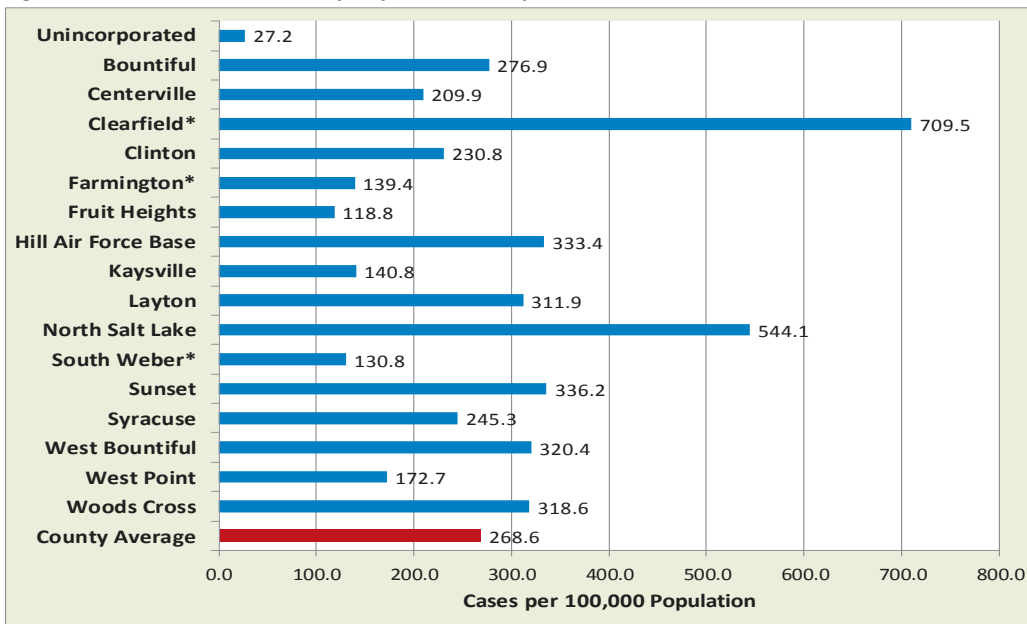
Sexually transmitted diseases reported in Davis County during 2015 include chlamydia, gonorrhea, syphilis, and HIV/AIDS. Chlamydia was the most commonly reported STD with **886** (88.8%) cases, followed by gonorrhea with **87** (8.7%) cases, syphilis with **14** (1.4%) cases, and HIV/AIDS with **11** (1.1%) cases (see Figure 42).

Figure 42. Sexually Transmitted Diseases, Davis County, 2015



Sexually Transmitted Diseases

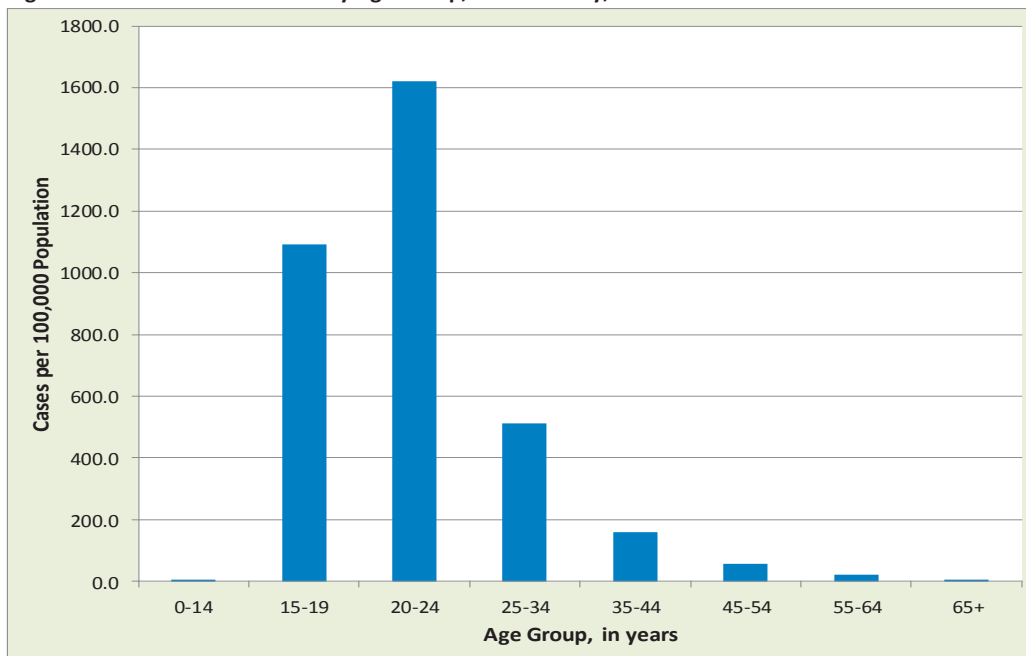
Figure 43. Incidence of all STDs by City, Davis County, 2015



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

Sexually transmitted diseases occurred among residents of every city in Davis County. The average rate in the county was 268.6 cases per 100,000 residents (see Figure 43).

Figure 44. Incidence of all STDs by Age Group, Davis County, 2015



Sexually transmitted diseases were most often reported among women (57.1%) and among 20-24 years old (see Figure 44).

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. Most females and approximately 50% of males infected with chlamydia do not have obvious symptoms. Serious complications include chronic pain, infertility, prostatitis, and organ damage.



Chlamydia is the most commonly reported STD in the United States.

Chlamydia and gonorrhea rates have been increasing for the past several years (see Figure 45). This is partially due to increased screening of high-risk individuals. During 2015, there were **886** cases of chlamydia reported in Davis County, a 4.0% decrease from the 923 cases reported in 2014.

Chlamydia infections continue to account for the largest disease burden in Davis County. However, Davis County traditionally has lower rates of chlamydia when compared to Utah and the United States (see Figure 45).

Most concerning to public health is the age group most commonly affected (15-24 year olds) (see Figure 46). While investigating cases, 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.

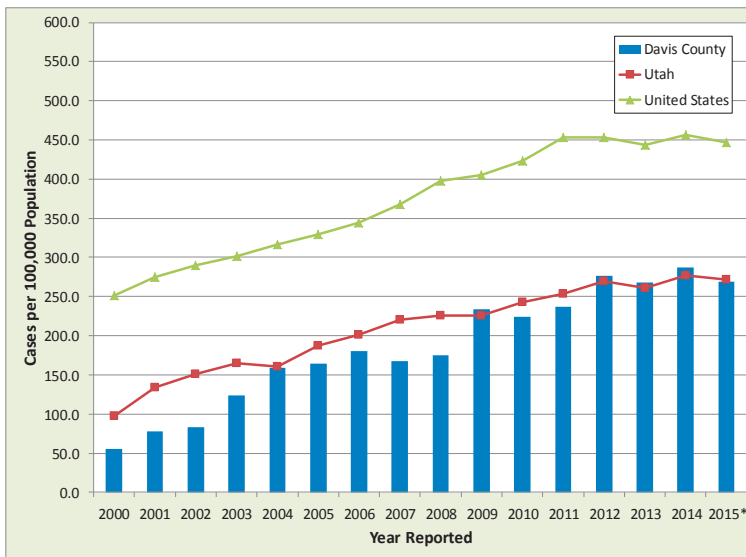
2015 Highlights

A total of **886** chlamydia cases were reported in Davis County during 2015.

Chlamydia infections continue to account for the largest disease burden in Davis County.

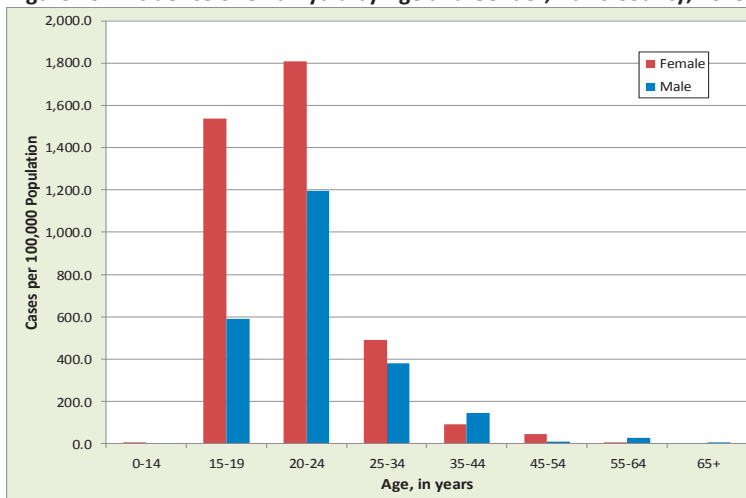
Traditionally, Davis County has lower rates of chlamydia when compared with Utah and the United States.

Figure 45. Incidence of Chlamydia, Davis County, Utah, U.S., 2000-2015



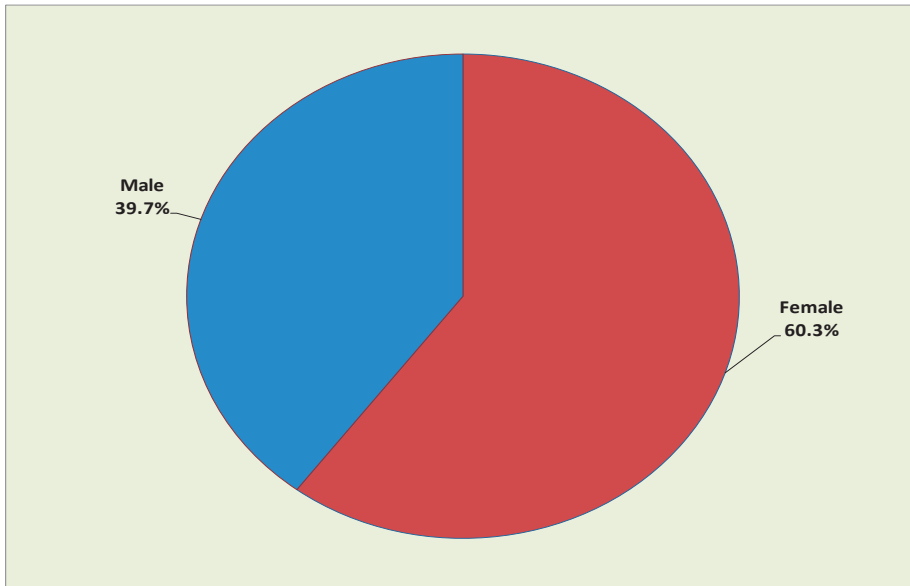
*Utah and United States 2015 data is provisional.

Figure 46. Incidence of Chlamydia by Age and Gender, Davis County, 2015



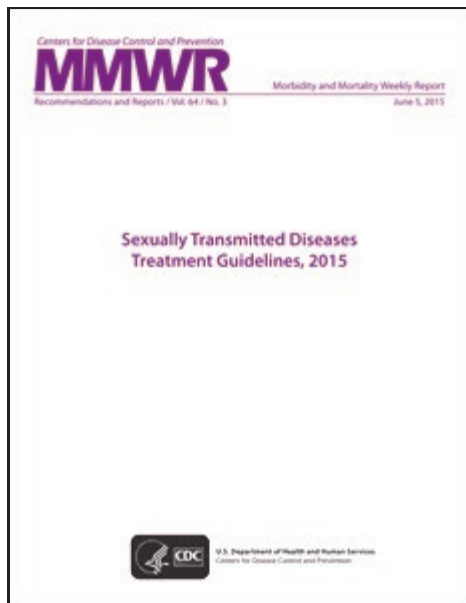
Chlamydia

Figure 47. Chlamydia by Gender, Davis County, 2015



Females are often diagnosed during routine medical visits (see Figure 47). 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. Not only do contact investigations limit the spread of infection to new cases, but they also decrease the likelihood of re-infection. Re-infections occur when appropriately treated individuals engage in sexual activity with their untreated partners.

Figure 48. Sexually Transmitted Diseases Treatment Guidelines, 2015



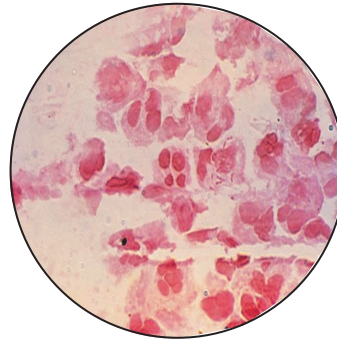
The information in this report updates the Sexually Transmitted Diseases Treatment Guidelines, 2010. These updated guidelines address: 1) alternative treatment regimens for *N. gonorrhoeae*; 2) the use of nucleic acid amplification tests for the diagnosis of trichomoniasis; 3) alternative treatment options for genital warts; 4) the role of *M. genitalium* in urethritis/cervicitis and treatment-related implications; 5) updated HPV vaccine recommendations and counseling messages; 6) the management of persons who are transgender; 7) annual testing for Hepatitis C in persons with HIV infections; 8) updated recommendations for diagnostic evaluation of urethritis; and 9) retesting to detect repeat infection.

Because the majority of infected individuals have no symptoms of an STD, it is important for public health to encourage medical providers to routinely test and treat sexually active patients, especially those ages 25 and younger. New CDC guidance on the treatment of STDs was made available this year (see Figure 48). Davis County Health Department continues to notify the medical community of changes found in the Sexually Transmitted Diseases Guidelines, 2015. Periodic Health Updates are also distributed to the medical community in an effort to communicate and establish awareness of current disease trends.

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

Gonorrhea

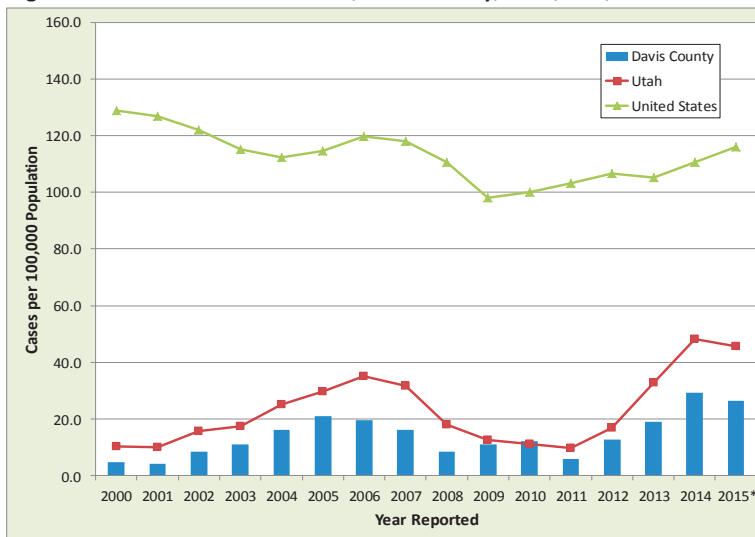
Gonorrhea is a sexually transmitted disease caused by the bacteria *Neisseria gonorrhoeae*. Gonorrhea infections are often asymptomatic in women and are becoming increasingly so in men. If left untreated, gonorrhea may result in serious complications including chronic pain, infertility, septic arthritis, hepatitis, endocarditis, and meningitis. Gonorrhea is complex and has the ability to develop resistance to antibiotics. Fluoroquinolones are no longer recommended by CDC due to increasing resistance. Cephalosporins are the only remaining antibiotic class recommended for treatment.



Gonorrhea has progressively developed resistance to several antibiotics used to treat it.

During 2015, there were **87** cases of gonorrhea reported in Davis County, a 7.4% decrease from the 94 cases reported during 2014 (see Figure 49). Although increases in gonorrhea rates have been observed in both Davis County and Utah, their rates continue to be well below the rate seen in the United States (see Figure 46).

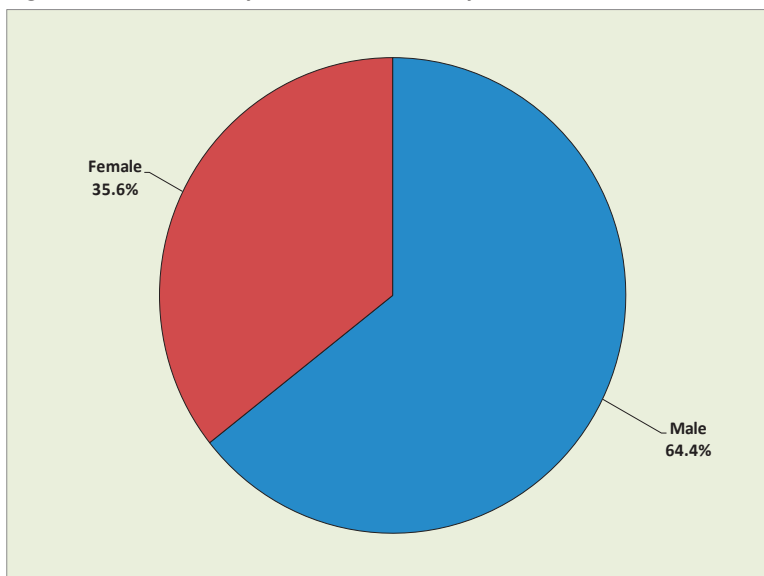
Figure 49. Incidence of Gonorrhea, Davis County, Utah, U.S., 2000-2015



*Utah and United States 2015 data are provisional.

Unlike chlamydia, gonorrhea infections in Davis County were more frequent in males (see Figure 50). Disease interviews identified men who have sex with men (MSM), multiple sex partners, anonymous partners, incarceration, and substance abuse as common risk factors for gonorrhea infection.

Figure 50. Gonorrhea by Gender, Davis County, 2015



2015 Highlights

During 2015, **87** cases of gonorrhea were reported in Davis County.

Gonorrhea infections in Davis County are more frequent in males.

Davis County and Utah have seen significant increases in rates of gonorrhea in recent years.

Gonorrhea

The median age of those infected was 28 years (see Figure 51). This represented no change from what was reported in 2014. Davis County continues to see gonorrhea infections in the younger population.

The most frequently used laboratory test is a urine sample which screens for both gonorrhea and chlamydia. This less-invasive testing process is more appealing to patients and may encourage sexually active individuals to seek testing. However, with the increasing trend of anal/oral intercourse, some STDs will be missed when 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/or oral intercourse.

The Sexually Transmitted Diseases Treatment Guidelines, 2015 recommend treating all gonorrhea cases for both gonorrhea and chlamydia - regardless of chlamydia test results. The guidelines also recommend a new treatment regimen for gonorrhea: a combination therapy of a ceftriaxone injection (e.g. Rocephin) and oral azithromycin to be given the same day (preferably simultaneously). Doxycycline is no longer recommended as a first-line treatment regimen for gonorrhea. This change was implemented to assist in controlling multidrug-resistant gonorrhea.

Gonorrhea infections occurred year-round, but had significant increases during April and December 2015 (see Figure 52). DCHD continues to participate with a statewide workgroup to determine possible causes for the increased number of gonorrheal infections.

Figure 51. Gonorrhea by Age and Gender, Davis County, 2015

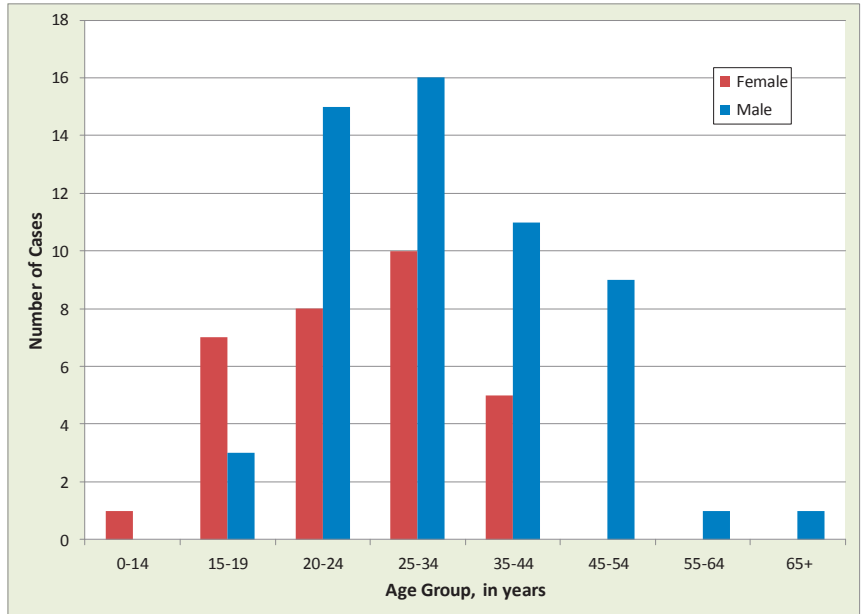
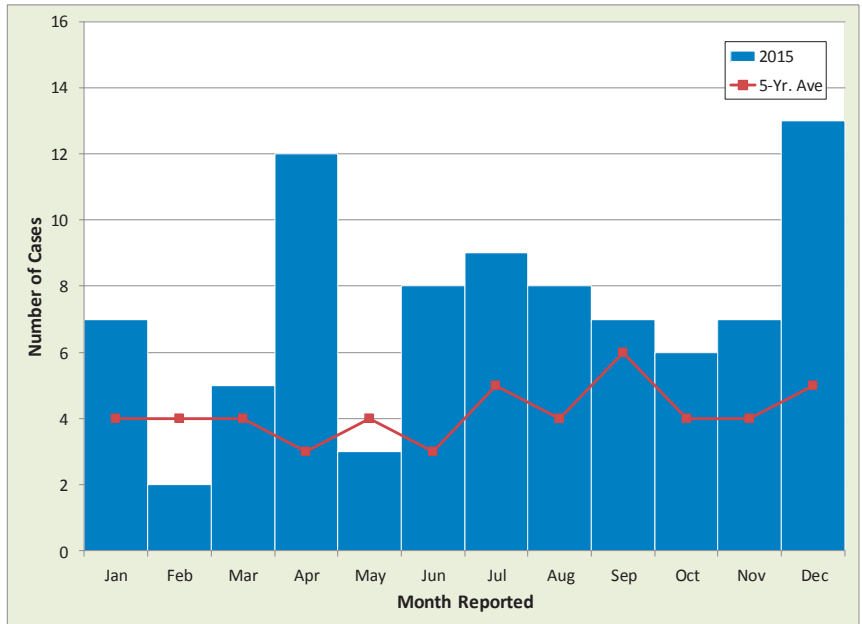
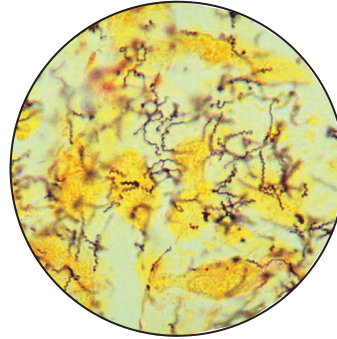


Figure 52. Gonorrhea by Month Reported, Davis County, 2015



Syphilis

Syphilis is a sexually-transmitted disease caused by the bacterial spirochete *Treponema pallidum*. Symptoms in adults are broken into stages: *primary*, *secondary*, *early latent*, and *late latent* syphilis. Syphilis is transmitted from person to person by direct contact with a syphilitic sore, known as a chancre, usually during sexual contact. Pregnant women with the disease can transmit it to their unborn child. Syphilis has been called “The Great Pretender” as its symptoms can look like many other diseases. The painless sore that appears initially when a person is first infected can be confused as a pimple or other seemingly harmless sore. However, many of these syphilitic sores develop in the rectum or vagina and are not noticed. Thus, most transmission is from persons who are unaware of their infection. Over the past several years, syphilis has continued to increase among men who have sex with men (MSM). Recent national outbreaks among MSM have been marked by high rates of coinfection with HIV and high-risk sexual behaviors.



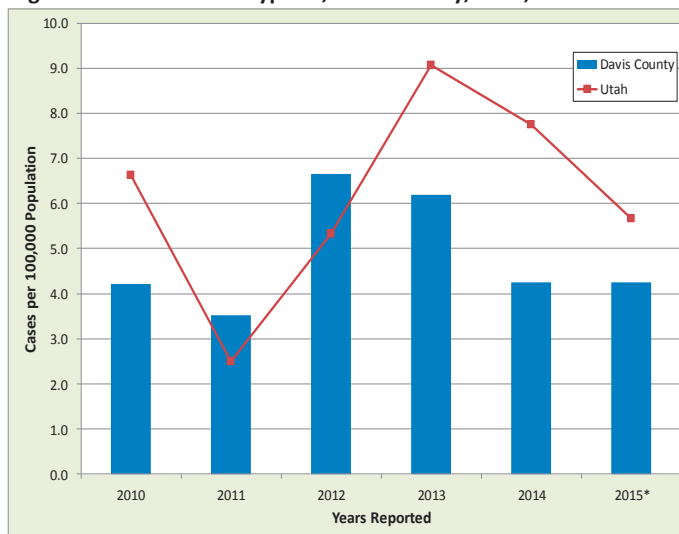
Syphilis is an STD that can cause long-term complications if not treated correctly. Symptoms in adults are divided into stages: *primary*, *secondary*, *early latent*, and *late latent* syphilis.

During 2015, there were **14** cases of syphilis reported in Davis County (see Figure 53). Two cases were classified as *primary*, three as *secondary*, two as *early latent*, and seven as *late latent*.

Through disease investigations, it was noted that the majority of those infected with any stage of syphilis were men who have sex with men (MSM). Other identified risk factors include unprotected anal sex, injection drug use (IDU), multiple sex partners, anonymous sex with individuals of unknown STD/HIV status, foreign-born, and substance abuse. Only a few individuals were diagnosed with symptoms.

The staging of syphilis is difficult and requires obtaining a good history, risk factors, previous treatment regimens, and evaluation of symptoms. Partner’s disease status also helps in the staging process. The later stages of infection require a more rigorous treatment protocol. Another important factor to consider is the risk of transmission to an unborn fetus. Congenital syphilis can result in miscarriages, stillbirths, and death.

Figure 53. Incidence of Syphilis, Davis County, Utah, 2010-2015



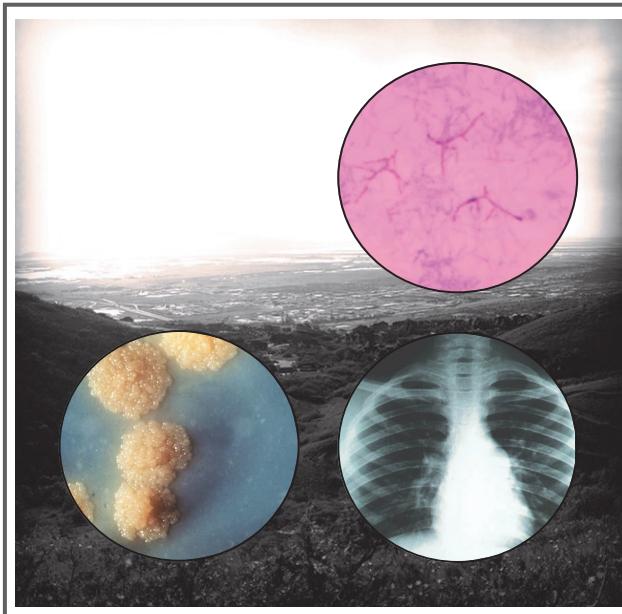
*Utah 2015 data is provisional.

2015 Highlights

A total of **14** cases of syphilis were reported during 2015 in Davis County.

The majority of those infected with any stage of syphilis were men who have sex with men (MSM).

Davis County traditionally has lower rates of syphilis, when compared with Utah.



Tuberculosis

Tuberculosis is a disease caused by germs that are spread from person to person through the air. TB usually affects the lungs, but can also affect other parts of the body, such as the brain, kidneys, or spine.

Approximately one-third of the world’s population and 9 to 14 million people in the United States are infected with *M. tuberculosis*. On average, 10% of infected individuals will develop active tuberculosis at some point in their lives. In 2015, 9.6 million people worldwide became sick with TB disease resulting in approximately 1.5 million TB-related deaths. In the United States, there were 9,421 TB cases in 2014 (2.96 cases per 100,000 persons) — a 2.2% decline compared to 2013 (3.0 cases per 100,000 persons). This is the smallest decline in more than a decade. Utah had 37 confirmed cases (1.2 cases per 100,000 persons) reported in 2015.

By the early 1980s, TB was considered to be under control and many states redirected TB prevention and control funds to other programs. As a result, 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 led to more aggressive control efforts. Since then, 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 those 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 drugs used to treat tuberculosis and has a high mortality rate.

Davis County had **no new** active tuberculosis disease (ATBD) cases in 2015 (see Figure 54) and **89** latent tuberculosis infections (LTBI) (see Figure 55).

Figure 54. Active Tuberculosis Cases by Year, Davis County, 2002-2015

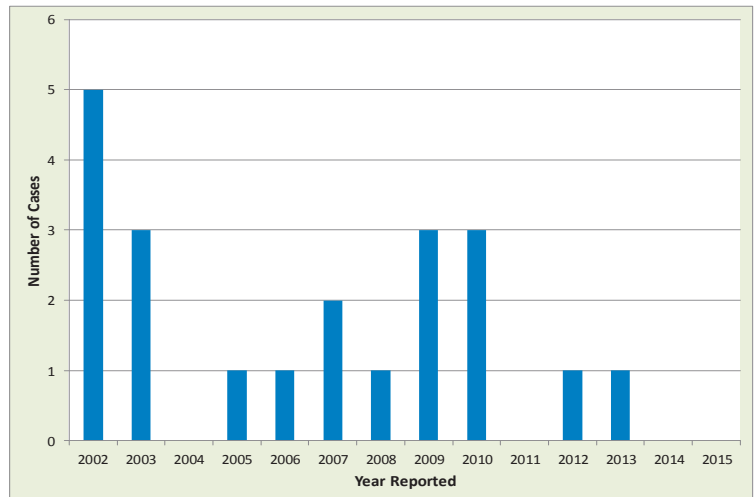
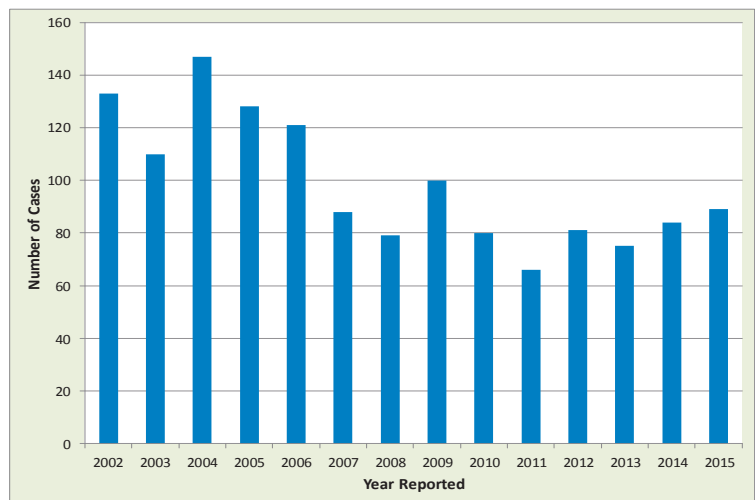
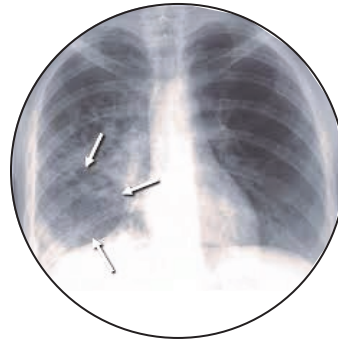


Figure 55. Latent Tuberculosis Infections (LTBI) by Year, Davis County, 2002-2015



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 United States 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.



TB is a disease caused by *Mycobacterium tuberculosis*. This bacteria usually attack the lungs, but can attack any part of the body, such as the kidney, spine, and brain.

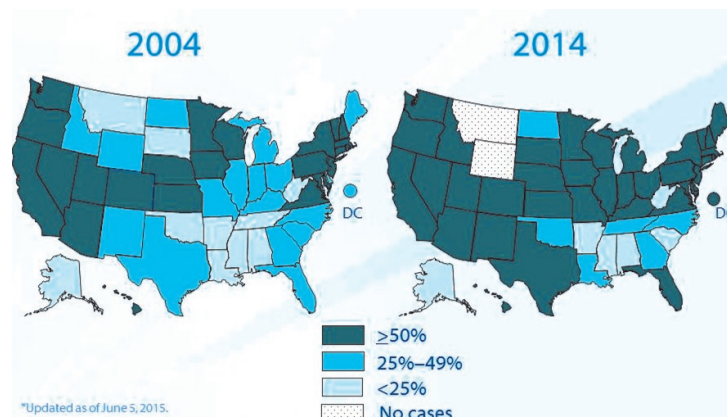
In 2015, Davis County had **no new** cases of active tuberculosis. On average, Davis County investigates one to two cases of active tuberculosis a year.

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. Both pulmonary and extra-pulmonary TB typically require six months of treatment.

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.

In the United States, tuberculosis is primarily seen in individuals who are foreign-born or have traveled/lived in endemic countries (see Figure 56).

Figure 56. Percentage of TB Cases Among Foreign-born Persons, United States, 2004 & 2014



2015 Highlights

No new cases of active tuberculosis were reported in Davis County in 2015.

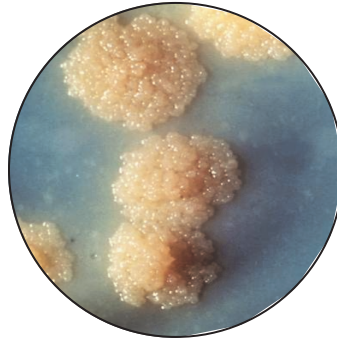
On average, Davis County investigates one to two cases of active tuberculosis a year.

In the United States, tuberculosis is primarily seen in individuals who are foreign-born or traveled/lived in endemic countries.

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.

Approximately 200 clients are referred to Davis County Health Department annually for tuberculosis evaluation. These evaluations can include interviews, repeat skin testing/blood screening tests, chest x-rays, sputum testing, and physical exams in order to provide an accurate diagnosis.



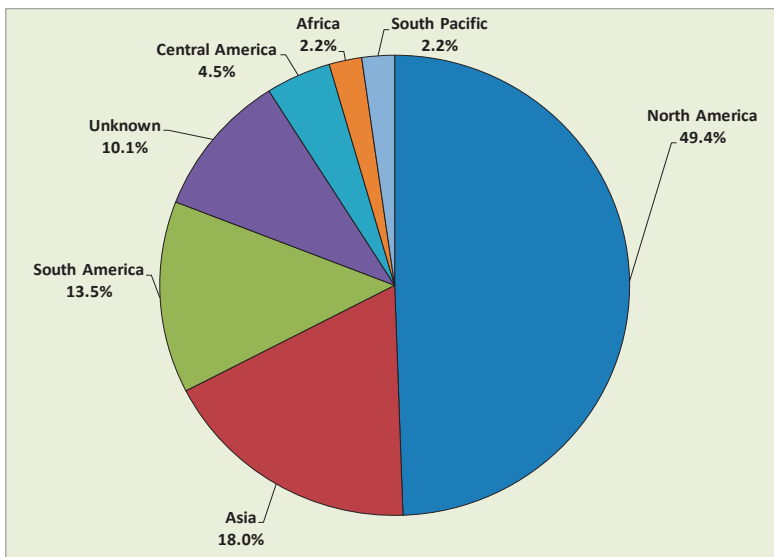
Persons with LTBI do not feel sick and do not have any symptoms. They are infected with *M. tuberculosis*, but do not have TB disease.

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 2015, Davis County managed **89** clients with LTBI, with an average of **18** 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 traveled to endemic countries (see Figure 57).

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

Figure 57. LTBI by Place of Birth, Davis County, 2015



2015 Highlights

During 2015, Davis County managed **89** patients with LTBI.

The majority of individuals who receive LTBI treatment in Davis County are foreign-born or traveled/lived in endemic countries.

DCHD provided **1,073** tuberculin skin tests to the public in 2015.

Latent Tuberculosis Infection (LTBI)

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.

Davis County managed LTBI patients of all ages (see Figure 58). The age groups with the highest frequency of cases included 15-19 years and 20-24 years. These age groups correspond with missionaries who are screened prior to leaving and those who are screened and treated after returning home.

Davis County Health Department provided **1,073** tuberculin skin tests to the public in 2015 (see Figure 59). However, these numbers only account for a small percentage of all TB tests performed in the community. Most often, those who sought TB testing did so for a job or school requirement (77.6%). Other reasons included pre- and post-mission requirements (11.6%), personal choice (4.9%), refugee or immigrant requirements (2.0%), immunocompromised (<1.0%), exposure to TB (<1.0%), migrant work requirements (<0.1%), and substance abuse (<0.1%) (see Figure 59).

Figure 58. LTBI by Age Group, Davis County, 2015

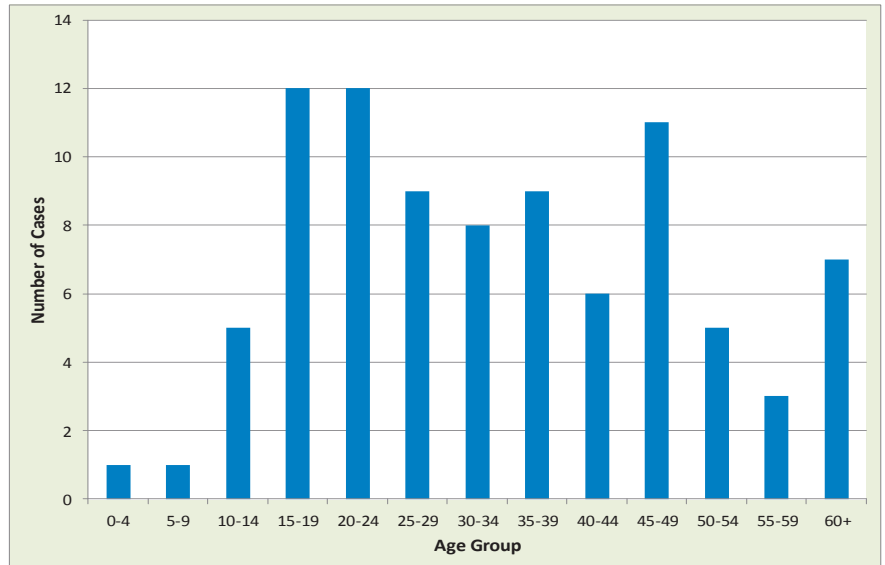
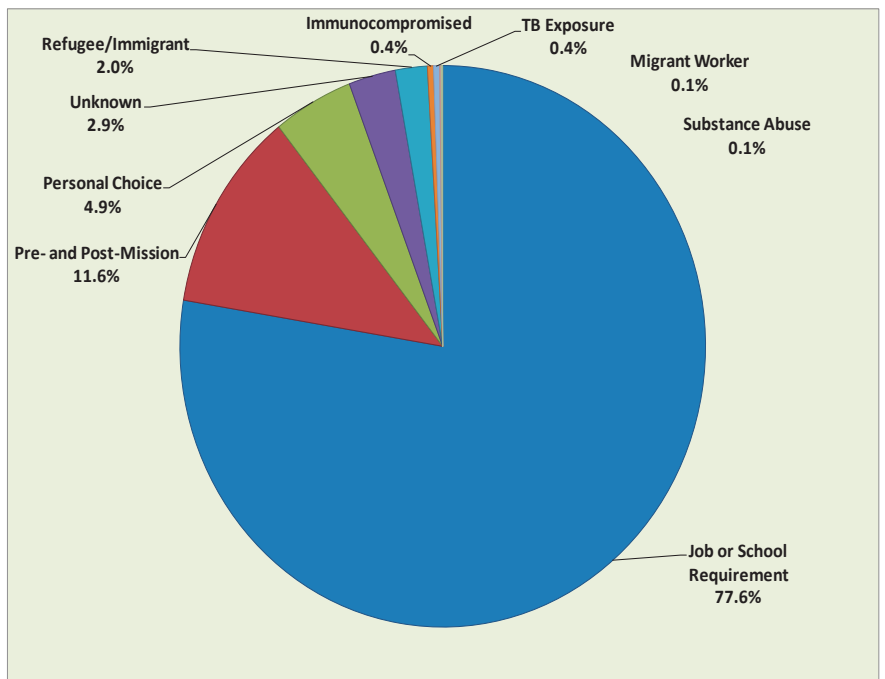


Figure 59. Reasons for TB Testing, Davis County Health Department, 2015



Program Highlights

During 2015, several program activities were implemented to address disease trends and enhance community education.

STD/HIV Program Highlights:

School District STD Education

To help address the STD disease burden among adolescents, Davis County Health Department (DCHD) continued a partnership with Davis School District (DSD) to provide STD/HIV education in the secondary schools. Davis County is one of the few local health departments to 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. Teachers have been offered trainings on the approved STD/HIV presentation in an effort to standardize the presented materials, update and increase the knowledge base of district educators, and expand the pool of trained professionals. In

2015, 33 presentations by health department staff were provided, reaching approximately 1,177 students in grades 8, 10, and 11. For high school students, abstinence pamphlets were provided by DCHD 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 Davis County Health Department's STD Hotline number—which is staffed by a nurse Monday through Friday (8:00am - 5:00pm).

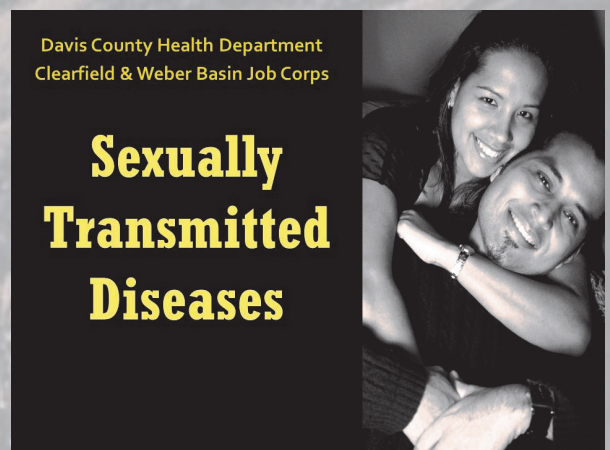
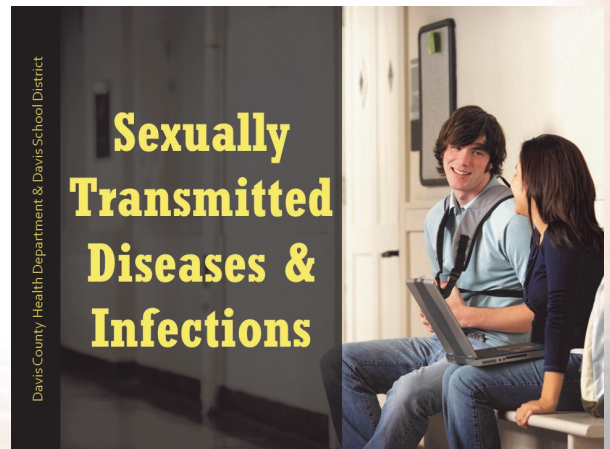
Surveys are provided to teachers and students at the secondary schools to help assess satisfaction of the presentations. The results of the surveys have been highly rated with many expressing appreciation for the services provided.

Community Outreach Education

DCHD partners with the two local Job Corps Centers (Clearfield and Weber Basin) to provide STD/HIV education to students in their facilities. Classes are taught weekly at the Clearfield Job Corps Center and quarterly at the Weber Basin location. For 2015, the following results were noted:

- **43** presentations were given
- **1,163** students participated in the presentations
- **685** (59%) 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.



Program Highlights

Low-Cost STD/HIV Screening Clinic

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 low-cost screening to residents through their clinic. Two options have been available to the community:



- **Low-Cost Screening Clinic:** This is a walk-in clinic where individuals can access STD screening Monday through Friday (8:00am - 5:00pm). Individuals are provided educational materials on STD/HIV and offered testing, but no physical exam is performed. Those who test positive are reported to the health department for further investigation and treatment. Testing supplies and medications are provided by the health department. Midtown Clinic provides a medical assistant who is responsible for collecting the specimens.

During 2015, approximately **319** clients received testing through the low-cost clinic. Davis County identified **40** positive chlamydia, **one** gonorrhea, **four** syphilis infections—an STD infectivity rate of 14%.

- **Provider Exam STD Testing:** Individuals who are symptomatic can receive STD services through Midtown Clinic. Clients make an appointment to see a medical provider, obtain a physical examination, and are tested for chlamydia, gonorrhea, and HIV (syphilis testing is performed if the individual is at-risk). Additional tests are available for an added fee. Testing is provided by Midtown Clinic. If test results are positive, Midtown Clinic treats the patient with medication provided by DCHD and refers the case to DCHD for further investigation. In 2015, **123** clients were tested by Midtown Clinic through this program.

STD/HIV Contact Clinic

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, and treated by DCHD at no charge. In 2015, approximately **177** individuals were seen in the STD/HIV Contact Clinic. Of those, **71** tested positive for chlamydia (40%) and **six** tested positive for gonorrhea (3%). Of the **28** who were tested for syphilis, **four** (14%) were positive. In addition, **two** (10%) of the **20** 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 in the control of STDs.

Rapid HIV Testing

Traditional HIV testing may take up to 10 days for results. To decrease the wait time, DCHD conducts free rapid HIV clinics throughout the year, often in conjunction with national HIV and STD events. Results are available within 15-20 minutes. Rapid testing is also performed in the STD/HIV contact clinic. In 2015, 47 rapid HIV tests were administered—two were positive. Those performing the tests are trained to give positive test results and provide important resources to infected clients.

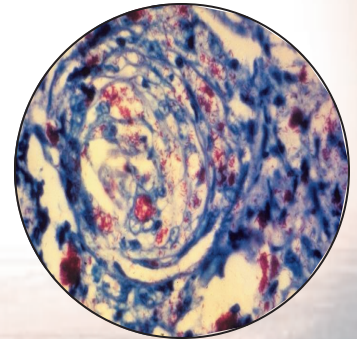
Tuberculosis Program Highlights:

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

Program Highlights

staff member to observe the patient taking their medication daily or (when possible) two to three times a week. 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, DCHD offers clients a video-conferencing option where those with a history of compliancy can be observed taking their medication through applications such as Skype or FaceTime. The tuberculosis control nurse conducts periodic face-to-face encounters to ensure that any possible treatment side effects is recognized. Video conferencing will only be considered for individuals who display responsible behaviors and are low-risk for complications.

Hansen's disease (Leprosy) also falls under the Tuberculosis program. Every few years a Hansen's disease is reported to the health department. In 2014, DCHD received report of a Hansen's disease case. Case management for leprosy can be anywhere from 6 months to two years, depending on the type of leprosy and the treatment regimen. The case of Hansen's disease reported in Davis County in 2014 is currently following a two year treatment plan and will complete treatment in October 2016. Those being treated for Hansen's disease take daily medication and are monitored monthly. Salt Lake County Health Department has a specialized clinic that is staffed with contracted providers who specialize in tuberculosis and Hansen's disease. This clinic is made available to all local health departments free-of-charge. DCHD uses this clinic to assist with the diagnosis, treatment and case management of unique/difficult cases of tuberculosis and Hansen's disease. For all other tuberculosis cases, Utah Department of Health (UDOH) and DCHD partner with Dr. Gary Alexander for consultation/evaluation and treatment management of Davis County residents who are diagnosed with active tuberculosis.



DCHD has also partnered with Midtown Community Health Center - Davis to conduct physicals/evaluations and prescription management for those Davis County residents who have Latent Tuberculosis Infection (LTBI). Clients receive a full medical exam from the Midtown healthcare provider to determine capability and appropriateness of LTBI treatment. Throughout the course of treatment, which typically is nine months, the Midtown providers are available for consultation and other needed workups.

Overall Division Highlights:

Davis County Health Department Website

The Communicable Disease and Epidemiology Division website remains a valuable resource for the community. In 2015, the website was updated to be more user-friendly and service-oriented. The website is available at: <http://www.daviscountyutah.gov/health>.

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. It also offers information specific to healthcare professionals and medical providers—including reporting guidelines, disease data for Davis County, and links to the Utah's Communicable Disease Rule.



Program Highlights

Ask-A-Nurse Email

The Ask-A-Nurse Email is routinely utilized by the public for answers to communicable disease issues. This system is monitored daily by DCHD nurses 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 accessed at: ask-a-nurse@daviscountyutah.gov.

Healthcare Associated Infections (HAI) Grant

Davis County continued to receive funding to assist in the identification and control of healthcare associated infections. In 2015, HAI outbreaks were detected and control efforts were implemented smoothly, in part 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.



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 Davis County Sherriff's Office (DCSO) and other Emergency Medical Services (EMS) agencies within Davis County, DCHD provides bloodborne pathogen training once a month. This class is free of charge. It is also available off-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, or Hepatitis C from an on-the-job exposure. In conjunction with the BBP training, DCHD also provides baseline training for 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.

In 2015, 11 agencies utilized DCHD for EMS services. A total of 344 baseline tests were performed (including HIV, Hepatitis B, and Hepatitis C) and 87 Hepatitis B vaccines were administered. Forty-nine individuals attended the monthly bloodborne pathogen classes and one offsite class was conducted.

BioSense Grant

DCHD continued 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 regarding emergency department visits and hospitalizations from multiple sources, which provides users the ability to confidentially track health issues as they evolve.

In 2015, BioSense syndromes were used to track the presence of Enterovirus D-68, influenza-like illness, acute gastrointestinal illnesses, measles, animal bites, and respiratory illnesses. The epidemiologist is alerted by BioSense when emergency department and clinic visits for identified symptoms reach a certain threshold. Data from these alerts are analyzed to identify clusters of illness or diseases of concern. In 2015, Utah Department of Health worked with IASIS and MountainStar facilities to onboard their systems for electronic reporting. Their additional participation has improved BioSense's ability to provide a comprehensive picture of the health status of Davis County.

Program Highlights

igotsick.health.utah.gov Website

DCHD monitors a statewide website for reporting suspect foodborne illnesses. This system allows the general public to report illnesses that may be related to food consumed at home, in a restaurant, or in a group setting. Once a report is submitted, it is routed to the appropriate jurisdiction for review. DCHD has been able to utilize these reports to identify outbreaks that were occurring in the community. This system helps to identify outbreaks earlier, making the implementation of control measures more timely and limiting the number of people affected.



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 2015, the Communicable Disease and Epidemiology Division received student interns from Brigham Young University and Weber State University.

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 potential cases in Davis County. Grant funding from CDC is being used to develop plans that address early detection and containment, transportation, and medical care of suspect cases of Ebola. Efforts this year were focused upon collaboration between public health (including emergency response), private healthcare systems, and emergency medical services. Preparation planning will continue over the next few years and these new plans will be exercised to ensure continuity and feasibility.

As cases of Ebola continued to be detected in West Africa, travelers returning to the United States were tightly monitored. As these travelers were identified, local health departments were contacted to implement active monitoring, which consisted of daily interactions to assess for the development of Ebola symptoms. This process continues through the full incubation period of 21 days. In 2015, Davis County provided active monitoring on several returning travelers. All of those residents who were monitored were symptom free and cleared. On January 14, 2016, the World Health Organization (WHO) declared West Africa free from Ebola, but a new case was identified in Sierra Leone shortly thereafter. Active monitoring of travelers returning to the United States will be discontinued as these countries become Ebola-free.

Animal Control Collaboration

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 2015, Davis County Health Department evaluated 496 incidents where a human exposure occurred. This collaboration is an example of a successful partnership between Animal Control and public health that other counties in Utah may consider using.

Throughout 2015, DCHD provided consultation and on-site interventions with Animal Control Officers in an effort to address rabies control in the community. In-services and rabies vaccinations (pre- and post-exposure) were provided to Animal Control staff.

Program Highlights

Seasonal Illness Educational Campaign:

As part of the Communicable Disease and Epidemiology Division strategic goals, in 2014-2015 a year long educational campaign was launched and completed. Consistently, individuals who are affected by a disease show a lack of knowledge and understanding of the risk behaviors that lead to their infections. To address this issue, staff decided to focus on specific seasonal diseases that have the greatest impact on the community. Throughout the year, six seasonal diseases (vaccine-preventable diseases, respiratory infections, foodborne illnesses, STD/HIVs, and recreational water illnesses) were addressed through education and screenings. These included:

- Presentations in the community
- Social Media posts (Facebook)
- Special events (free STD/HIV/Hepatitis C testing, information booths at “Back-to-School” vaccine clinics)
- Distribution of materials in the community
- Flyers on food safety in grocery bags at Kent’s Market—Clearfield UT
- Flyers on food safety at the Bountiful UT Food Pantry
- Safe swimming packets to certified pools in Davis County
- Recreational water safety at campgrounds within Davis County

Public Health Accreditation

DCHD submitted the required documentation, completed a Public Health Accreditation Board (PHAB) site visit, and received full “Accreditation” on November 10, 2015. This prestigious award is only given to public health agencies who demonstrate advanced quality and performance in protecting the health and well-being of their community. Currently, there are only 96 health departments in the United States who have been awarded accreditation—Davis County Health Department is now among this respected group.



School Absenteeism Project

Davis County Health Department continued their partnership with Davis School District (DSD) and the University of Utah Division of Public Health to develop an online platform for school absenteeism analysis. The new system generates automatic daily uploads of absenteeism data from Davis School District to the platform, analyzing and displaying data at district-, school-, and classroom-levels. Davis County Health Department piloted the new system during the 2014-15 school year and found it has increased staff’s capability to monitor aberrations in absenteeism while minimizing the amount of time to do so. The platform has the potential to inform DCHD and DSD of potential developments in minimal time, such that public health interventions can be initiated more efficiently.

Davis County Demographics—2015

Table 8. Davis County Population, by Age Group*

Age Group	Population
<1 year	5,756
1-14 years	86,923
15-24 years	48,315
25-44 years	93,394
45-64 years	65,150
65-84 years	26,577
85+ years	3,577
Total	329,692

Table 9. Davis County Population, by Gender*

Gender	Population
Male	166,063
Female	163,629
Total	329,692

Table 10. Davis County Population, by Race*

Race	Population
White	305,595
Black	4,752
American Indian or Alaskan Native	2,207
Native Hawaiian or Pacific Islander	2,330
2 or More Races	8,289
Total	329,692

Table 11. Davis County Population, by Ethnicity*

Ethnicity	Population
Hispanic or Latino (of any race)	29,853

*Population estimates for 2015 are not yet available. These figures represent the estimates for 2014.

Source: Retrieved January 2016 from Utah Department of Health, Center for Health Data and Informatics, Indicator-Based Information System for Public Health. Available at: <https://ibis.health.utah.gov/>

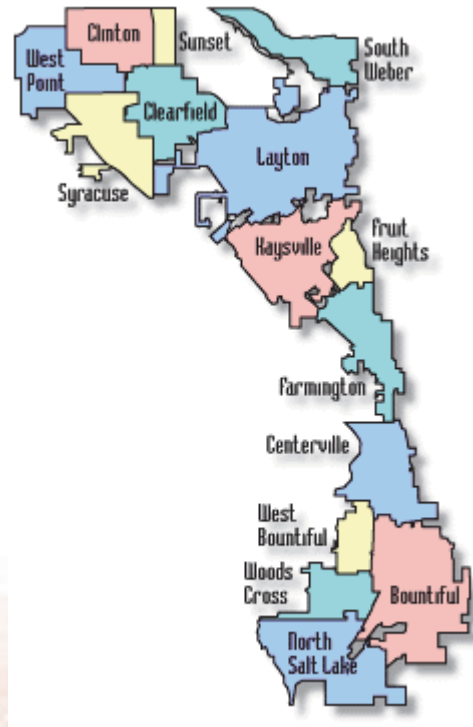


Table 12. Davis County Population, by City*

City	Population
Bountiful	43,385
Centerville	16,819
Clearfield	30,484
Clinton	21,104
Farmington	22,159
Fruit Heights	5,859
Hill Air Force Base	3,310
Kaysville	29,494
Layton	72,231
North Salt Lake	19,193
South Weber	6,731
Sunset	5,149
Syracuse	26,639
Unincorporated County	388
West Bountiful	5,446
West Point	10,204
Woods Cross	11,097
Total	329,692

