Davis County Health Department

Communicable Disease & Epidemiology Division

Communicable Diseases Davis County 2012

Communicable Diseases
Davis County 2012

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Executive Summary

This annual communicable disease surveillance report summarizes all communicable diseases reported in Davis County in 2012. 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 2012 was the pertussis outbreak that occurred nationally and across the state of Utah. 1,450 cases of pertussis were reported in Utah in 2012, as compared to 618 cases reported in 2011. Nationally, 41,000 cases were reported to CDC, with 18 pertussis-related deaths, most being infants. Utah was ranked 8th in the nation for incidence of pertussis (40.9/100,000). Davis County was also affected by the outbreak with 139 cases (43.9/100,000) of pertussis identified throughout the year, with the majority of cases reported between July – August 2012. This is a 456% increase, as compared to the 25 cases reported in 2011. During the disease investigations, many household and social contacts were found to be symptomatic as well – thus indicating a more profound disease burden than was being reported. Several cases reported being appropriately vaccinated against pertussis. Surveillance and research by the Centers for Disease Control (CDC) revealed that due to changes in the epidemiology of pertussis in the United States, there was diminished protection among those who received the acellular vaccine (DTaP) versus the vaccine containing the inactivated whole cell bacteria (DTP). Vaccination continues to be the single most effective strategy to reduce morbidity and mortality caused by pertussis.

Other communicable diseases of concern/interest for 2012 are summarized below:

1. 2012 marked another year of elevated Sexually Transmitted Disease (STD) reports. Chlamydia infections accounted for the largest disease burden with 862 cases. This was a 17% increase from the previous year (739). Gonorrhea cases more than doubled (40) compared to the 18 cases reported in 2011. Disease investigations of gonorrhea cases identified the following risk factors: men who have sex with men (MSM), co-infections with other STDs, multiple sex partners, anonymous partners, incarceration, drug use, and out of state/international sexual activity. Of note this year, 77% of gonorrhea cases identified themselves as heterosexual.

2. Cryptosporidiosis case reports more than doubled in 2012, as compared to the past four years. In 2007, Utah experienced a large outbreak where 294 cases were reported in Davis County and 1,952 in Utah. Recreational water exposure was noted as a common risk factor. Control measures were implemented at that time

which included the installation of UV lights in several Davis County pool systems. Over the next four years, cryptosporidiosis declined to expected levels. However, in 2012, there was another jump in case reports. Davis County disease interviews did not reveal a significant link to recreational water exposure. Other counties in Utah also experienced an increase in reported cases.

3. Three confirmed infant botulism cases were reported in 2012. All three cases had exposure to environmental conditions where *C. botulinum* spores can be ingested (e.g. construction sites, camping). These infants were hospitalized for an extended period of time and received human-derived botulinum antitoxin (BabyBIG) to aid in their recovery process. Utah receives approximately five cases of infant botulism per year.

4. Salmonella reports were at lower than expected levels in Davis County, and Utah as a whole, in 2012. One Davis County case was linked to a national outbreak associated with exposure to live poultry. The individual worked at a farm supply store that sold poultry. No shiga toxin-producing *Escherichia coli* were reported until July and the total number of cases for the year was at expected levels. Campylobacteriosis cases increased slightly from 2011. Raw milk consumption was reported by a few cases who obtained milk from an out of county dairy.

5. Davis County assisted in the investigation of a gastrointestinal illness cluster associated with a scout camp in Wyoming. Even though the camp is located in Wyoming, it is operated by a Utah Boy Scout council and most of the campers are Utah residents. Approximately 58 out of 800 individuals were ill with gastrointestinal symptoms after working at, attending or coming in contact with someone who was connected to the camp. Davis County investigated 43 campers and found 16 to be symptomatic. Samples obtained from ill individuals were positive for norovirus, genotype I. The investigation revealed that fomite/environmental contamination and direct person-to-person transmission were likely the cause of the outbreak.

Introduction

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

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

The Communicable Disease and Epidemiology Division is organized into four main program areas: STD/HIV, Tuberculosis Control, Infectious Disease, and Disease Surveillance. A program description follows:

STD/HIV program:

Sexually Transmitted Diseases (STDs) affect men and women of all ages, backgrounds, and economic status. Even though 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 19 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 have an interview with a skilled communicable disease nurse to:

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

Tuberculosis Control program:

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

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

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

Infectious Disease program:

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

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

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

- **Enteric Diseases** (Food and/or Waterborne)
    - Bacterial, viral, and parasitic diseases involving the gastrointestinal tract

- **Vaccine-Preventable Diseases**
    - Diseases that are preventable with vaccines

- **Vector/Zoonotic Diseases**
    - Diseases transmitted by insects, animals, or birds

- **Invasive Diseases**
    - Bacterial infections of the blood stream, cerebral spinal fluid (e.g. meningitis/encephalitis) or other normally sterile sites (e.g. synovial, pleural or pericardial fluid)

- **Other reportable diseases/conditions**
    - Diseases that do not fall under the above categories

Disease Surveillance program:

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

- Providing medical professionals with access to disease reporting 24 hours a day/seven days a week

- Maintaining a computerized system for efficient storage and access to data

- Incorporating a variety of data sources including:
    - Notifiable disease reports
    - School absenteeism
    - Sentinel physician reports
    - Syndromic data

- Monitoring the occurrence and distribution of infectious disease activity

- Disseminating surveillance data to the public and medical professionals

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

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

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

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

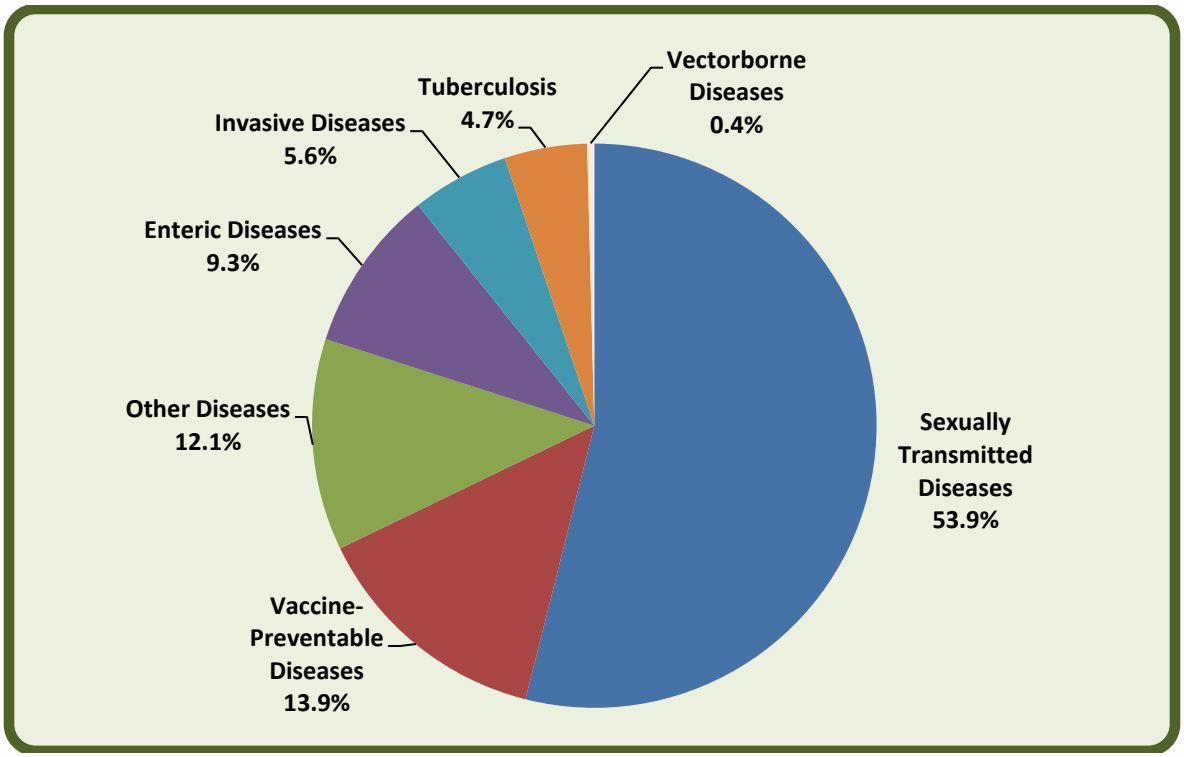
Reportable Disease Summary

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

The Davis County Health Department received a total of **1,732** disease reports during 2012, a 27% increase from the 1,365 disease reports received in 2011.

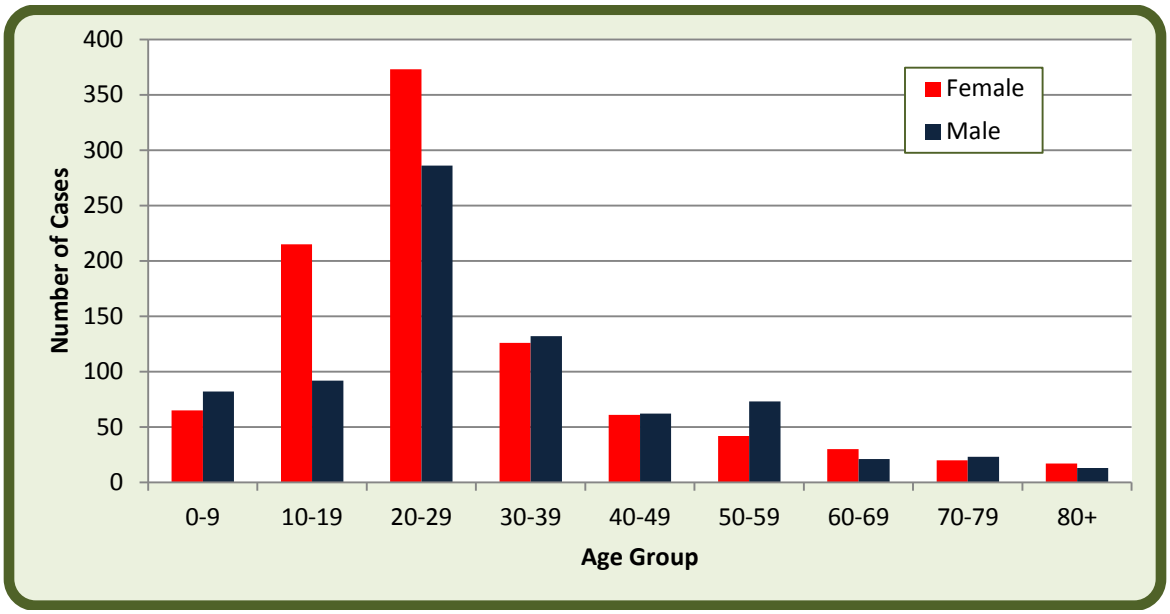
Over half (53.9%) of the diseases reported were sexually transmitted diseases (STDs), followed by vaccine-preventable diseases (VPDs) 13.9%, other diseases 12.1%, enteric diseases 9.3%, invasive diseases 5.6%, tuberculosis infections (TB) 4.7% and vectorborne/zoonotic diseases (VBD) <1%.

Diseases Reported by Type, Davis County, 2012



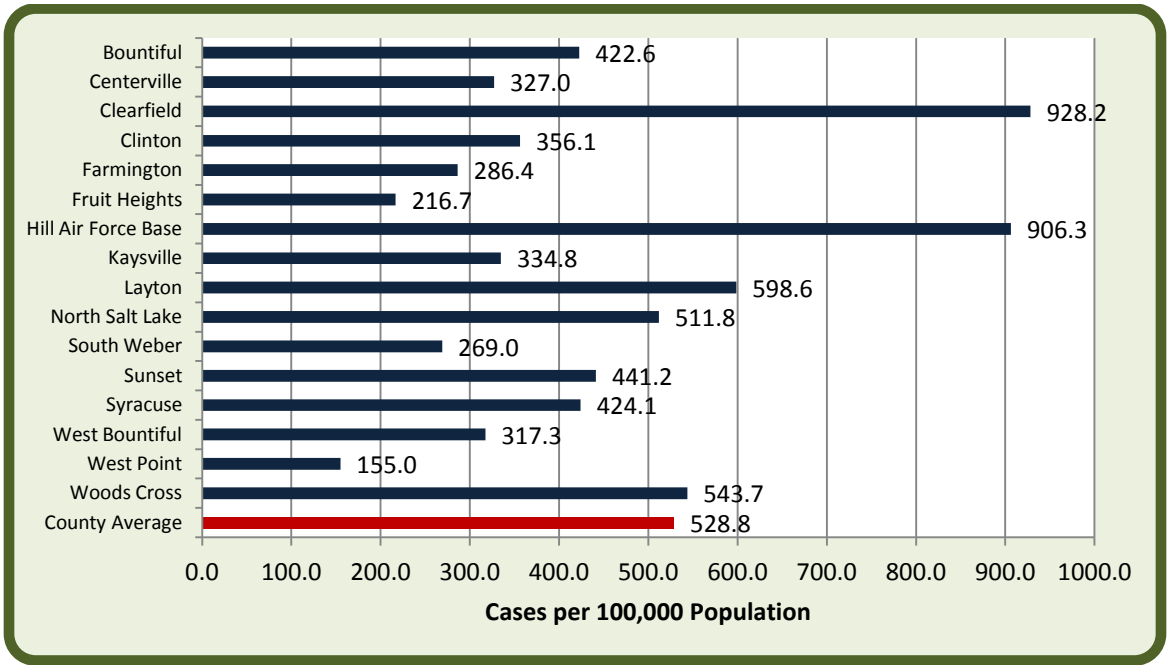
Cases were most often reported among females (54.8%) and among 20-29 year-olds. Sexually transmitted diseases had a significant impact on the 20-29 year old age group. Statistically, females are more impacted by sexually transmitted diseases.

Disease Reports by Age Group and Gender, Davis County, 2012



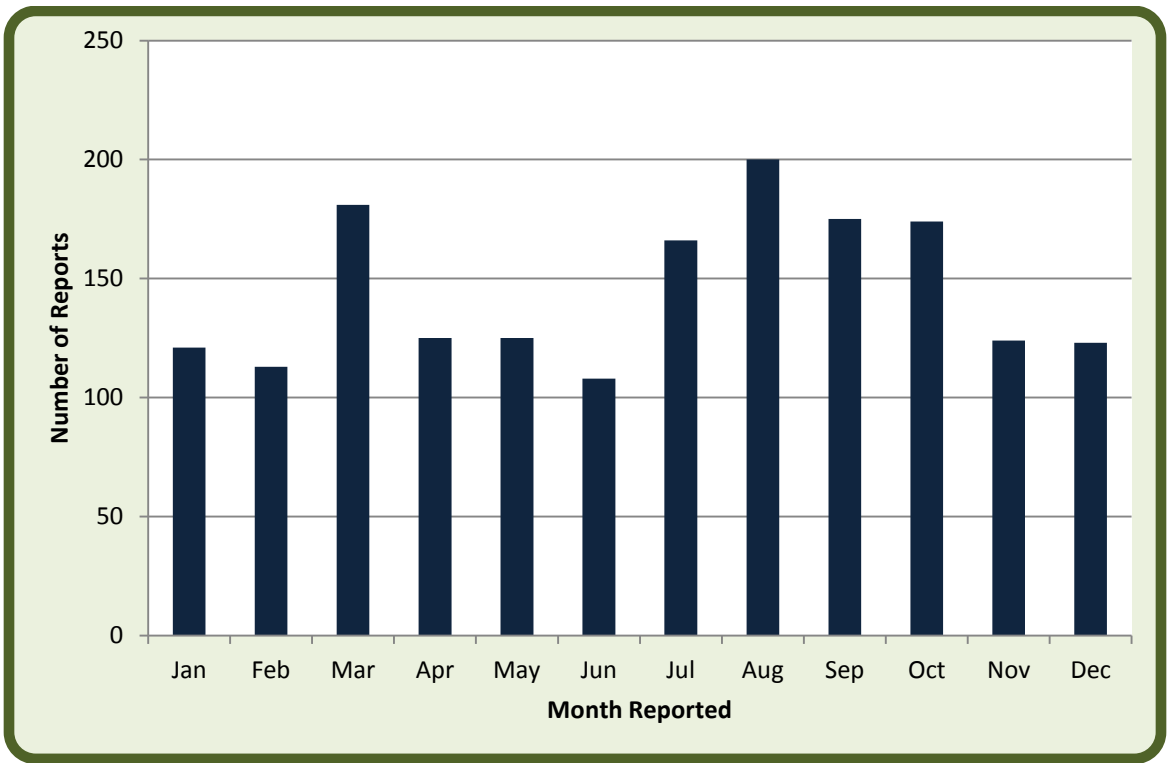
Disease rates by city are identified by the place of residence of the affected individual. These rates do not suggest that one city is better or worse than another, but simply describe the disease burden in each city. Tuberculosis data are not included because most infections were acquired outside of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

Incidence of All Reportable Diseases by City, Davis County, 2012



The disease burden in Davis County normally stays consistent throughout the year. In 2012, on average, 144 diseases were reported each month.

Disease Reports by Month, Davis County, 2012



Top 20 Diseases		
Disease	**Rank**	**Number of Cases**
Chlamydia	1	862
Hepatitis C, Acute & Chronic	2	196
Pertussis	3	139
Tuberculosis, Latent	4	81
Streptococcal Disease, Invasive	5	78
Cryptosporidiosis	6	46
Influenza, Hospitalized	7	43
Gonorrhea	8	40
Chickenpox	9	37
Giardia	9	37
Campylobacter	11	36
Hepatitis B, Acute & Chronic	12	21
Syphilis - All Stages	12	21
Salmonella	14	19
Meningitis, Aseptic/Viral	15	16
Shiga toxin-producing *E. coli*	16	12
HIV/AIDS	17	11
Coccidioidomycosis	18	9
Norovirus	19	6
Lyme Disease	20	4

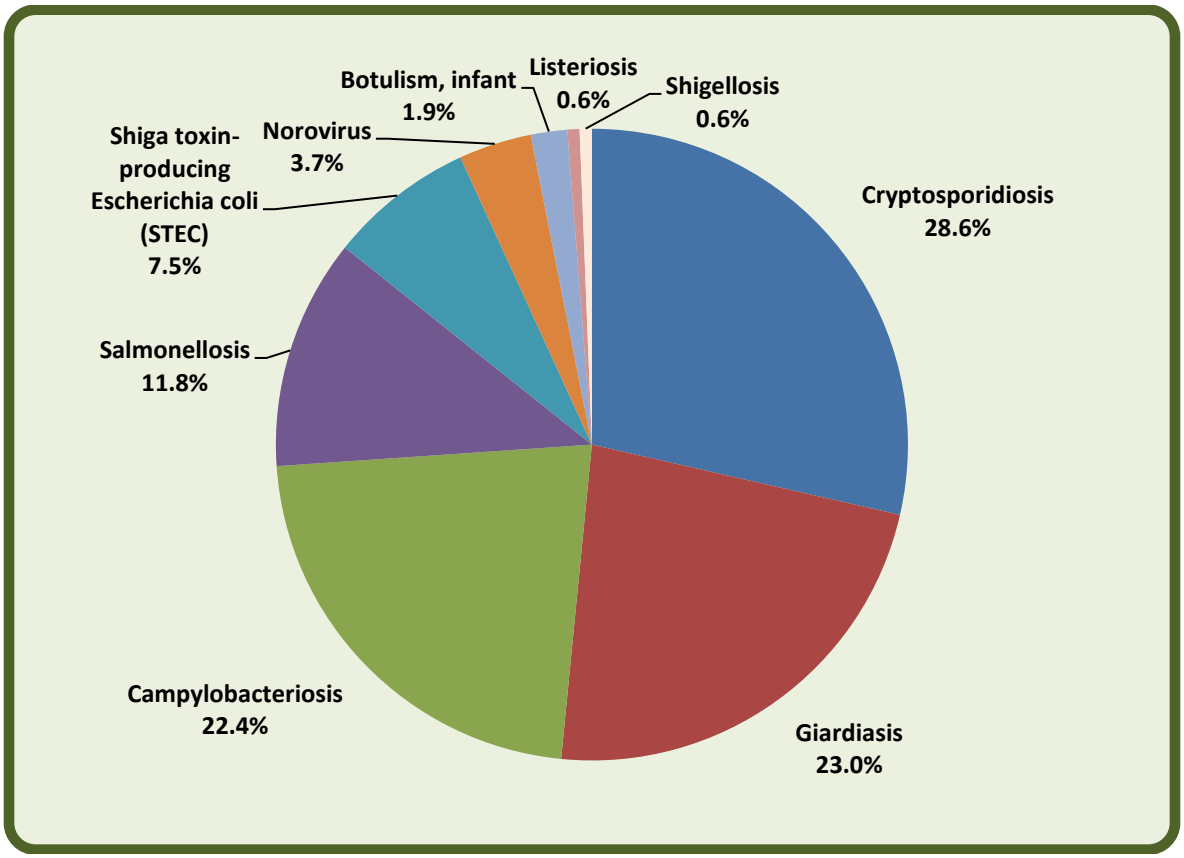
Diseases Reported by Year, 2007-2012							
Disease	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**5 Yr Ave (2007-11)**
Amebiasis	0	0	0	1	1	0	0.4
Botulism, Infant	0	0	0	0	1	3	0.2
Botulism, Foodborne	0	0	0	0	0	0	0
Brucellosis	0	1	0	0	1	1	0.4
Campylobacter	18	60	26	19	33	36	31.2
Chickenpox	111	104	97	62	42	37	83.2
Chlamydia	501	535	735	702	739	862	642.4
Coccidiodomycosis	1	2	3	1	2	9	1.8
Colorado Tick Fever	0	0	0	0	0	1	0
Creutzfeldt-Jakob Disease (CJD)	0	1	2	0	1	1	0.8
Cryptosporidiosis	294	7	3	22	19	46	69
Dengue Fever	0	0	0	1	0	1	0.2
Encephalitis	1	0	1	1	1	1	0.8
Giardia	47	39	35	31	23	37	35
Gonorrhea	48	26	35	38	18	40	33
H. influenzae, invasive disease	7	4	4	0	3	1	3.6
Hemolytic Uremic Syndrome (HUS)	4	0	2	0	1	0	1.4
Hepatitis A	1	2	1	2	3	1	1.8
Hepatitis B, Acute & Chronic	26	37	31	24	26	21	28.8
Hepatitis C, Acute & Chronic	94	112	115	71	150	196	108.4
HIV/AIDS	6	11	10	9	4	11	8
Influenza, Hospitalized	34	55	157	11	43	43	60
Legionellosis	3	2	3	0	9	2	3.4
Listeriosis	0	1	1	2	0	1	0.8
Lyme Disease	1	4	1	0	1	4	1.4
Malaria	0	0	0	1	0	0	0.2
Meningitis, Aseptic/Viral	26	19	22	9	9	16	17
Meningitis, Bacterial - Other	2	2	2	2	2	1	2
Meningococcal Disease	1	0	1	0	1	0	0.6
Mumps	0	1	1	1	0	0	0.6
Norovirus	17	1	1	7	20	6	9.2
Pertussis	18	13	18	28	25	139	20.4
Salmonella	24	27	30	21	39	19	28.2
Shiga toxin-producing *E. coli*	20	12	20	15	12	12	15.8
Shigella	4	2	5	4	1	1	3.2
Streptococcal Disease, Invasive	54	56	48	74	57	78	57.8
Syphilis - All Stages	5	13	5	13	11	21	9.4
Tuberculosis, Active	2	1	3	3	0	1	1.8
Tuberculosis, Latent	88	79	100	80	66	81	82.6
Carbapenem-Resistant Enterobacteriaceae (CRE)						2	--
West Nile Virus Infection	6	2	0	1	1	0	2
Yersiniosis	0	0	1	0	0	0	0.2
Total	1,464	1,231	1,519	1,256	1,365	1,732	1,367.0

Enteric Diseases

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

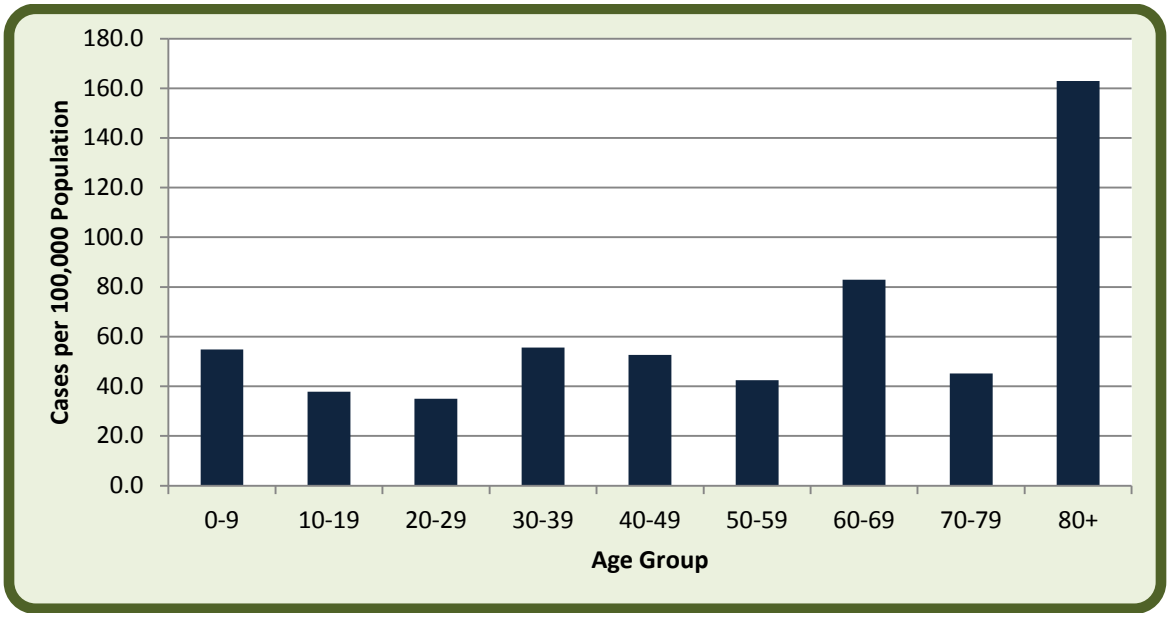
There were **161** enteric disease cases reported during 2012. Cryptosporidiosis was the most frequently reported enteric disease with **46** cases (28.6%), followed by giardiasis with **37** cases (23.0%), campylobacteriosis with **36** cases (22.4%), salmonellosis with **19** cases (11.8%), and shiga toxin-producing *Escherichia coli* with **12** cases (7.5%).

Enteric Diseases, Davis County, 2012



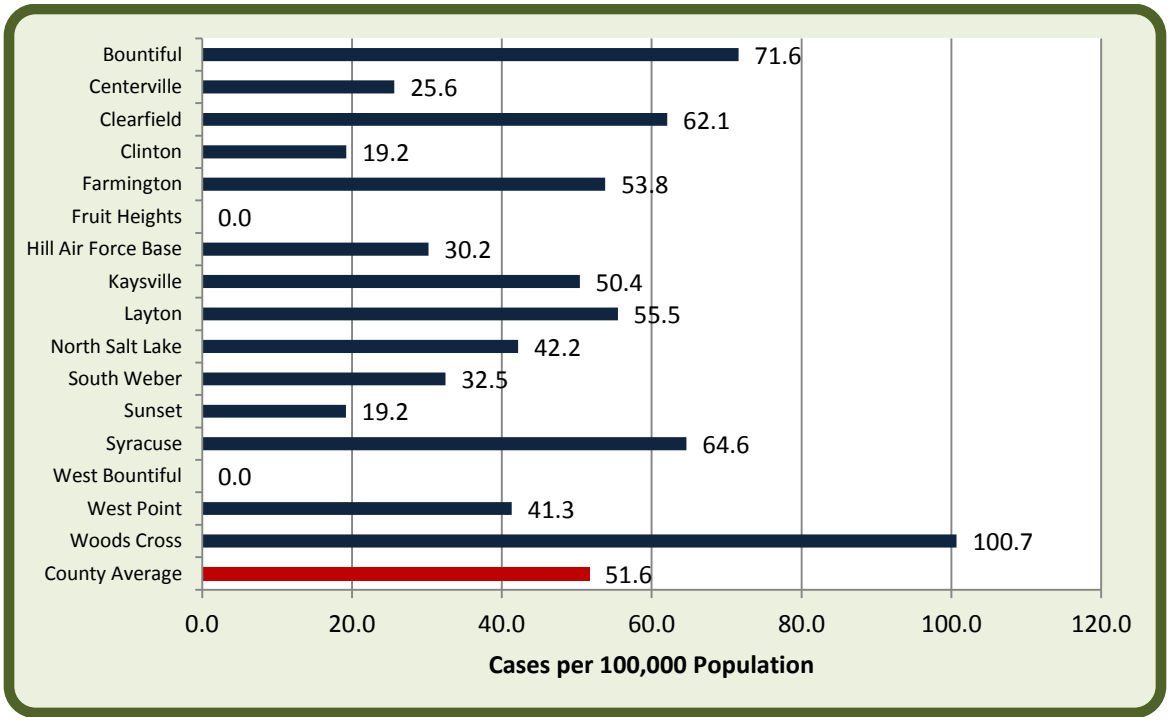
Slightly more than half of the cases were females (50.3%) and rates of illness were highest among the elderly.

Incidence of Enteric Diseases by Age Group, Davis County, 2012



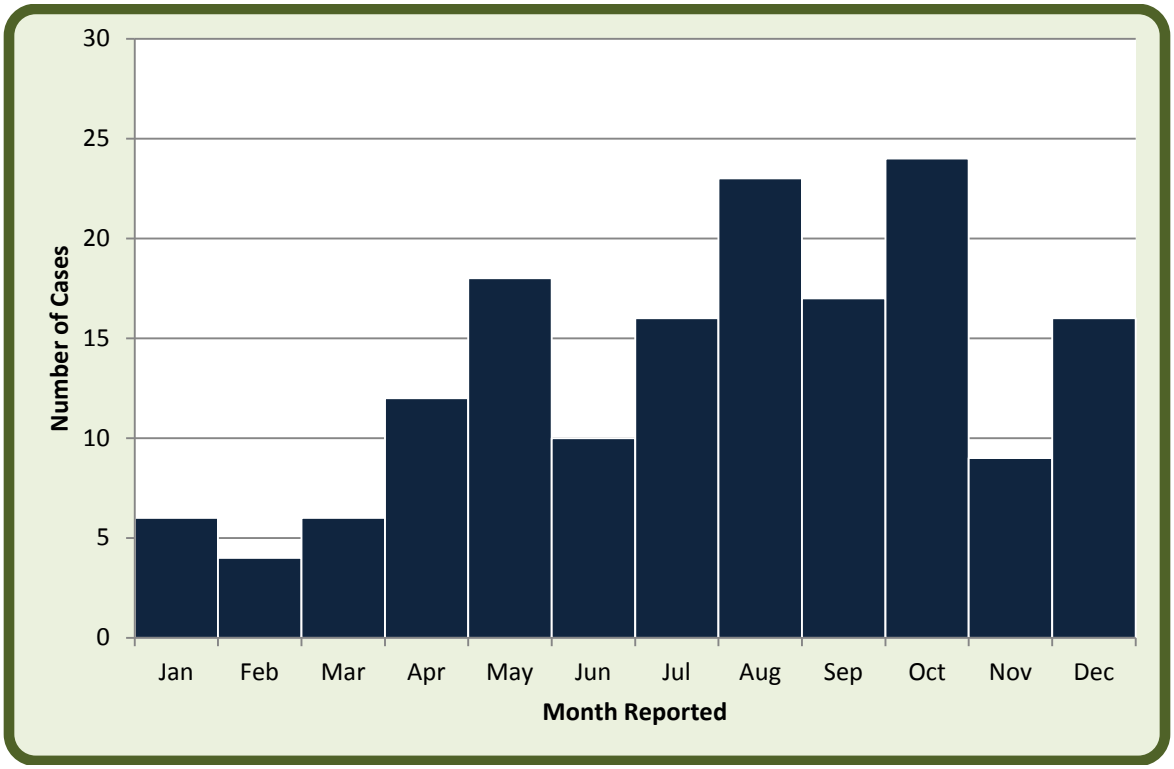
Enteric diseases were reported among residents of every city within Davis County except Fruit Heights and West Bountiful. The rate by city varied, but the average rate of enteric diseases was 51.6 per 100,000 residents.

Incidence of Enteric Diseases by City, Davis County, 2012



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

Enteric Diseases by Month Reported, Davis County, 2012



Botulism

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

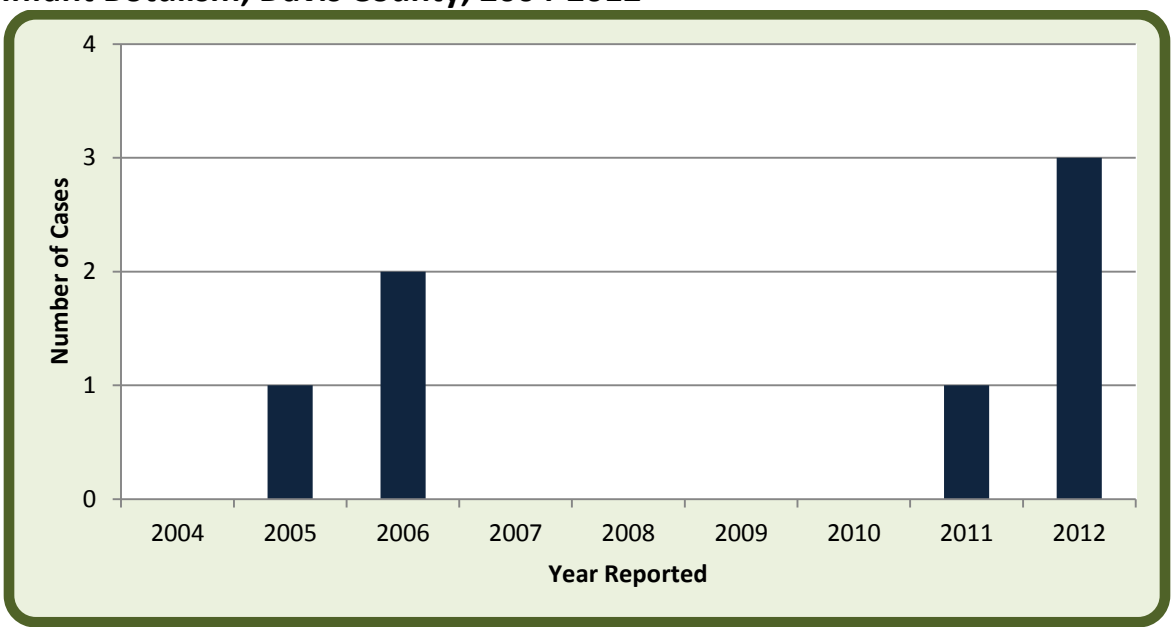
Infant botulism is a disease caused when the *Clostridium botulinum* toxin is produced in the intestines of very young children after becoming infected by the bacteria. Children who get infant botulism are generally younger than six months old. The spores of *Clostridium botulinum* are common in soil,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

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

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

During 2012, there were **three cases** of infant botulism and **no cases** of food-borne or wound botulism reported in Davis County. All three cases of infant botulism were not associated with the consumption of honey or corn syrup.

Infant Botulism, Davis County, 2004-2012

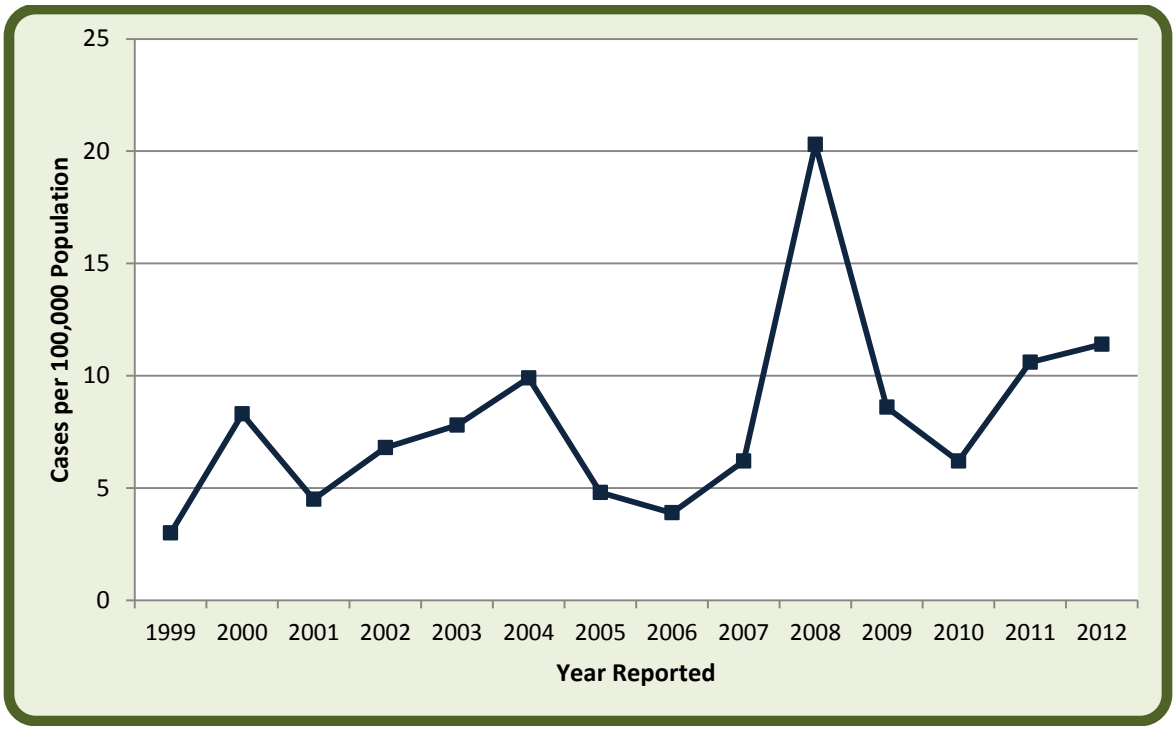


Campylobacteriosis

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 a part of large outbreaks. Active surveillance through the Centers for Disease Control and Prevention (CDC) indicates about 15 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 million persons every year, or 0.5% of the general population.

During 2012, there were **36** cases of campylobacteriosis reported in Davis County.

Incidence of Campylobacteriosis, Davis County, 1999-2012



2012 Disease Highlights:

In 2012, Davis County investigated 36 confirmed cases of campylobacteriosis, the highest annual number of cases reported in the last 20 years (with the exception of 2008 when a large outbreak occurred associated with a youth group that participated in a pioneer trek). No clusters of cases with a common exposure were identified. The cases reported a variety of high-risk exposures including: foreign travel, consumption of unpasteurized milk, ingestion of undercooked poultry, and contact with animals. The reason for the increase in campylobacter cases is unknown; however, other areas of the state also experienced an increase in campylobacteriosis in 2012.

Cryptosporidiosis

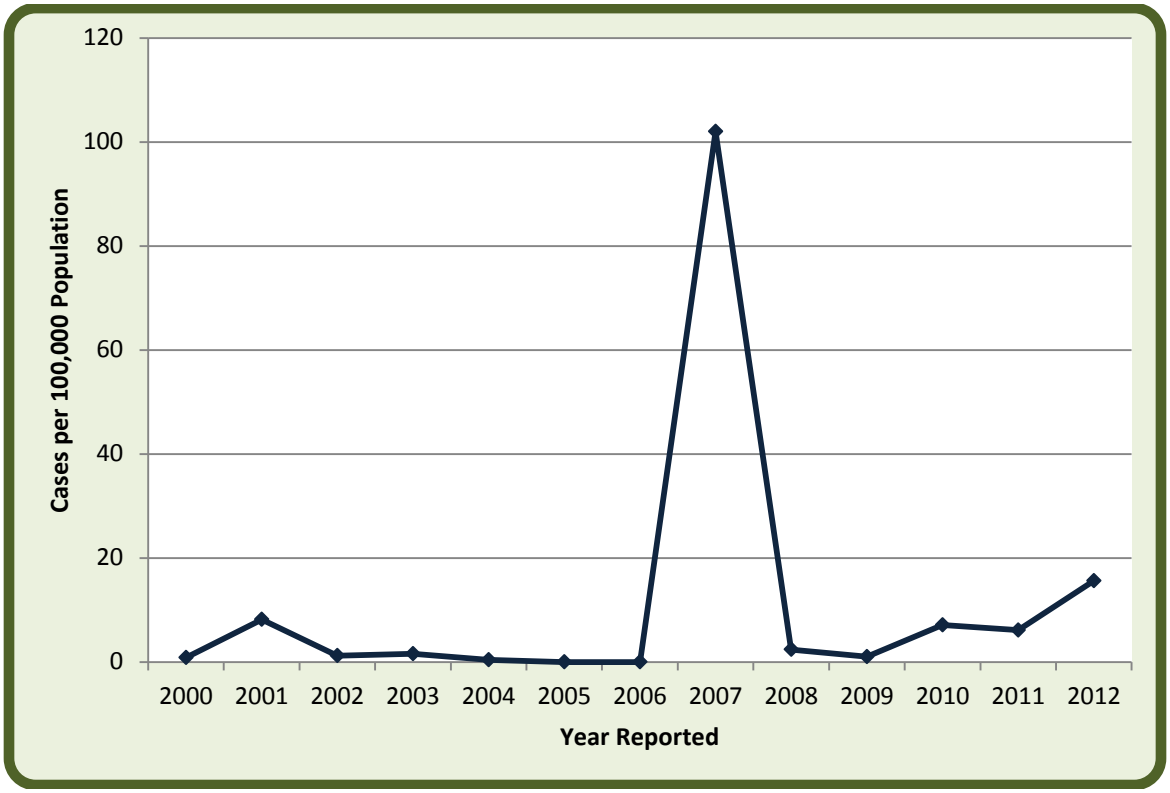
Cryptosporidiosis is an infection caused by the protozoan organism *Cryptosporidium parvum*. *Cryptosporidia* have been found in many hosts, including man, cattle and other domestic mammals. Infections occur via person-to-person, fecal-oral, animal-to-person, and waterborne transmission. During the past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

During 2012, there were **46** cases of cryptosporidiosis reported in Davis County.

2012 Disease Highlights:

Davis County experienced a higher than expected case count of cryptosporidiosis in 2012 with 46 cases reported. In 2007, Utah had an outbreak of cryptosporidiosis with 1,910 cases, of which 294 came from Davis County. The outbreak was associated with public swimming pools. These public pools provided an effective mode of transmission for the disease. Control measures were implemented after the outbreak which included the installation of UV lights in several Davis County pool systems. Over the next four years, cryptosporidiosis declined to expected levels. The increase in cases during 2012 did not reveal a significant link to recreational water exposure.

Incidence of Cryptosporidiosis by Year, Davis County, 2000-2012



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 genogroups, which in turn are divided into at least 31 genetic clusters. Noroviruses are transmitted primarily through the fecal-oral route, either by consumption of fecally contaminated food/water or by direct person-to-person contact. Environmental and fomite contamination are also sources of infection. Evidence exists for transmission via aerosolization of vomitus resulting in droplets contaminating surfaces or entering the oral mucosa and being swallowed. No evidence suggests that infection occurs through the respiratory route. CDC estimates that 23 million cases of acute gastroenteritis due to norovirus infection occur each year, and that at least 50% of all foodborne outbreaks of gastroenteritis can be attributed to noroviruses.

During 2012, there were **6** cases of norovirus reported in Davis County. Outbreaks were identified in some Davis County long-term care facilities.

2012 Disease Highlights:

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

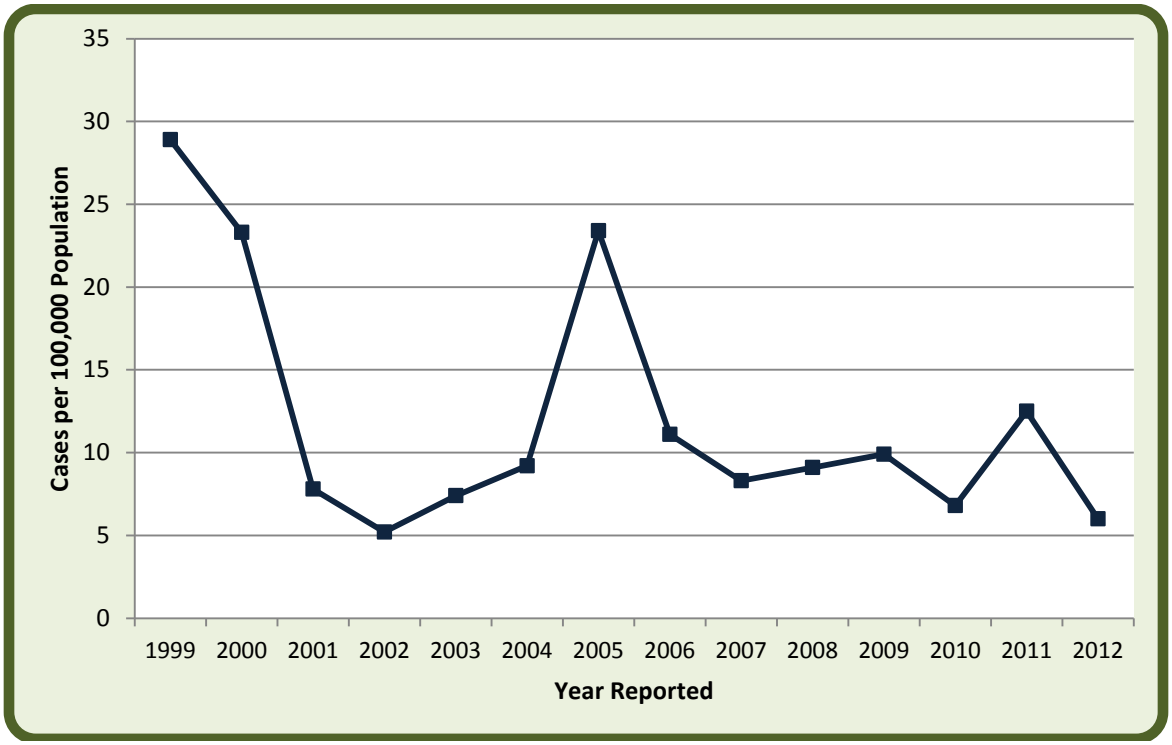
- In July and August of 2012, Davis County Health Department (DCHD) assisted the Wyoming State Health Department in the investigation of a cluster of gastrointestinal illness associated with a Boy Scout camp located in Wyoming. Most of the attendees at this camp are from Utah. There were approximately 800 Boy Scouts/Scout Masters from 48 Troops that attended the camp between July 19, 2012 and August 9, 2012. Fifteen Troops were identified as having at least one ill attendee – eleven of those Troops were able to be located and interviewed. A total of 16 staff members and 32 Scouts reported gastrointestinal symptoms. DCHD interviewed 43 attendees from the four Davis County Troops and found 16 attendees (leaders and Scouts) reporting illness consistent with the established case definition. Wyoming public health submitted stool samples from some of the ill attendees and found that they were positive for norovirus, genotype I. The investigation revealed that fomite/environmental contamination and direct person-to-person transmission were likely the cause of the outbreak.

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 are carried by many domestic animals. Every year, approximately 40,000 cases of salmonellosis are reported in the United States. Because many mild cases are not diagnosed or reported, the actual number of infections may be thirty or more times greater. Salmonellosis is more common in summer than in winter. Children are the most likely to be diagnosed with salmonellosis. Young children, the elderly, and those who are immunocompromised are most likely to have severe infections. It is estimated that approximately 450 persons die each year from salmonellosis.

The number of Salmonellosis cases reported in Davis County in 2012 was down significantly from 2011. A total of **19** cases were reported, a decrease of over 51% from the 39 cases reported in 2011.

Incidence of Salmonellosis, Davis County, 1999-2012



2012 Disease Highlights:

Because of the many different strains of *Salmonella*, determining the serotype and pulsed-field gel electrophoresis (PFGE) pattern of *Salmonella* isolates is critical to identifying sources and epidemiological links among cases. Private laboratories are required to submit *Salmonella* isolates to the Unified State Laboratories: Public Health 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 Typhimurium was the most commonly reported *Salmonella* serotype during 2012 with **four** cases (21.0%) followed by *Salmonella* Enteritidis with **three** cases (15.7%), *Salmonella* Braenderup with **three** cases (15.7%) and *Salmonella* Javiana with **two** cases (10.5%). The number of cases of salmonellosis among Davis County residents by serotype is shown in the table below.

Salmonellosis Serotypes, Davis County, 2012

Serotype	Number of Cases	Percent
Typhimurium	4	21.0%
Enteritidis	3	15.7%
Braenderup	3	15.7%
Javiana	2	10.5%
Agona	1	5.3%
Anatum	1	5.3%
B:1:-monophasic	1	5.3%
Infantis	1	5.3%
Mississippi	1	5.3%
Newport	1	5.3%
Weltevreden	1	5.3%
Total	**19**	**100.0%**

Salmonellosis Clusters

Salmonella Typhimurium

One Davis County resident was linked to a national cluster of *Salmonella* Typhimurium infections matched by PFGE. The Centers for Disease Control and Prevention (CDC) conducted an investigation and determined that most of the cases, including the Davis County case, had contact with snakes and feeder rodents. The rodents were suspected to be the source of the outbreak.

Salmonella Braenderup

A Davis County resident was linked to a national cluster of *Salmonella* Braenderup infections. This cluster investigation is ongoing and involves at least 35 cases from 20 states. Most of the cases had exposure to live chicks and/or ducklings. The Davis County case had exposure to many chicks through his employment at a local farm-supply store. The CDC and the United States Department of Agriculture are investigating the role of several large hatcheries in this outbreak.

Shiga Toxin Producing *Escherichia coli* (STEC) Infection

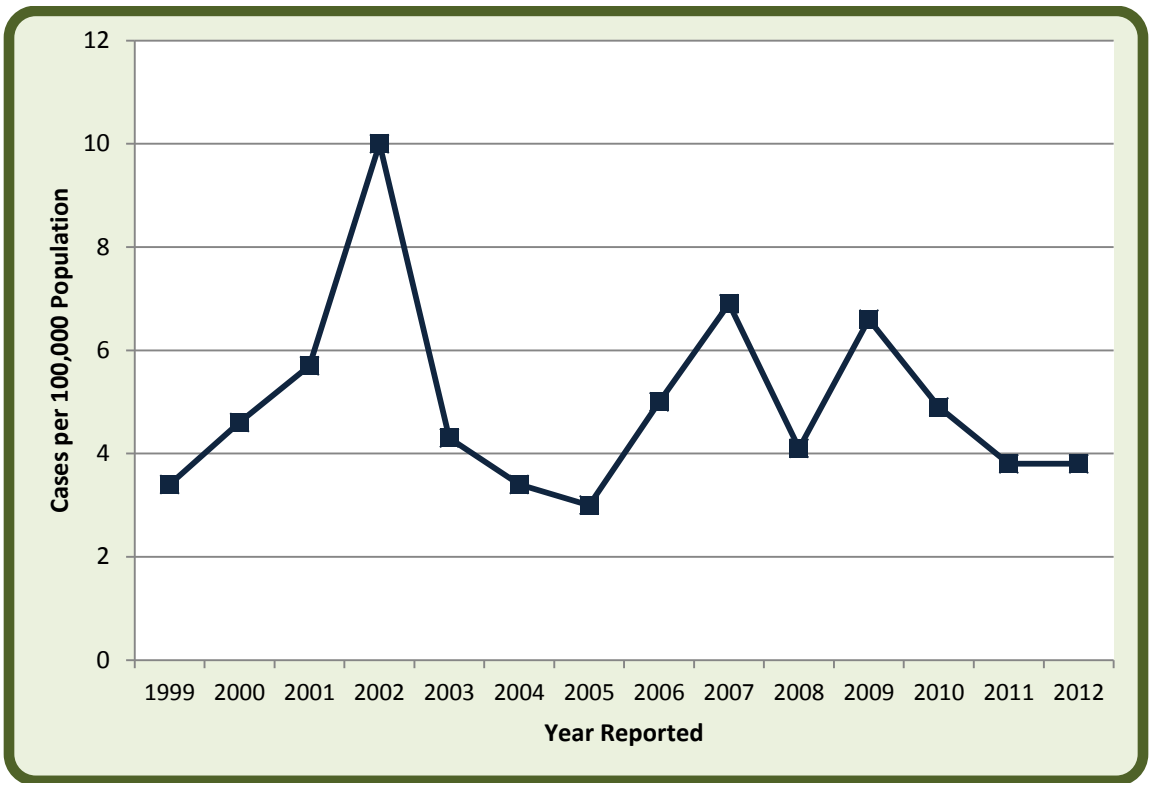
E. coli are bacteria that normally live in the intestines of humans and animals. Certain strains of *E. coli*, including 0121, 011, 026 and 0157:H7 produce Shiga toxins that can cause hemorrhagic colitis, manifested as bloody stools. The most serious complication of the infection is Hemolytic Uremic 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 2012, there were **12** cases of STEC reported in Davis County.

Incidence of STEC Infections, Davis County, 1999-2012



2012 Disease Highlights:

In 2012, the most common strain of STEC reported in Davis County was O157:H7 with **six** cases (50%). This strain is the most common nationally. Other strains identified included O103, O111, and O26. One patient was infected with an unusual strain that had to be sent to the Centers for Disease Control and Prevention(CDC) for typing. That strain was identified as O113:H21. No STEC clusters were identified in Davis County during the year.

The cases ranged in age from 2 to 58, with a median age of 17. A total of six cases (50%) were male. STEC is most commonly reported during the summer months. In 2012, nine cases (75%) were reported in July, August and September.

Two of the Davis County cases were hospitalized, but no HUS cases and no deaths were reported. Possible exposures reported by patients included: animal contact, swimming in untreated recreational water, fair attendance, and camping.

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

Shiga Toxin Producing *E. coli* Serotypes, Davis County, 2012

Serotype	Number of Cases	Percent
O157:H7	6	50.0%
O103	3	25.0%
0111	1	8.3%
O113:H21	1	8.3%
O26	1	8.3%
Total	**12**	**100.0%**

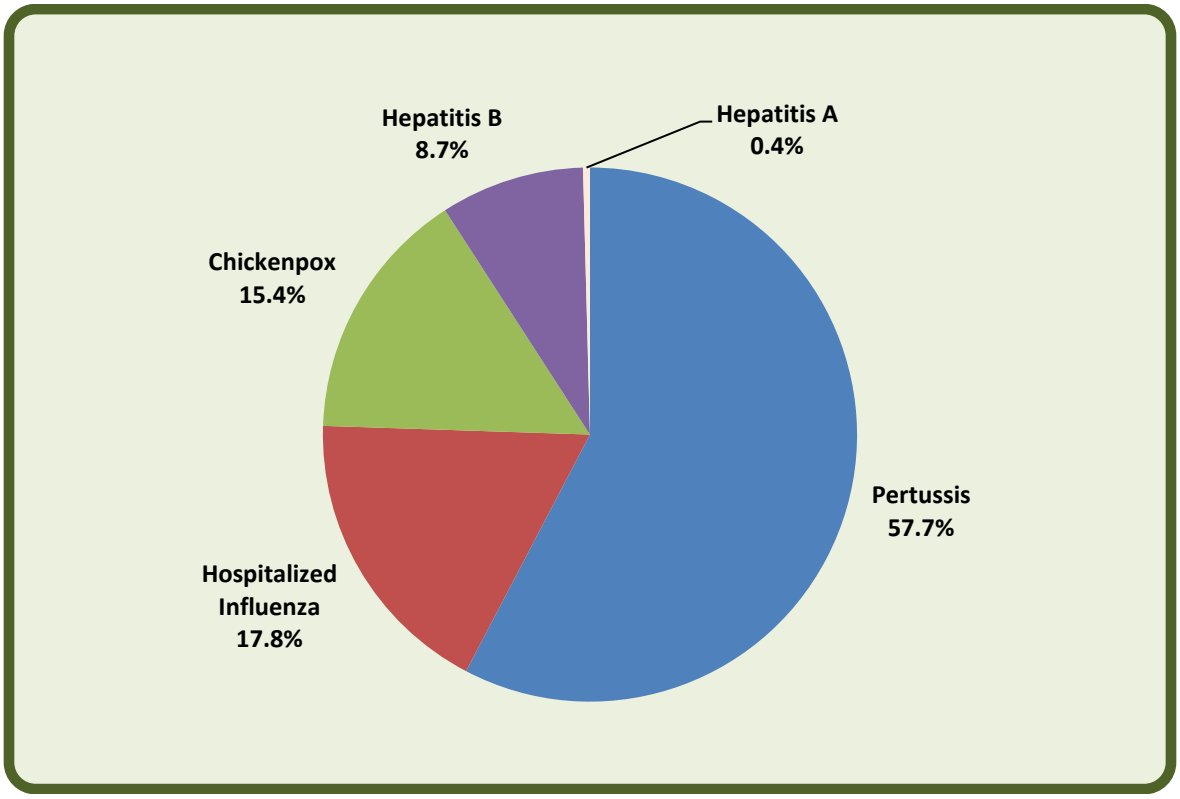
Vaccine-Preventable Diseases

Vaccine-Preventable Diseases (VPD) are diseases that are preventable through the use of immunizations. Historically, many vaccine-preventable diseases historically 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, 27 million children do not receive basic vaccines and two 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 breakthrough, and incomplete or no vaccinations.

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

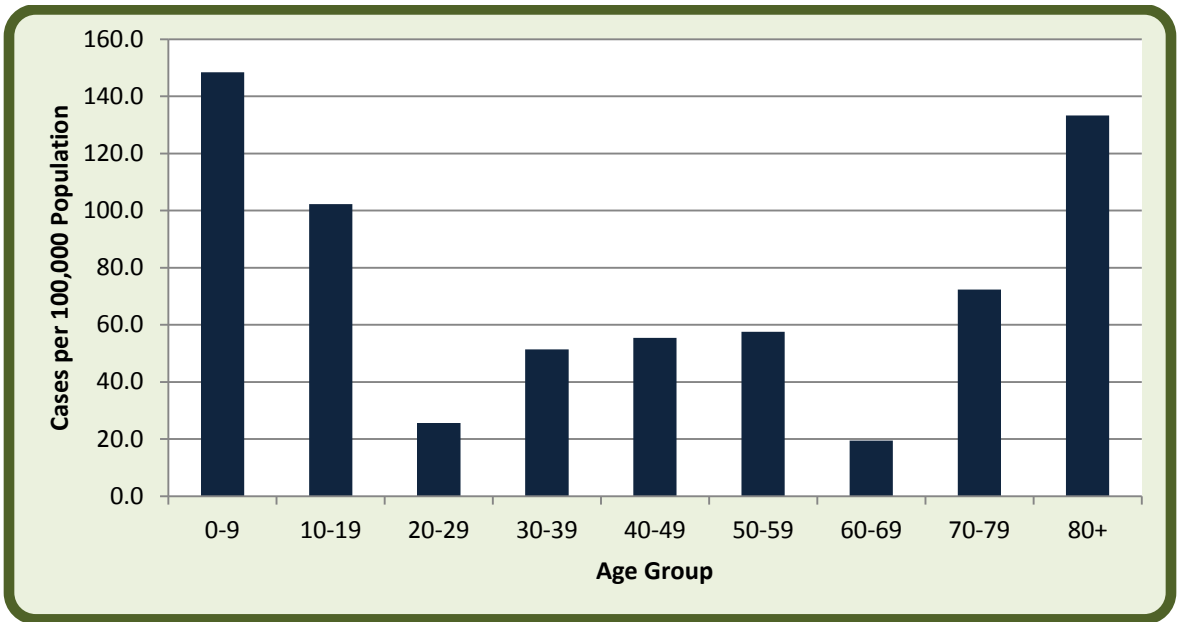
In 2012, Davis County experienced a large outbreak of pertussis. As a result, pertussis was the most commonly reported VPD with **139** cases (58% of all VPDs). Hospitalized influenza was the next most common disease in this category with **43** cases (18%), followed by chickenpox with **37** cases (15%) and hepatitis B with **21** cases (9%). One case of hepatitis A in a Davis County resident who traveled to Mexico was also reported.

Vaccine-Preventable Diseases, Davis County, 2012



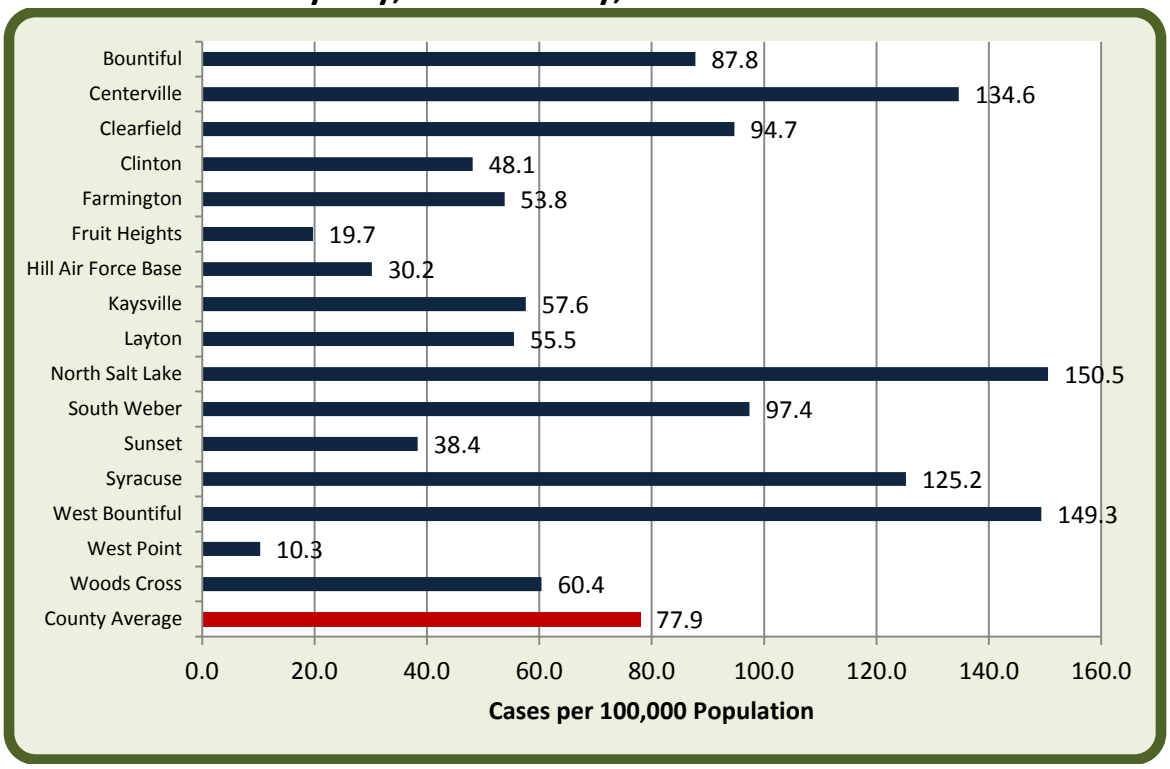
The incidence of vaccine-preventable diseases is highest among children under the age of 10 and the elderly.

Incidence of VPDs by Age Group, Davis County, 2012



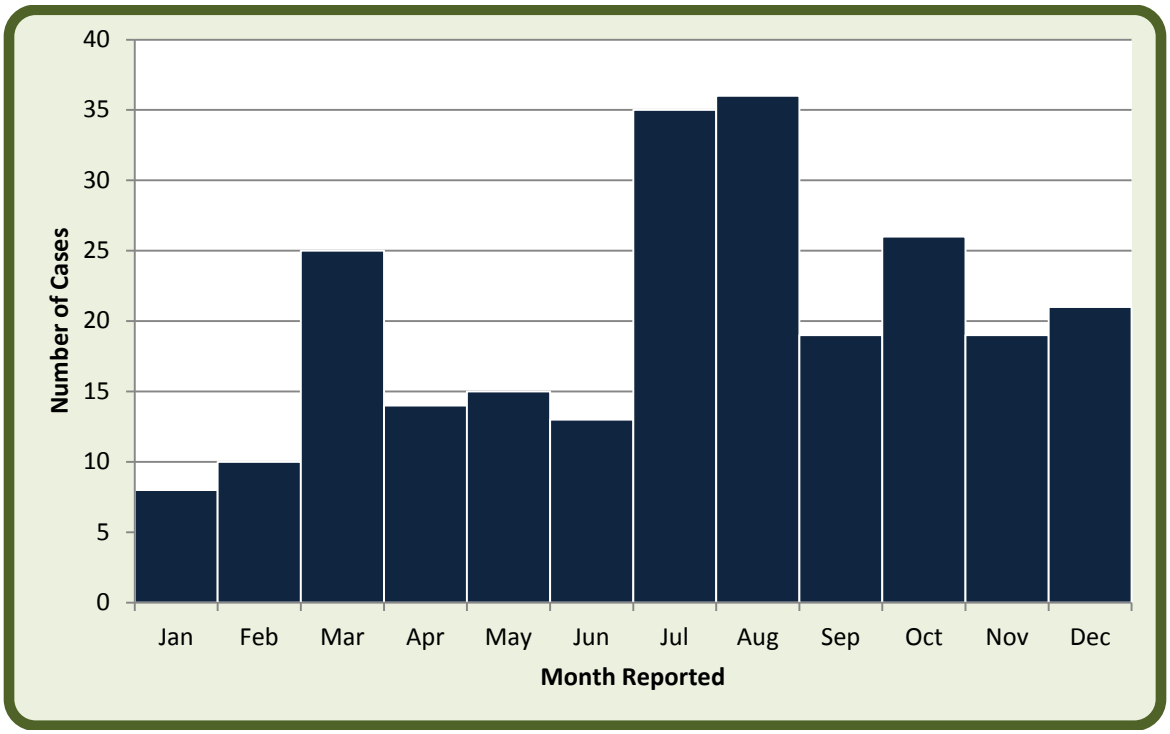
Vaccine-preventable diseases occurred in residents throughout the county. The average rate of vaccine-preventable diseases was **77.9** cases per 100,000 residents.

Incidence of VPDs by City, Davis County, 2012



Vaccine-preventable diseases (particularly pertussis and chickenpox) are usually reported more frequently during the school year. However, in 2012, Davis County experienced an outbreak of pertussis that peaked in July and August. Influenza cases typically peak in February.

VPDs by Month Reported, Davis County, 2012



Hepatitis B (Acute and Chronic Infections)

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

During 2012, there were **21 cases** of HBV reported in Davis County - 18 were chronic infections and three were determined to be acute cases. Of the chronic cases, **12** tested positive during pregnancy and were referred to our Perinatal Hepatitis B Program for further interventions. Several of the non-pregnant HBV cases were at high risk for infection (e.g. foreign born, IDU, sexual/household exposure to a positive contact).

Perinatal Hepatitis B Program:

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

In 2012, two children of chronically-infected mothers were diagnosed with hepatitis B. Both were vaccinated and received the HBIG prophylaxis at birth. 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 year and 5 years of age, 30% to 50% become chronically infected. By adulthood, the risk of acquiring chronic HBV infection is approximately 5%.

Influenza

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

The 2011-2012 influenza season was unusually mild. There were **27** cases of hospitalized influenza reported in Davis County compared to 52 cases reported during the 2010-2011 season.

2012 Disease Highlights:

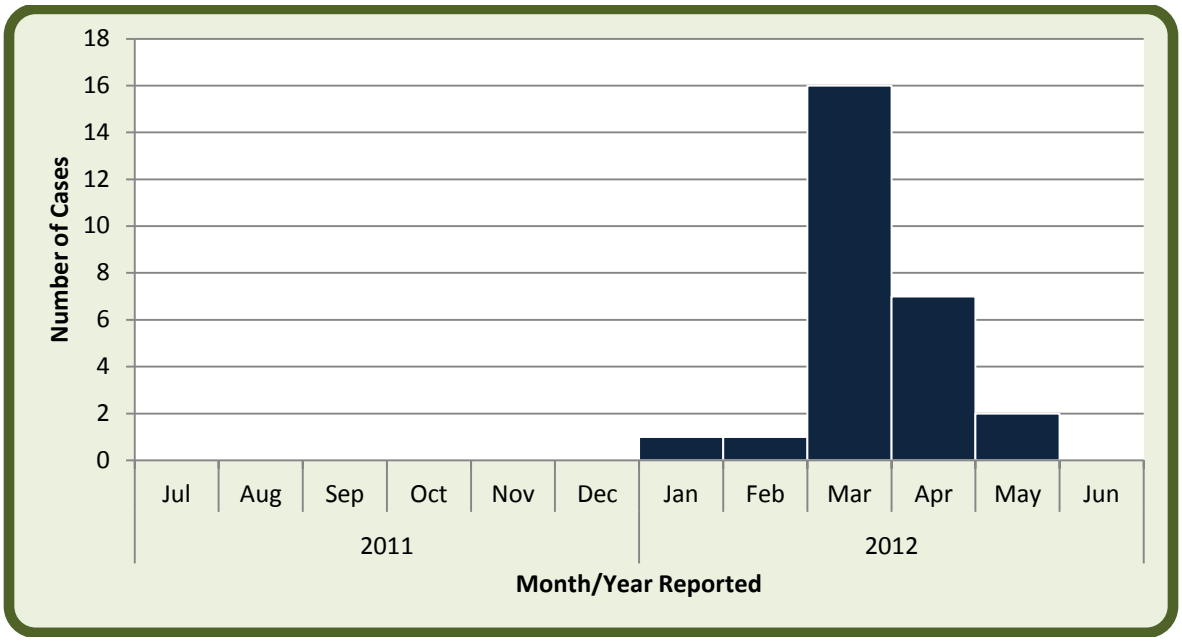
Because of the large number of cases that occur each season, traditional surveillance methods are impractical for influenza. Therefore, the disease is monitored using a variety of mechanisms. One method is through the use of "sentinel sites." Davis County tracks physician visits for influenza-like illness at sentinel sites throughout the county. These sites report data weekly in order to identify when influenza season begins and ends and to monitor the burden of disease in the county. These sites also submit specimens for influenza testing/typing to the Unified State Laboratory: Public Health so that circulating strains can be identified. During the 2011-2012 influenza season, four sentinel sites reported directly to the health department.

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

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

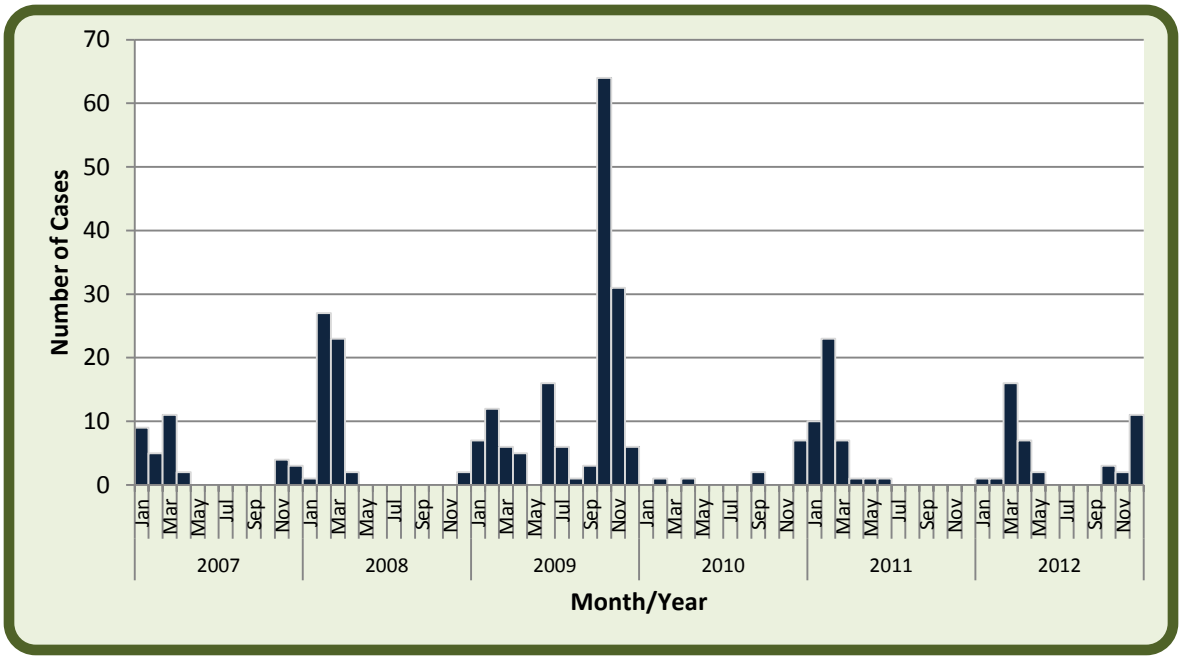
During the 2011-2012 influenza season, the incidence of influenza in Davis County was lower than expected, with only 27 cases of hospitalized influenza reported. However, the 2012-2013 influenza season began earlier than usual and the number of flu cases reported by the end of the 2012 indicates that it will be a moderate to severe flu season. Both type A (H3) and type B influenza strains are being detected, but type A (H3) is the more common circulating strain.

Hospitalized Influenza Cases by Month, Davis County, 2011-2012 Influenza Season



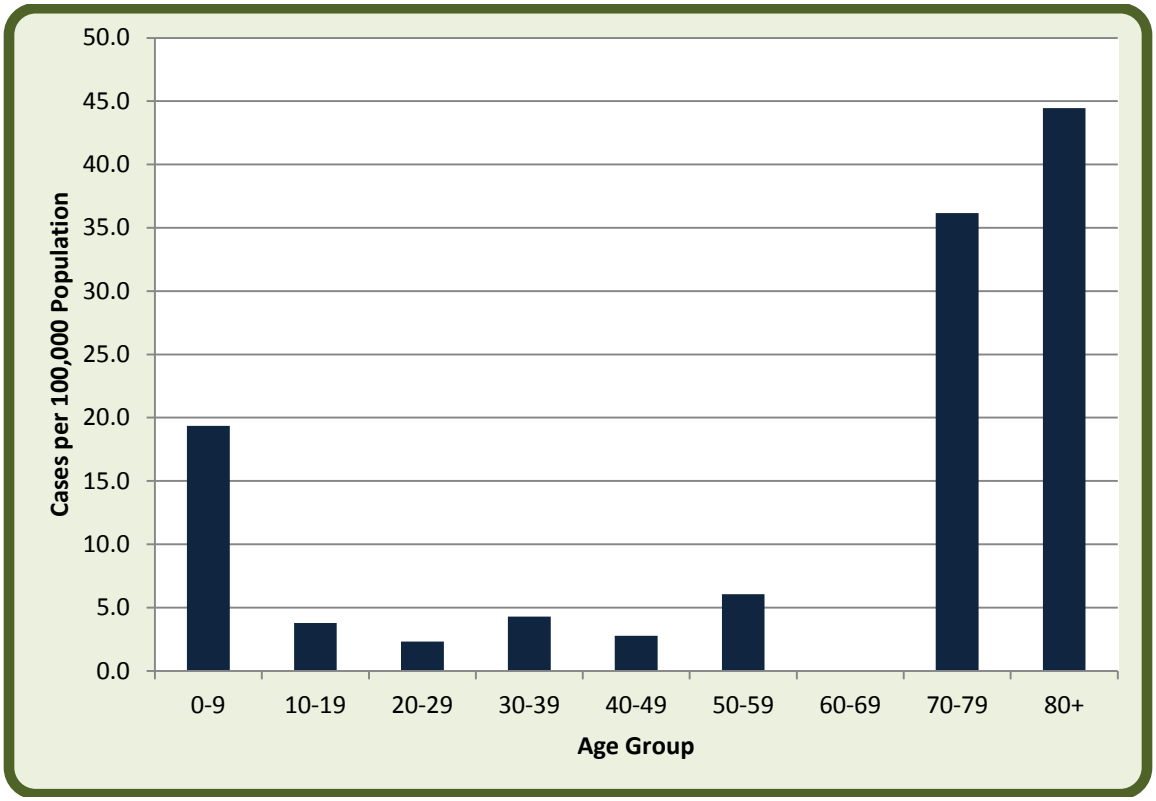
Although influenza cases can occur at any time of year, influenza viruses thrive in cold weather and cases typically peak in the winter months (January and February). The 2011-12 influenza season got off to a late start with cases not peaking until mid-March. It was one of the shortest and mildest flu seasons on record. In contrast, the 2012-13 influenza season began early with high influenza activity being reported in December. It appears that this will be a moderate/severe season.

Hospitalized Influenza Cases by Month, Davis County, 2007-2012



The very young and very old are the populations most severely affected by influenza infection. These groups have the highest rates of hospitalizations and deaths due to the disease.

Incidence of Hospitalized Influenza Cases by Age Group, Davis County, 2011-2012 Influenza Season

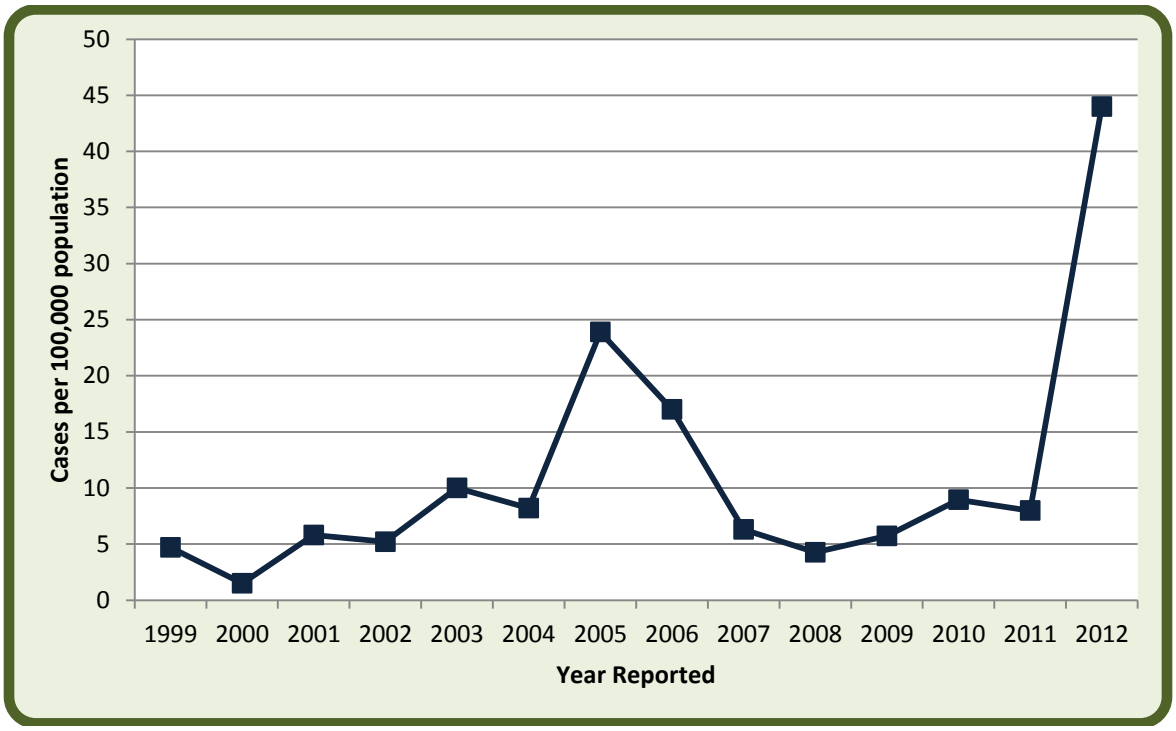


Pertussis

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

During 2012, there were **139** cases of pertussis reported in Davis County.

Incidence of Pertussis, Davis County, 1999-2012



2012 Disease Highlights:

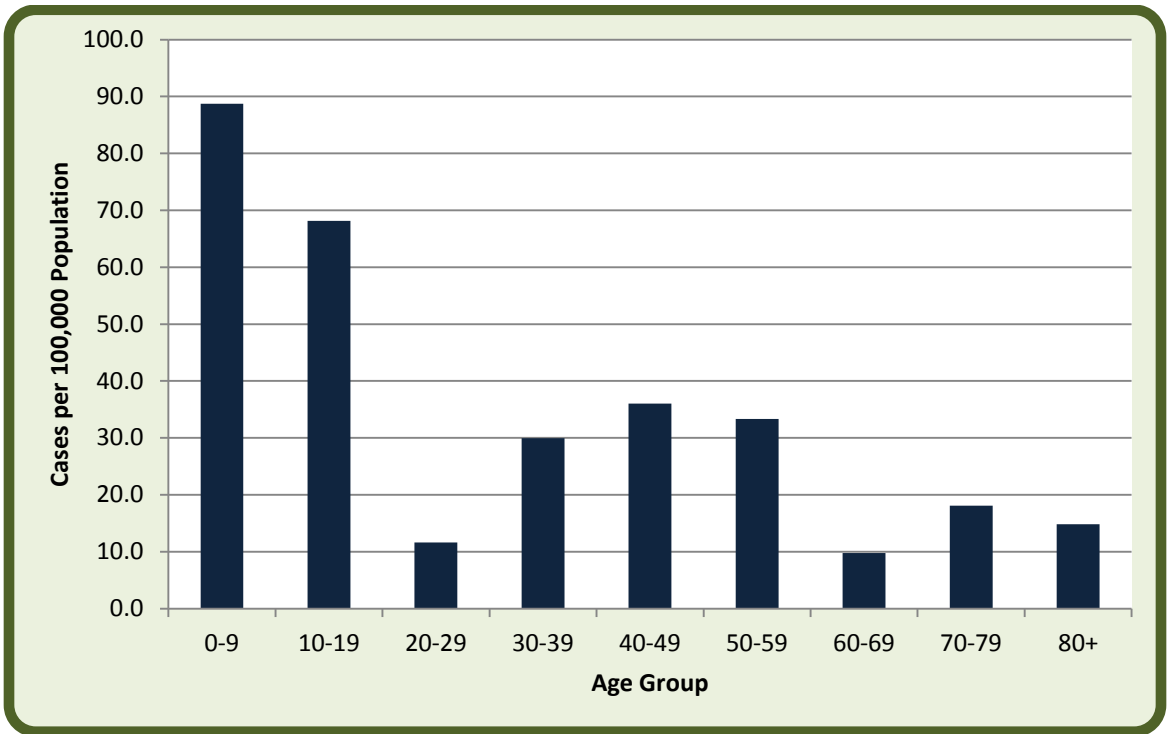
Davis County Health Department (DCHD) investigates approximately 25 pertussis cases each year (based on a 5-year average). In 2012, 139 cases were reported. This is a 456% increase in comparison to the 25 cases reported last year. This elevated trend was noted across the state and nationally. There were 1,450 cases of pertussis reported in Utah and one pediatric death, 3% of cases required hospitalization. In the United States, 41,000 cases of pertussis were reported in 2012 with 18 pertussis-related deaths. The majority of deaths occurred in infants < 3 months of age. Disease investigations conducted by DCHD found additional symptomatic contacts, indicating a more significant disease impact than what was initially reported. Risk factors for development of disease included: 1) no vaccination or under-vaccination, 2) waning antibody response, and 3) exposure to symptomatic individuals in the community via mass gatherings (e.g. schools, worksite, and religious meetings).

All reported pertussis cases are investigated promptly in an effort to stop disease spread. Contacts who experience a prolonged exposure to an infected case may benefit from antibiotic prophylaxis – if the antibiotic is 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 is required. The Tdap (tetanus, diphtheria and acellular pertussis) is recommended for anyone aged 11-64 and is a one-time dose. New guidance from CDC recommends pregnant women receive Tdap vaccine with every pregnancy, preferably given between weeks 27-36. Tetanus vaccination, however, is recommended every 10 years. The age groups most often affected by pertussis are those who are under-vaccinated including infants/children under five (because they have not completed the full vaccination series) and adolescents/adults (because of waning immunity).

As a result of the increase in pertussis cases, local health department (LHD) and Utah Department of Health (UDOH) representatives assembled together to evaluate the current intervention activities and implement new processes to help address the pertussis disease burden. In consultation with CDC, the workgroup developed new disease investigation guidelines, with emphasis on control measures within the school/daycare systems. A standardized approach was utilized in an effort to ensure continuity between the counties.

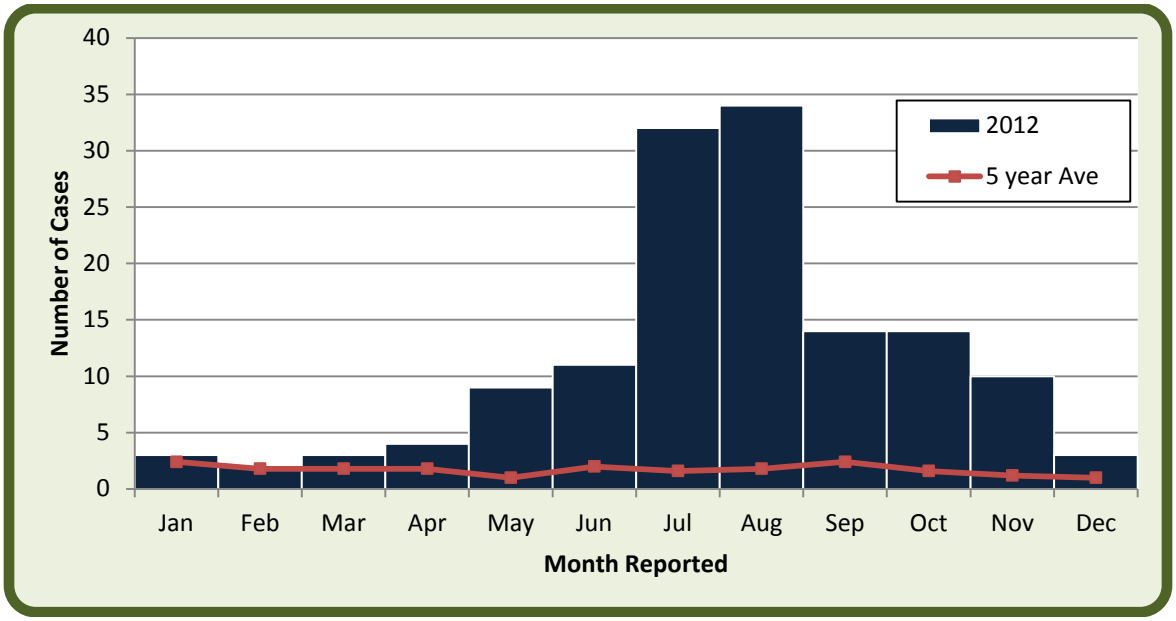
Infants and young children are the groups most severely impacted by pertussis. Although cases are common in older children and adults due to waning immunity, illness in these age groups is usually mild, and the diagnosis is often missed.

Incidence of Pertussis by Age Group, Davis County, 2012



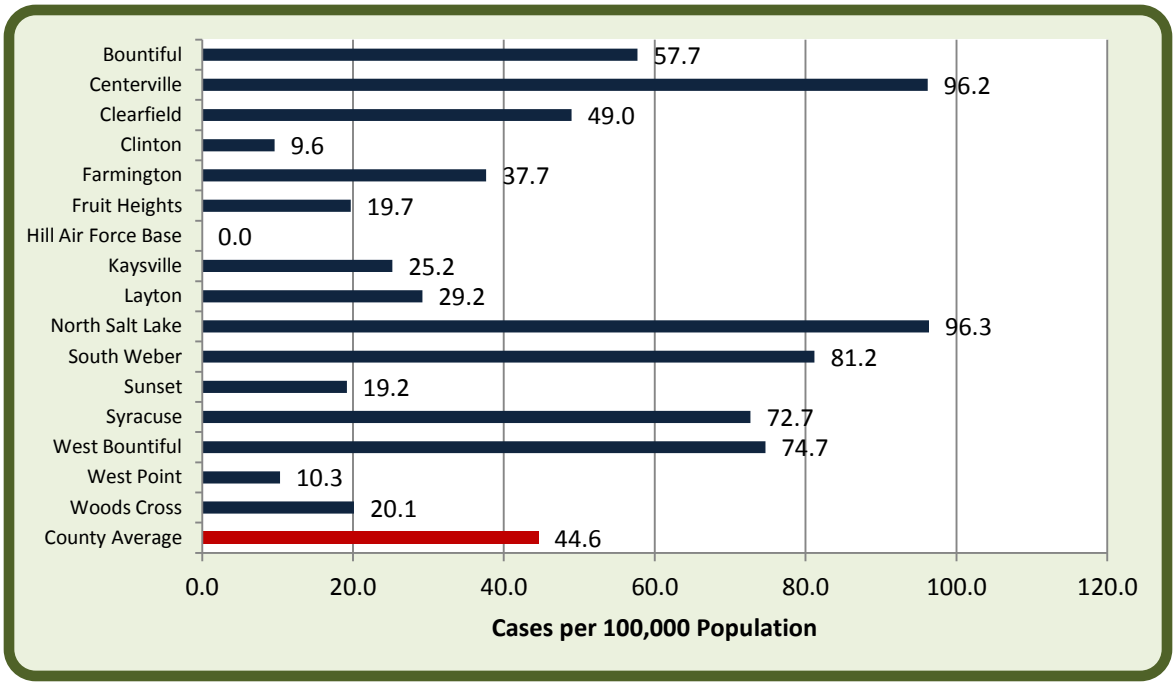
Cases of pertussis began rise in April of 2012 and peaked in July and August. Although the number of cases dropped substantially by the end of the year, the total was still above expected levels. DCHD continues to closely monitor pertussis cases.

Pertussis by Month Reported, Davis County, 2012



In 2012, pertussis cases were reported throughout Davis County. However, the incidence of disease was highest in North Salt Lake, Centerville, and South Weber.

Incidence of Pertussis by City, Davis County, 2012



Vectorborne/Zoonotic Diseases

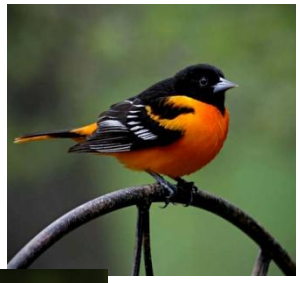
Vectorborne/zoonotic diseases are those diseases transmitted by an animal or insect. Vectorborne/zoonotic diseases do not often occur in Davis County. Some of these diseases, such as malaria and dengue fever, are typically acquired outside of the United States.

In 2012, there were **7 cases** of vectorborne/zoonotic diseases reported in Davis County.

Disease	Location of Exposure	Suspected Source of Infection	Number of Cases
Brucellosis	Spain	Raw goat cheese	1
Colorado Tick Fever	Wyoming	Tick bite	1
Dengue	Brazil	Mosquito bite	1
Lyme Disease	1-Utah, 3-Out-of-State	Tick bite	4
Total			**7**

Four of the cases of vectorborne/zoonotic diseases were male and three were female and all of the cases were adults.

Vectorborne/zoonotic diseases are rare in Davis County. All but one of the Davis County cases reported in 2012 were acquired outside of Utah, and at least two cases were acquired outside of the United States.



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 the Centers for Disease Control and Prevention (CDC) each year occur in wild animals such as raccoons, skunks, bats, and foxes. Domestic animals account for less than 10% of reported rabies cases, with cats, cattle, and dogs most often infected. In Utah, the majority of cases are reported in bats.

During 2012, there were **no cases** of human rabies and **one** animal rabies (bat) reported in Davis County.

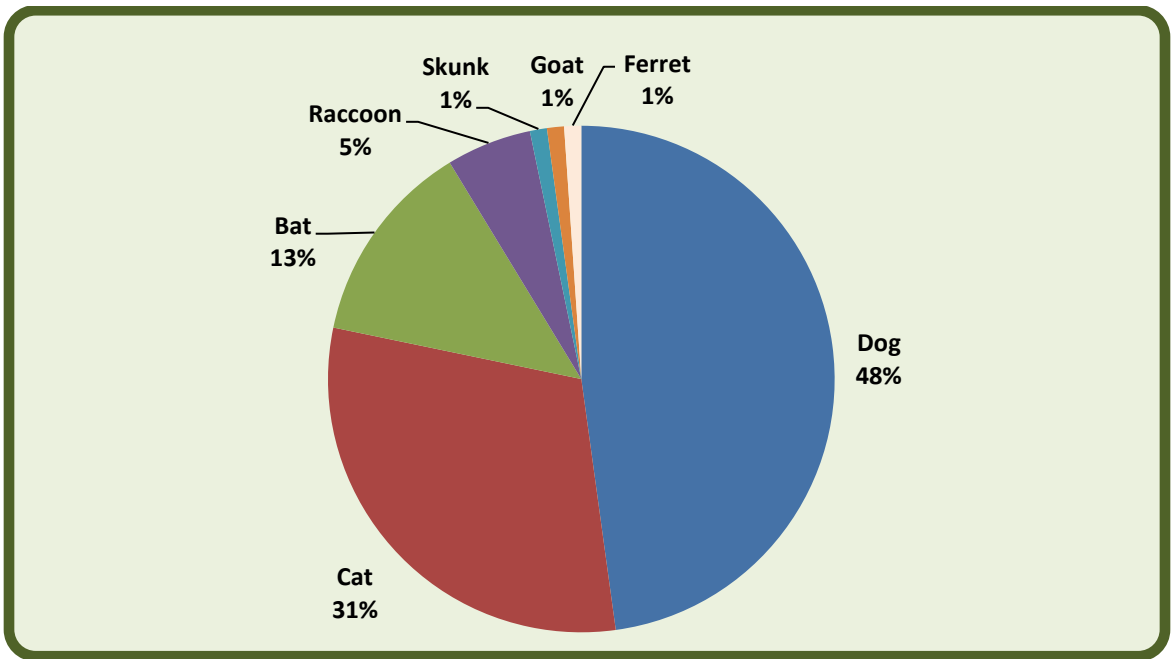
2012 Disease Highlights:

The Communicable Disease and Epidemiology Division evaluated 28 individuals who reported an exposure to an "at-risk" animal. Each case was interviewed and evaluated for need of rabies post-exposure prophylaxis (PEP). Those who were recommended PEP were tracked through completion of therapy or until PEP discontinued (either by choice or due to negative testing results of the suspect animal).

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 2012, the Davis County Environmental Health Division submitted 92 animals for rabies testing; one sample was positive (bat). Of these, 43 (47%) involved a human exposure and 49 (53%) were animal-to-animal exposures.

Animals Tested for Rabies, Davis County, 2012

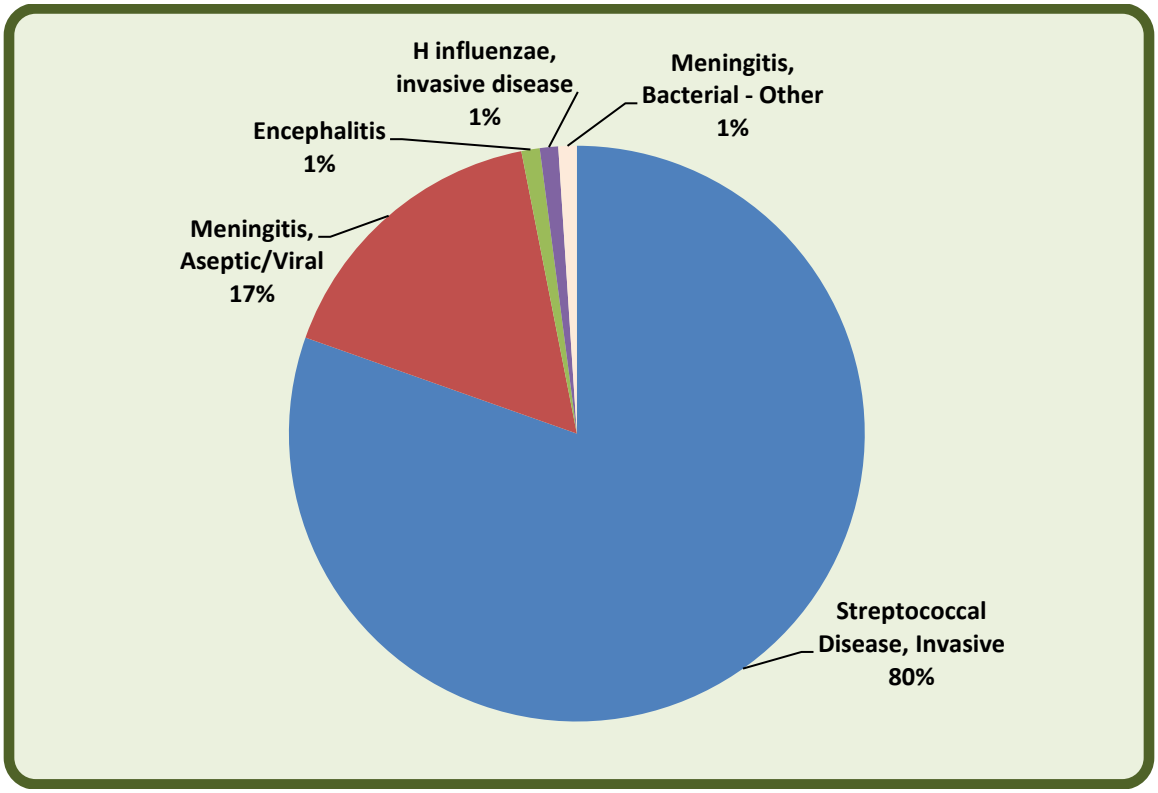


Invasive Diseases

Invasive diseases include infections of the bloodstream as well as meningitis and encephalitis. *Haemophilus influenzae* and meningococcal disease (*Neisseria meningitidis)* are discussed in the Vaccine-Preventable Disease section. 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 2012 were invasive streptococcal infections. These included Group A *Streptococcus*, Group B *Streptococcus*, Group C & G *Streptococcus*, *Streptococcus pneumoniae*, and other streptococcal infections.

Invasive Diseases, Davis County, 2012



Invasive Streptococcal Infections

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

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

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

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

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

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

In 2012, there were **78** cases of invasive streptococcal infections reported among Davis County residents (the 5-year average is 57). The majority of cases were due to strains that do not require an investigation or the implementation of public health control measures (e.g. *S. mutans, sanguinis and mitis*).

2012 Disease Highlights:

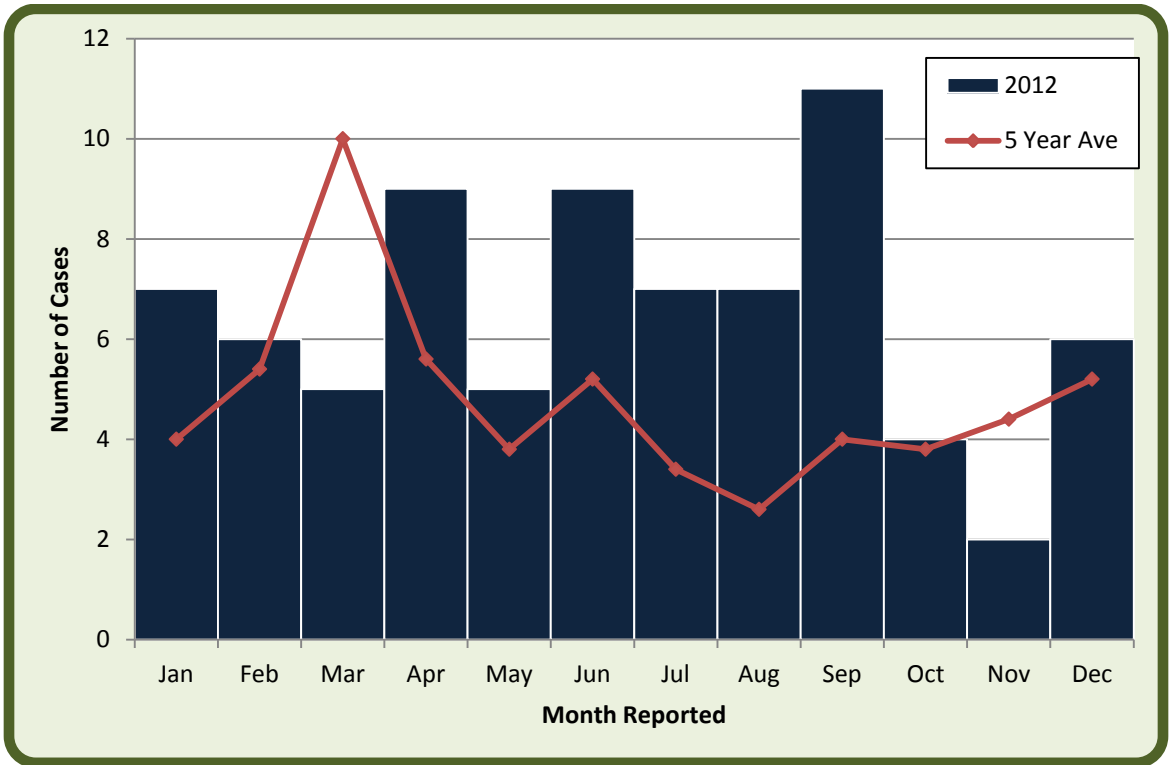
Invasive streptococcal infections tend to cause severe illness. In 2010, over 12% of reported invasive streptococcal infections were fatal. In 2011, the fatality rate decreased to less than 9% with five fatal cases among the 57 reported. In 2012, 7 out of 78 cases were fatal, a case fatality rate of 8.9%.

Types of Invasive Streptococcus Infections, Davis County, 2012

Type	Number of Cases
Group A *Streptococcus*	11
Group B *Streptococcus*	14
Group C & G *Streptococcus*	10
Other *Streptococcus* (*mitis, viridans, etc…)*	27
Streptococcus pneumoniae	16
Total	78

Infection with *Streptococcus pneumoniae* is particularly serious. In 2012, three out of 16 reported *S. pneumoniae* cases were fatal - a case fatality rate of almost 19%. This organism is the leading cause of vaccine-preventable illness and death in the United States. Pneumococcal pneumonia kills about one out of 20 people who get it. Bacteremia kills about one person in five and meningitis about three in ten. There are more than 90 strains of pneumoccocal bacteria. Fortunately, there are vaccines available to prevent some infections.

Invasive Streptococcal Infections by Month, Davis County, 2012

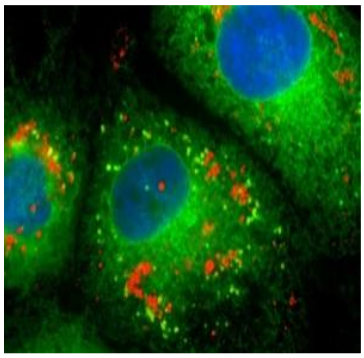


Other Reportable Diseases/Conditions

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

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

Disease	Number of Cases
Hepatitis C, acute and chronic	196
Coccidioidomycosis	9
Legionellosis	2
Carbapenem-Resistant Enterobactericeae (*Acinetobacter)*	2
Cruetzfeldt-Jakob Disease (CJD)	1



Hepatitis C

Legionella

Acinetobacter

Hepatitis C

Hepatitis C is a disease caused by a virus that infects the liver. Over time it can cause liver damage including cirrhosis, liver failure and cancer. Approximately 15-25% of those infected with HCV will recover from the infection. The remaining ~80% develop chronic infection. Each year 8,000 to 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, muscles aches, nausea, jaundice, loss of appetite and abdominal pain.

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

In 2012, Davis County received reports on **196** cases of HCV, a 31% increase from 2011 (150 cases).

2012 Disease Highlights:

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

As a result of a grant awarded to Davis County in 2012, HCV testing was conducted in the Davis County Jail for inmates entering the correctional system. **753** inmates were screened for HCV using the newly approved rapid test. Of those screened, **60** inmates tested positive – an infectivity rate of 8% in this incarcerated population. Most of those who tested positive were at high-risk for infection, yet were unaware of their infection. Those testing positive for HCV received one-on-one counseling, encouraged to seek confirmatory testing, and were provided resources in the community for when they are released. Hepatitis C remains an under-reported disease.

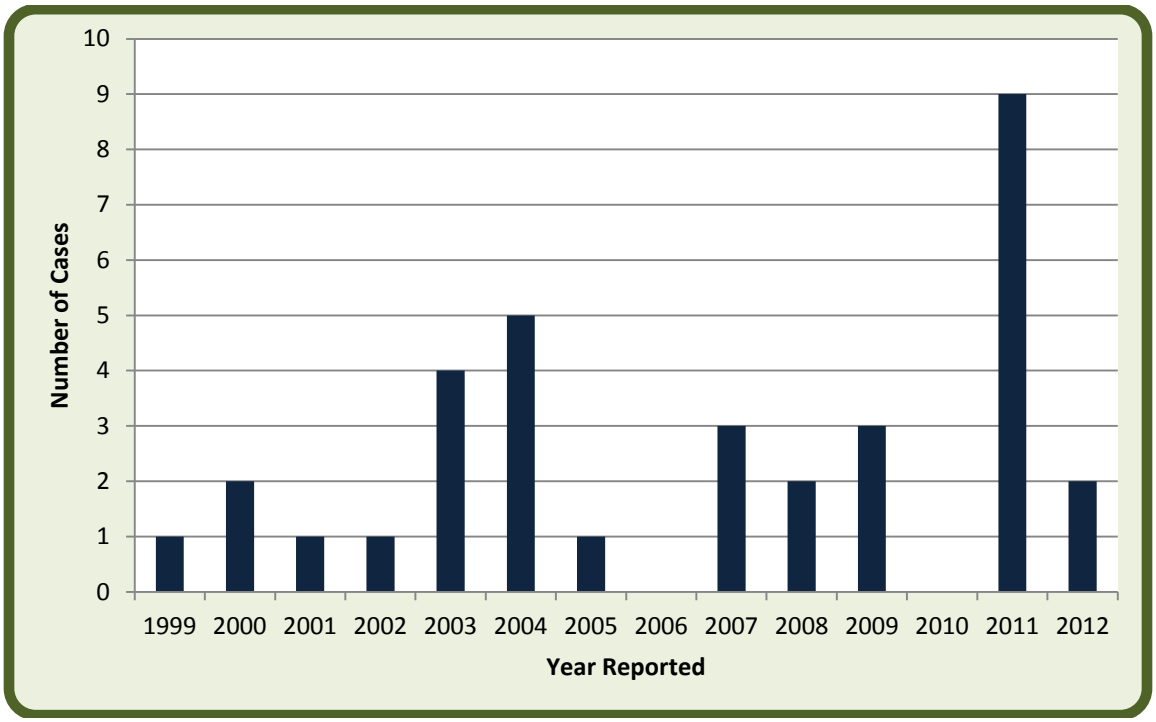
Legionellosis

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

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

During 2012, there were **two** cases of Legionellosis reported in Davis County.

Legionellosis Cases, Davis County, 1999-2012



2012 Disease Highlights:

Davis County receives an average of 1-2 cases of Legionellosis each year. In 2012, two cases were reported. It is important for public health to identify a source of the infection before an outbreak occurs. Often, however, the source remains unknown. Outbreaks of Legionellosis are reported throughout the year and have been associated with facility water systems (e.g. hotels, nursing homes, hospitals). 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 cases reported in Davis County in 2012 had pre-existing medical conditions that made them more susceptible.

Carbapenem-Resistant Enterobacteriaceae

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

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

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

In addition, beginning in 2013, Utah laboratories and health care facilities will be 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 help us understand where they are occurring and how to prevent their spread within and between facilities.

2012 Disease Highlights:

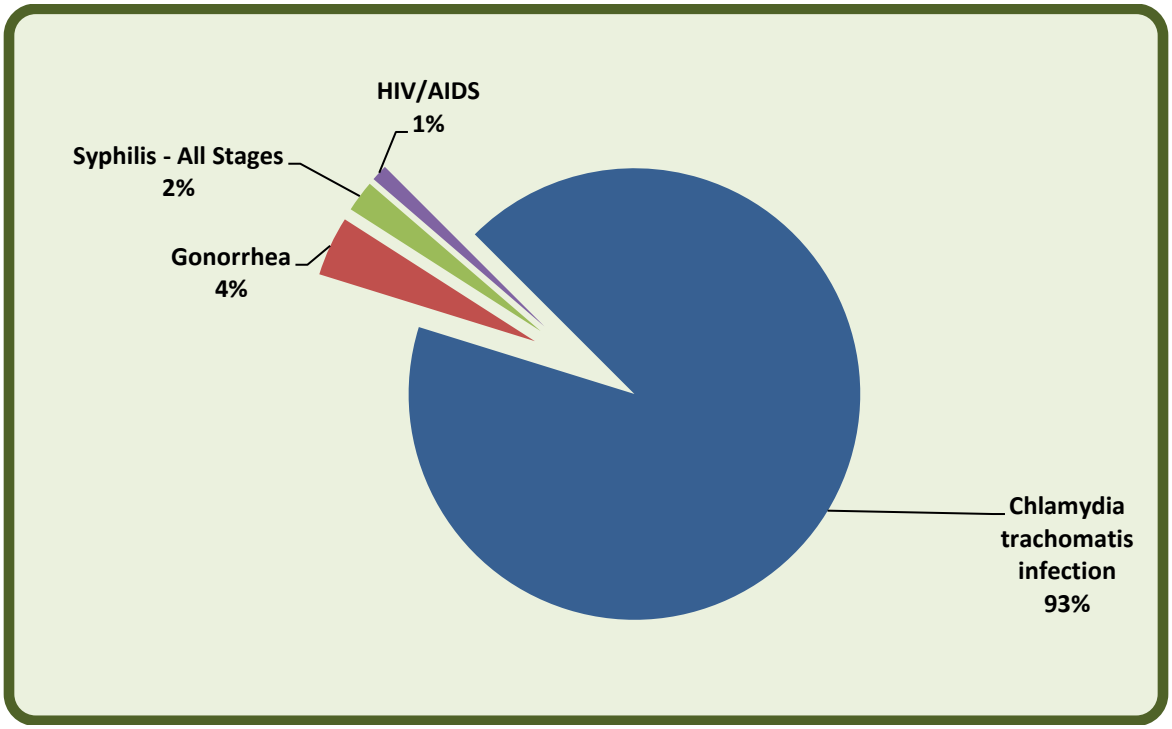
Although the reporting of CREs to the health department was not required in 2012, it was encouraged. A total of **two** CREs were reported to the Davis County Health Department during the year. Both patients were males older than 55 years of age and patients at different Davis County health care facilities when they developed their infections. Appropriate control measures to prevent spread were implemented at each facility.

Sexually Transmitted Diseases

Sexually transmitted diseases (STD) 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, scar tissue), especially if treatment is delayed. Viral STDs such as herpes (HSV), human papillomavirus (HPV), hepatitis B, and human immunodeficiency virus (HIV) are not typically curable, but medication is available to improve quality of life by decreasing the 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.

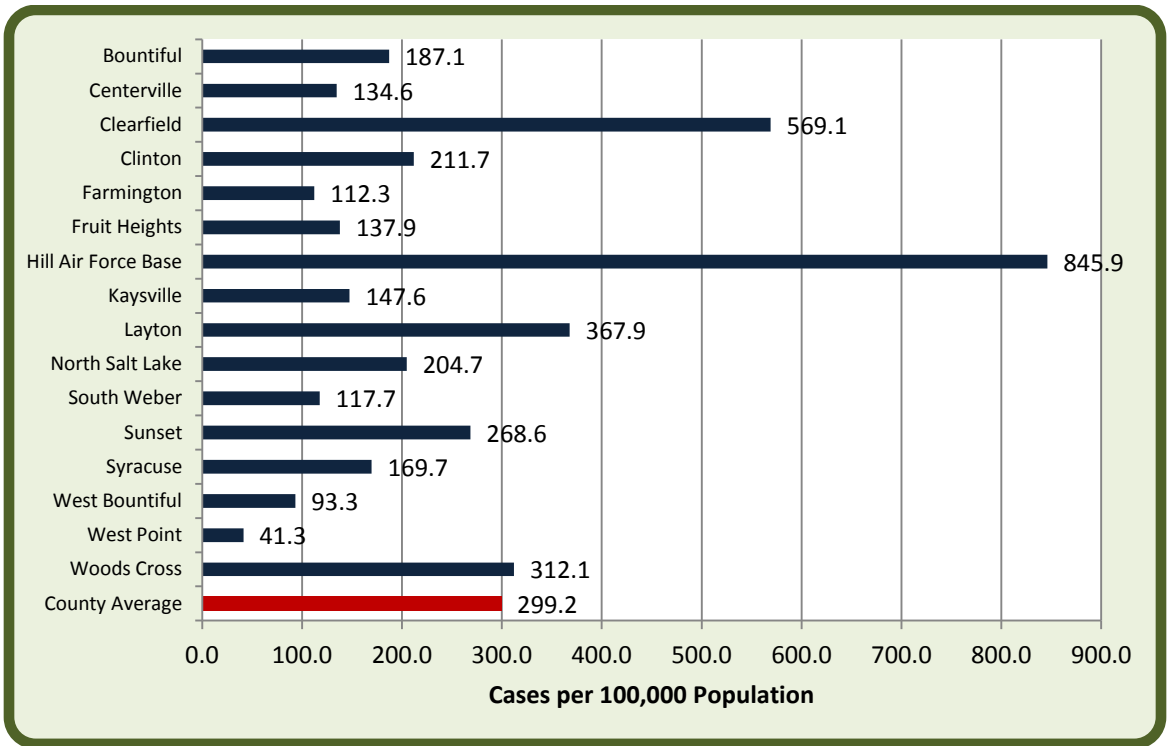
Sexually transmitted diseases reported in Davis County during 2012 included chlamydia, gonorrhea, syphilis, and HIV/AIDS. Chlamydia was the most commonly reported STD with **862** cases, followed by gonorrhea with **40** cases.

Sexually Transmitted Diseases, Davis County, 2012



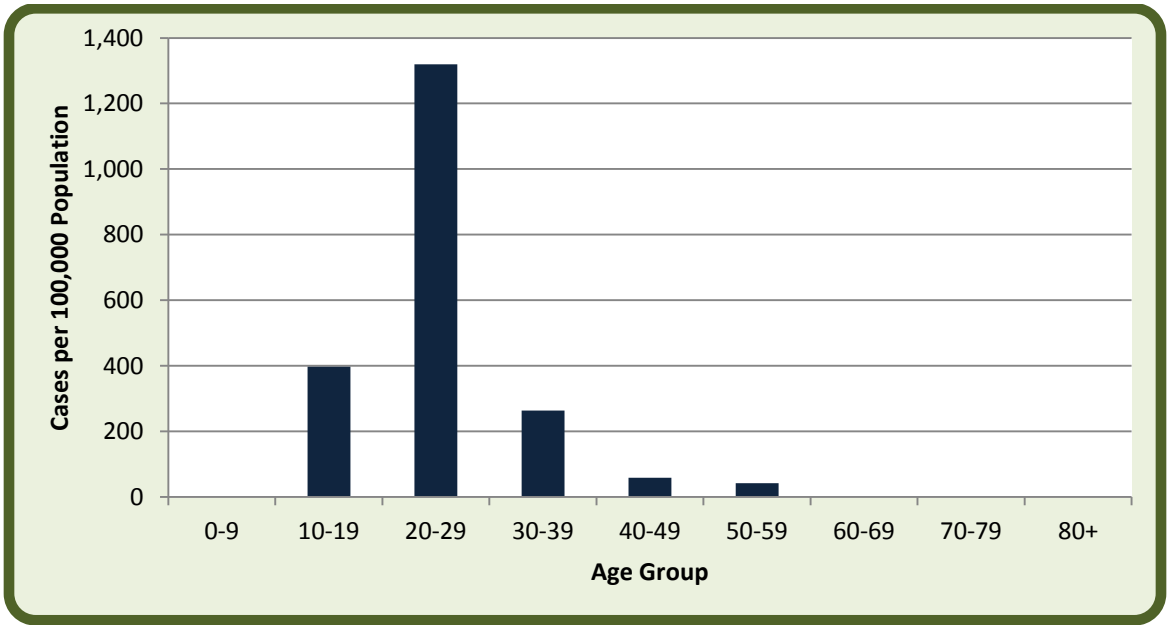
Sexually transmitted diseases occurred among residents of every city in Davis County. The average rate in the county was **299.2** cases per 100,000 residents.

Incidence of all STDs by City, Davis County, 2012



Sexually transmitted diseases were most often reported among women (61%) and among 18-24 year olds.

Incidence of all STDs by Age Group, Davis County, 2012



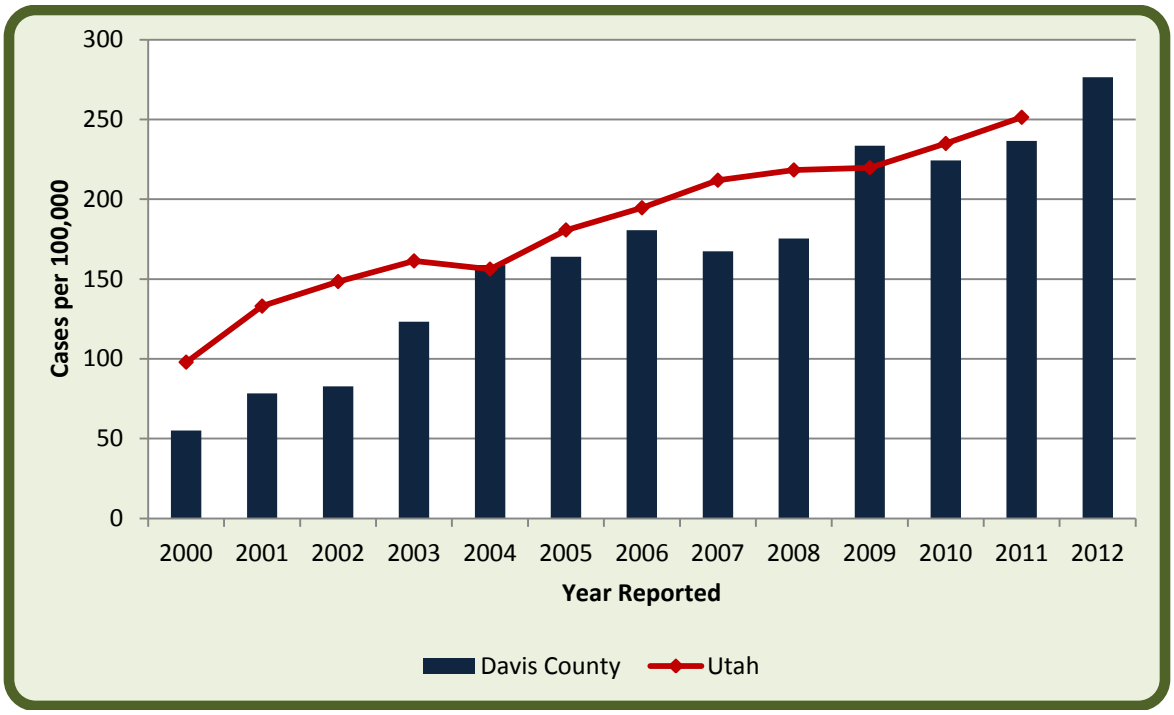
Chlamydia

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

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

During 2012, there were **862** cases of chlamydia reported in Davis County, a 17% increase from the 739 cases reported in 2011.

Incidence of Chlamydia, Davis County & Utah, 2000-2012



2012 Disease Highlights:

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

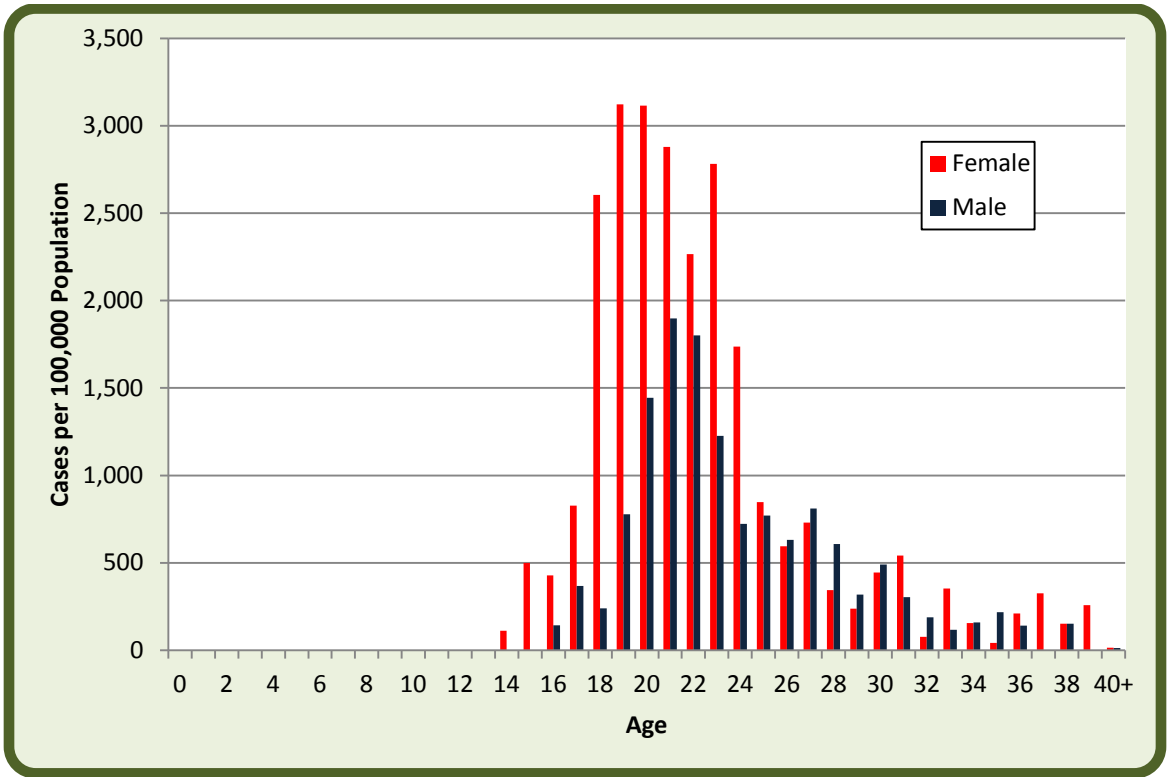
Those infected with chlamydia are frequently asymptomatic. Females are often diagnosed during routine medical visits. Their male partners are typically diagnosed following

contact investigations. It is the goal of the health department to locate these partners, offer free testing and treatment, provide disease education, and develop a risk-reduction plan. Re-infections occur when appropriately treated infected individuals engage in sexual activity with their untreated partners.

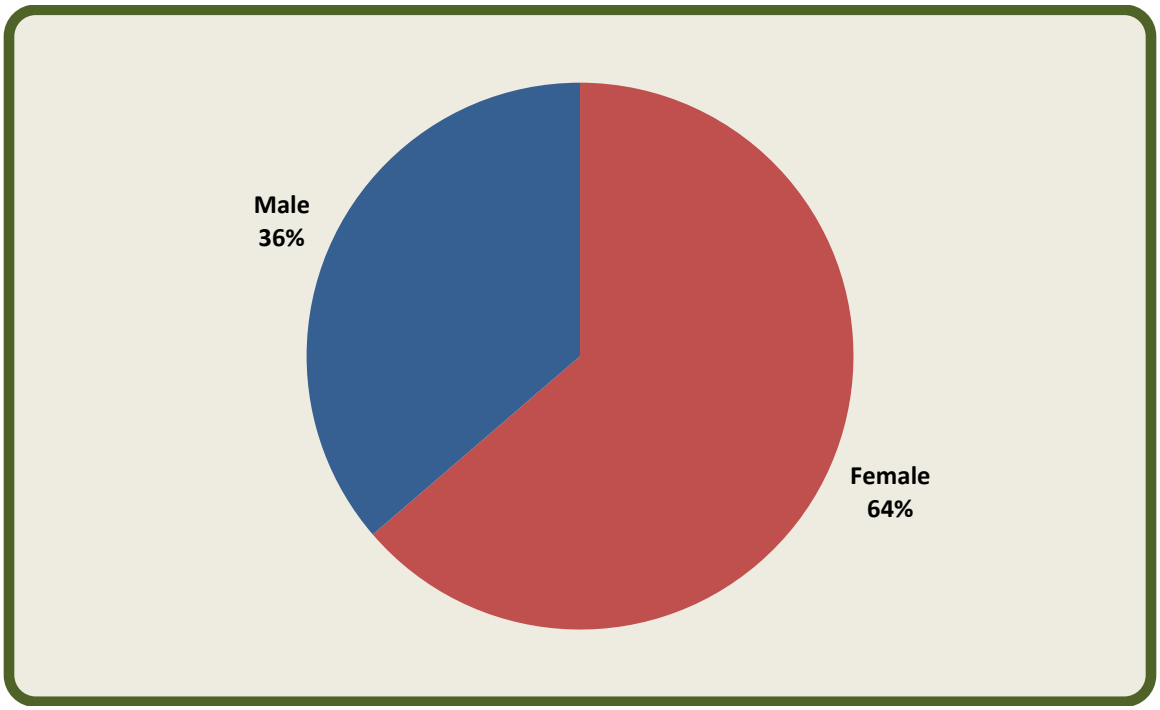
Because the majority of infected individuals have no symptoms of an STD, it is important for public health to encourage the medical community to routinely test their sexually active patients, especially those under the age of 25. Efforts were made this past year to update medical providers with the new 2010 STD treatment guidelines and increase awareness of STD disease trends.

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

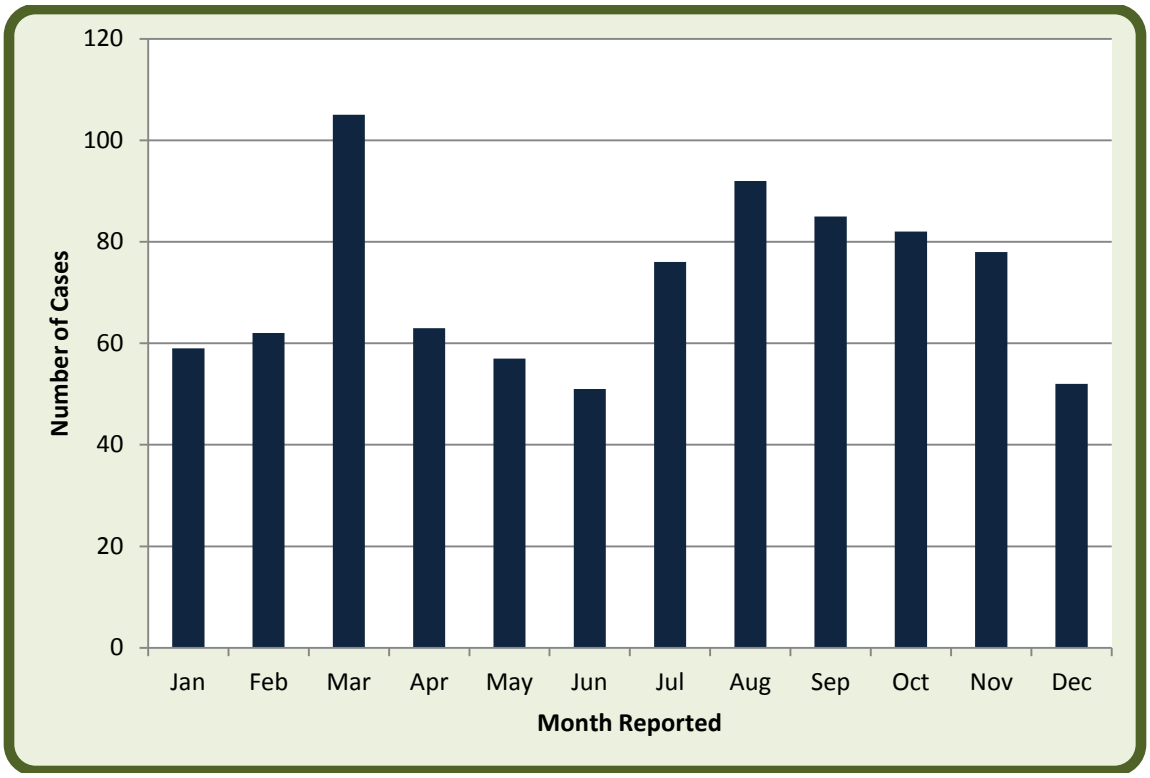
Incidence of Chlamydia by Age and Gender, Davis County, 2012



Chlamydia by Gender, Davis County, 2012



Chlamydia by Month Reported, Davis County, 2011

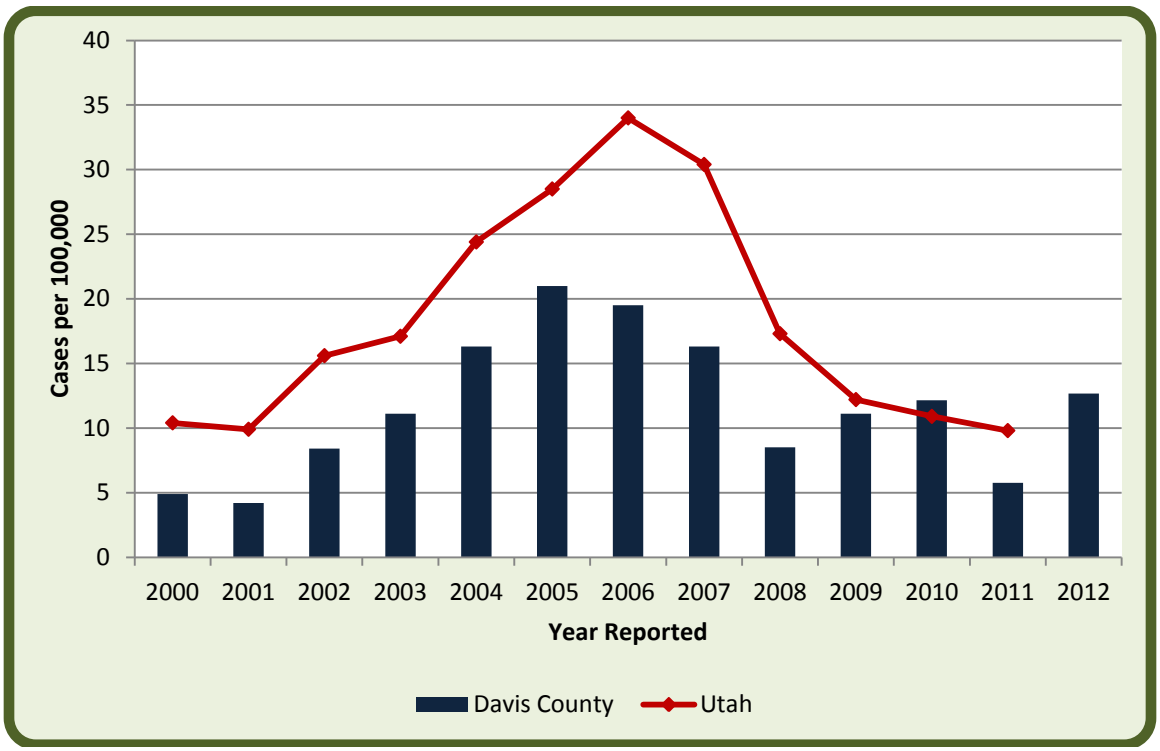


Gonorrhea

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

During 2012, there were **40** cases of gonorrhea reported in Davis County, a significant increase from the 18 cases reported during 2011.

Gonorrhea Rates by Year, Davis County & Utah, 2000-2012

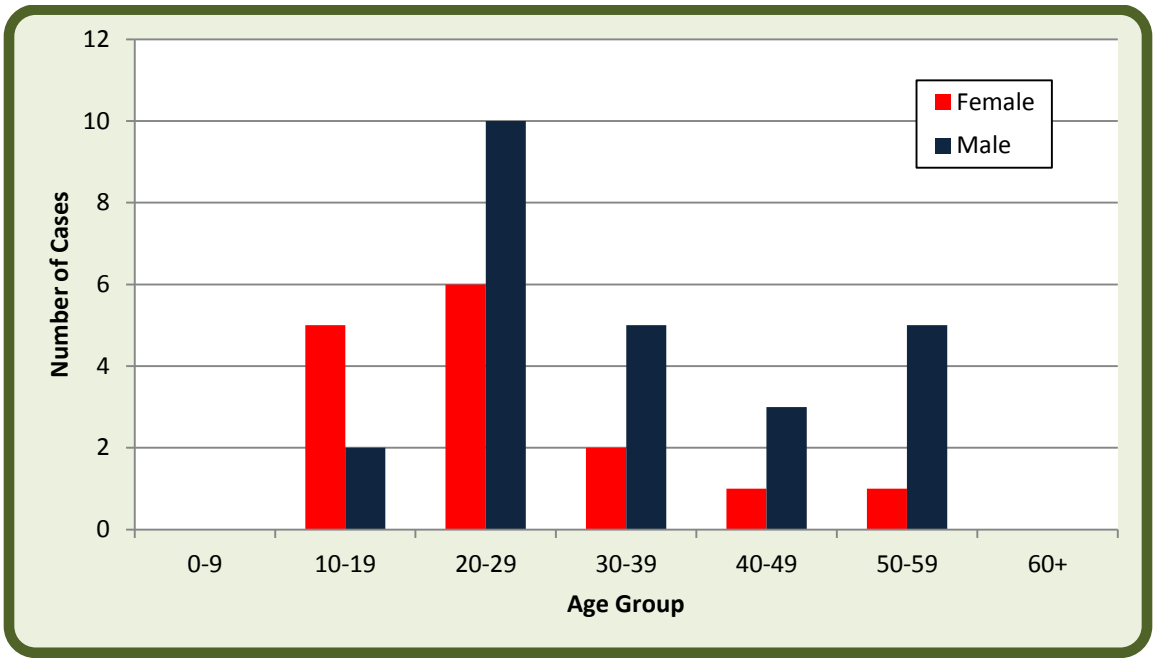


2012 Disease Highlights:

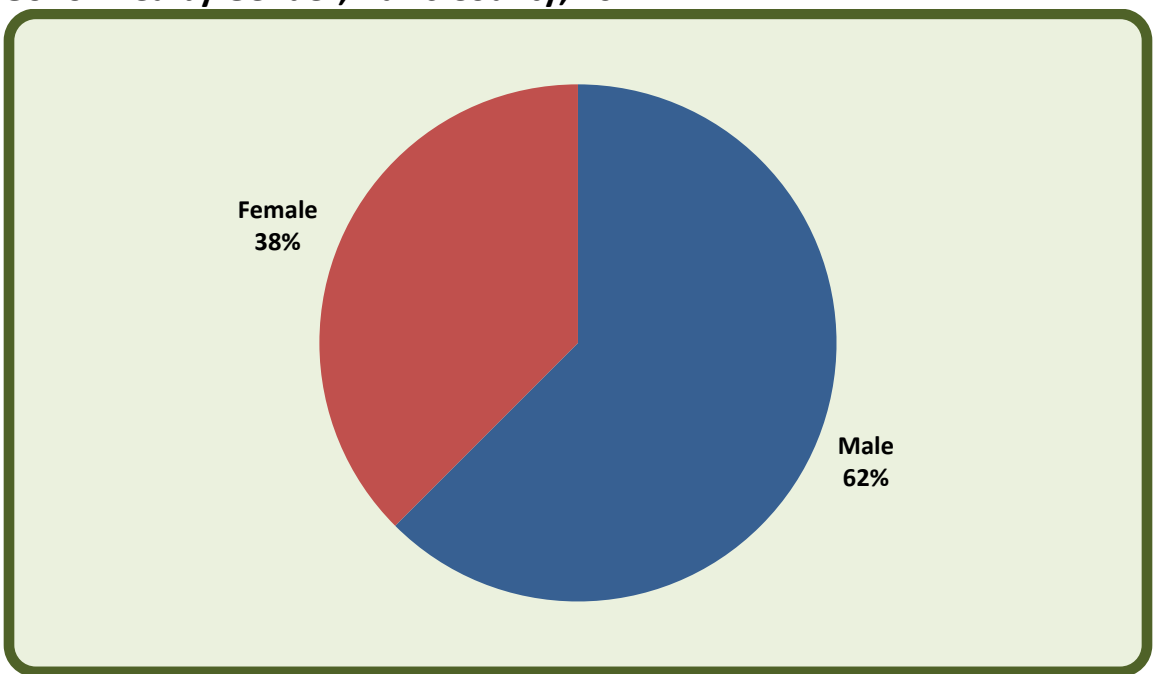
In 2012, Davis County noted a significant increase in gonorrhea cases. Like chlamydia, gonorrhea also tends to be an asymptomatic infection. Several of the reported cases of gonorrhea were also co-infected with chlamydia. Treatment guidelines recommend treating all gonorrhea cases for chlamydia as well, regardless of chlamydia test results. The most frequently used laboratory tests involve a urine sample that is screened for both gonorrhea and chlamydia. This less invasive testing process is more appealing to patients and may help encourage sexually active individuals to seek testing. Unfortunately, with the increasing trend of anal/oral intercourse, some STDs will be missed by using the urine test alone. Medical providers are encouraged to include rectal and oral swabs as part of their STD screening for those who engage in anal and oral intercourse.
In August 2012, CDC released changes to the gonorrhea treatment guidelines due to decreased effectiveness of cefixime (Suprax), a current first-line treatment option. New

guidance recommends a combination therapy of injectable ceftriaxone (Rocephin) and an effective oral antibiotic (azithromycin or doxycyline). This new information was distributed out to the medical community and adopted by Davis County for use in the STD clinics.

Gonorrhea by Age and Gender, Davis County, 2012



Gonorrhea by Gender, Davis County, 2012



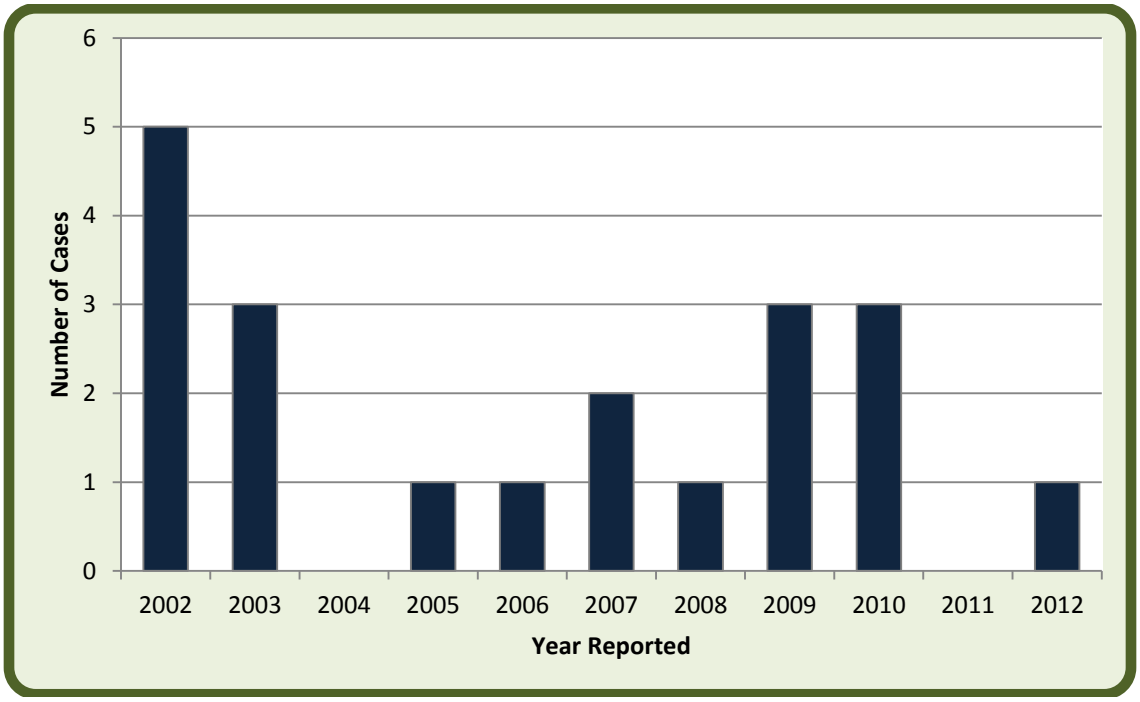
Tuberculosis

There are an estimated 9-14 million people in the United States infected with *M. tuberculosis*. On average, about 10% of infected individuals will develop active tuberculosis (TB) disease at some point in their lives. There were 10,528 TB cases in the United States in 2011 (3.4/100,000) – a 5.8% decline compared to 2010. Utah had 37 (1.3/100,000) cases reported in 2012. Since the 1992 TB resurgence peak in the United States, the number of TB cases reported annually has decreased by 61%.

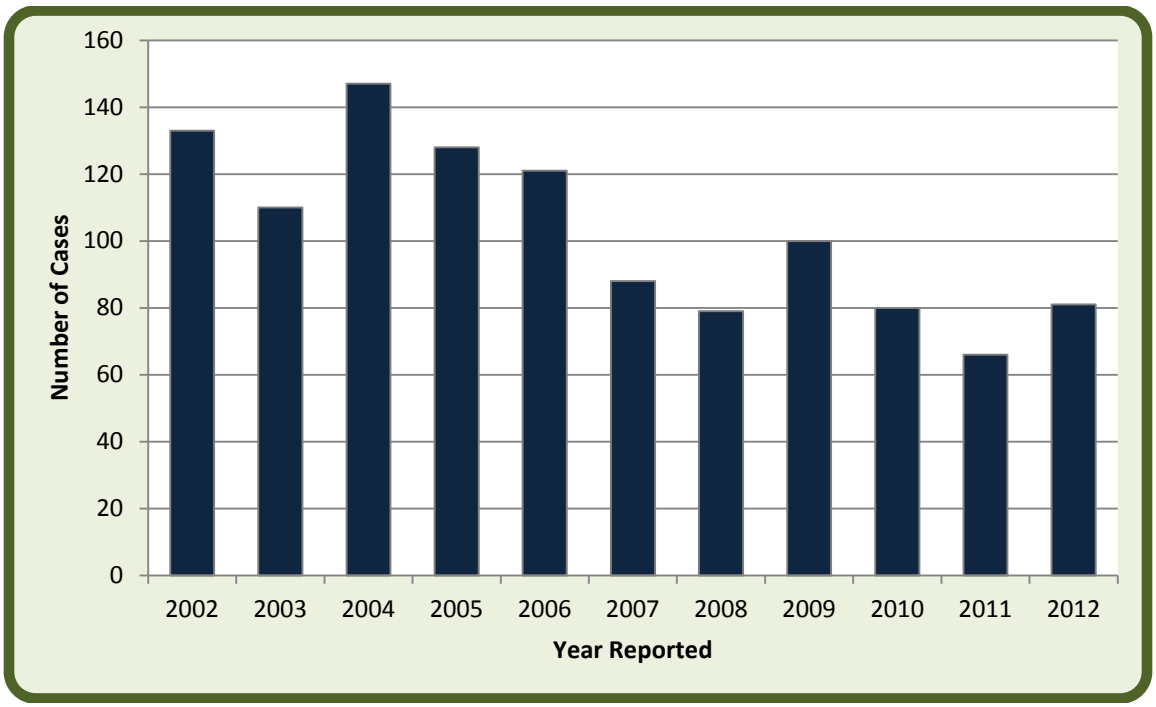
By the early 1980s, TB was considered to be under control and many states and cities redirected TB prevention and control funds to other programs. As a result of this, the country experienced a resurgence of TB, with a 20% increase in cases reported between 1985 and 1992. Many of these were persons with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

Davis County had **one new** active tuberculosis disease case in 2012 and **81** latent tuberculosis infection (LTBI) cases.

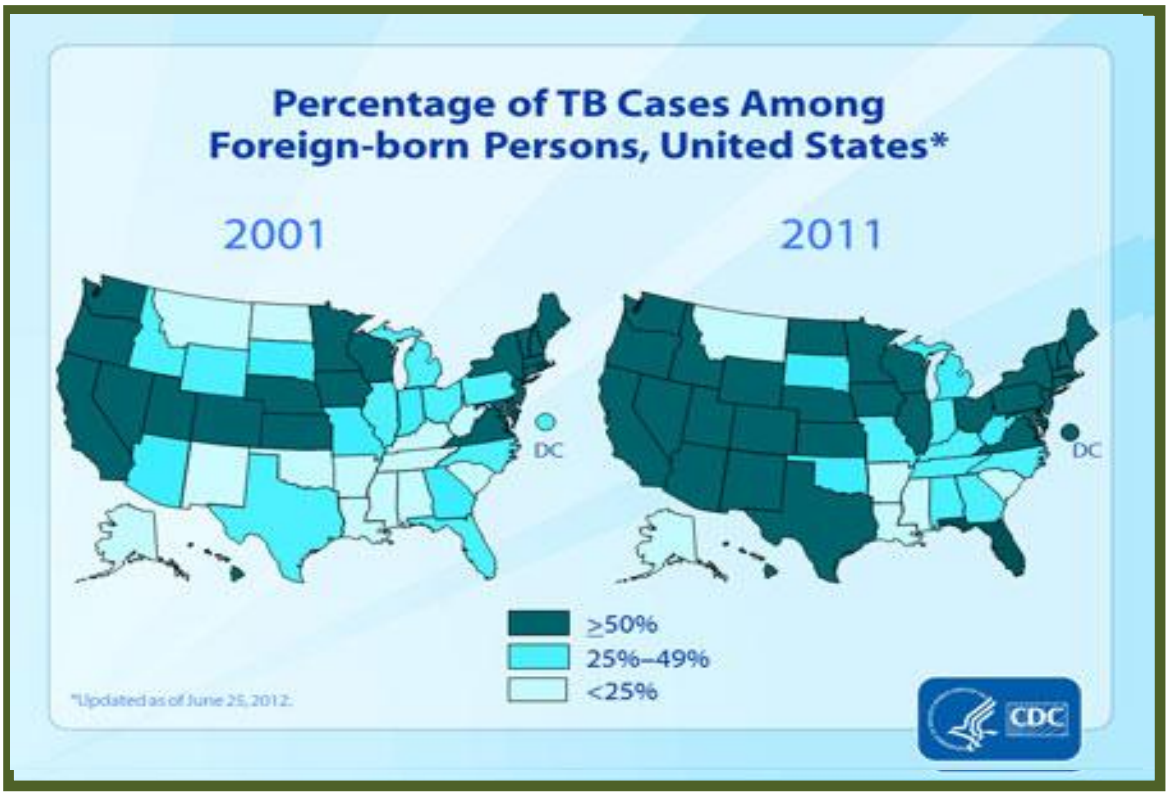
Active Tuberculosis Cases by Year, Davis County, 2002-2012



Latent Tuberculosis Infections (LTBI) by Year, Davis County, 2002-2012



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



Active Tuberculosis

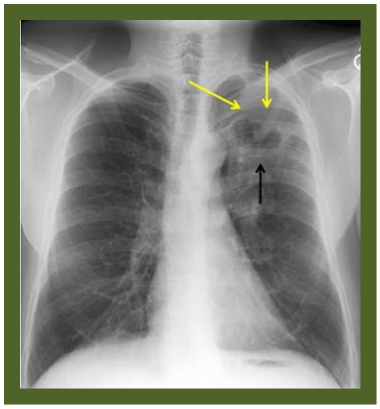
Tuberculosis (TB) is caused by a type of bacteria called *Mycobacterium tuberculosis*. The bacteria usually attack the lungs (pulmonary) but may attack any part of the body (extrapulmonary). TB is typically spread through the air when a person with TB disease of the lungs or throat expels tiny airborne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

In 2012, Davis County had **one new case** of active tuberculosis compared to no cases in 2011.

2012 Disease Highlights:

On average, Davis County investigates two cases of active tuberculosis a year. In 2012, there was one new active pulmonary TB case reported. Pulmonary TB typically requires six months of treatment. However, due to extensive disease and slow response to treatment, this case will require nine months of therapy. Management of active tuberculosis cases requires close collaboration between several agencies including local health departments, medical providers, Utah Department of Health, Unified Laboratory Services: Public Health and a commitment by the infected individual.

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



Latent Tuberculosis Infection (LTBI)

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

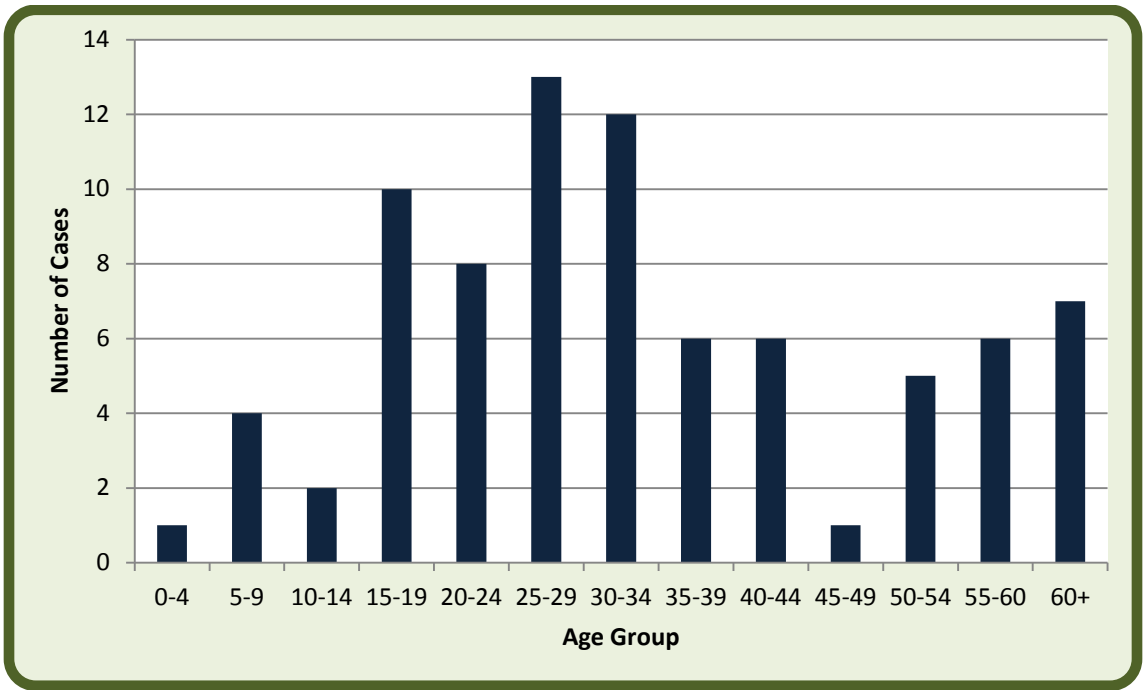
Davis County Health Department provided **950** tuberculin skin tests to the public in 2012. However, these numbers only account for a small percentage of all TB tests performed in the community.

2012 Disease Highlights:

With the low incidence of active tuberculosis in Davis County and Utah as a whole, the largest disease burden for tuberculosis falls under LTBI. During 2012, Davis County managed **81** clients with LTBI. Treatment of LTBI reduces the risk that latent TB will progress to active disease and is essential to the control and elimination of tuberculosis disease. Case management includes initial testing to rule out active disease and ensuring appropriate treatment of the infection. The majority of individuals who receive LTBI treatment in Davis County are foreign-born or returning LDS missionaries, who served missions in endemic countries. Typically, treatment for LTBI consists of daily antibiotic therapy for nine months. Individuals are monitored throughout therapy, but DOT is not necessary. Based on a 5-year average, the county manages **35** LTBI patients a month.

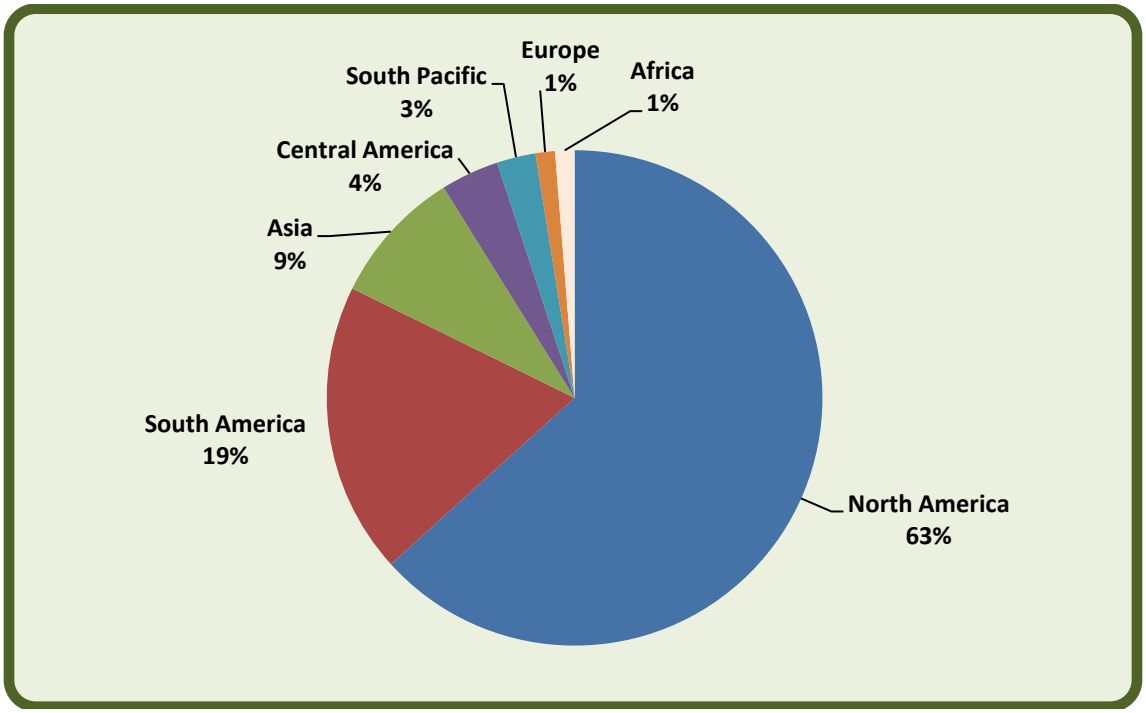
Davis County receives referrals for suspect active/latent tuberculosis from various medical facilities and providers. Screening tests consist of a tuberculin skin test (TST) or in-vitro serological test (e.g. Quantiferon-Gold). Those with positive test results are often referred to the health department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

LTBI by Age Group, Davis County, 2012



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

LTBI by Place of Birth, Davis County, 2012



Program Highlights

During 2012, several program activities were implemented to address disease trends and enhance community education.

STD/HIV Program Highlights:

- The Communicable Disease and Epidemiology Division was awarded an HIV Prevention grant in 2011 that was re-funded in 2012 and completed December 31, 2012. This grant was targeted to increase the awareness and knowledge of HIV/AIDS among incarcerated individuals. The grant also included extending the educational classes to adolescents in the community.

  Correctional Facility Grant Activities: The health department collaborated with the Davis County Jail to integrate a weekly class on Sexually Transmitted Diseases (including HIV/AIDS and Hepatitis) to the inmate population. Prior to the class, inmates were tested for HIV via rapid testing and for chlamydia/gonorrhea by urine sample. Chlamydia/gonorrhea testing was sent out to the Unified State Laboratory: Public Health and results were typically received 5-7 days following submission. After each class, a video was presented while HIV results were confidentially given to inmates. The video, "Safe in the City", is an approved Diffusion of Effective Behavioral Interventions (DEBI). Any inmate with a positive result was treated for the infection and a thorough disease investigation was conducted. For the year 2012, the following results were noted:

  - **45** presentations were provided
  - **332** inmates attended the classes
  - **103** (31%) of the attendees were of ethnic minority
  - **303** HIV & chlamydia/gonorrhea tests were performed

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

  Community Education Grant Activities: The health department partnered with the Davis School District (DSD) and two local Job Corp Centers (Clearfield and Weber-Basin) to provide STD education to students in their facilities. Davis County is one of the few local health departments that offer this service to students in the secondary school system. The presentation was created in collaboration with the curriculum department at the DSD and was approved by

the board for teaching within the Jr. high and high school settings. An expanded version was also developed for the Job Corp centers. For the year 2012, the following results were noted:

- **95** presentations were done in the secondary schools at DSD
- **3,798** students participated in the presentations at DSD
- **48** presentations were conducted at the two Job Corp centers
- **1199** students participated in the presentations at the Job Corp centers
- **576** (48%) of the students who participated at the Job Corp centers were of ethnic minority

Surveys were provided to teachers and students at the secondary schools to help assess the satisfaction of the presentations. The results of the survey were rated high with many expressing appreciation for the services being provided.

- Beginning July 1, 2012, Davis County Health Department was awarded an 18-month grant geared toward HIV, hepatitis C, chlamydia and gonorrhea screening in the incarcerated population. Due to the tremendous success of the previous year's grant, which also included working with incarcerated individuals, Utah Department of Health (UDOH) awarded the new grant to include hepatitis C testing. The grant focuses on new admissions to the jail facility in an effort to identify the base infection rate of entering inmates. Incoming inmates are tested prior to moving into an established housing unit to begin their sentences. The testing is an "Opt-Out" process – therefore, inmates sign a declination if they elect to not be tested. Those who are initially arrested and booked into the facility, but make bail and are released before entering a holding unit, are not included in the screening. The program has been very successful in identifying new infections within the inmate population that would otherwise have not been detected – especially hepatitis C. In 2012, the following results were noted:

  - **761** inmates were served
    - 184 females
    - 577 males
  - **60** (8%) inmates were hepatitis C positive
  - **1** inmate tested positive for HIV
  - **45** inmates tested positive for chlamydia
  - **2** inmates tested positive for gonorrhea

- To help address the STD disease burden among adolescents, DCHD continued their partnership with the Davis School District to provide STD/HIV education in the secondary schools. 95 presentations were conducted this year – reaching 3,798 students in grades 8, 10, and 11. For high school students, abstinence pamphlets were provided with STD/HIV facts and locations for STD testing. A modified version of the presentation is offered to the junior high age group. Students are

given information on how to access the Davis County Health Department STD Hotline – which is staffed by a nurse Monday-Friday (8:00 – 5:00 pm).

- Access to STD testing has been noted as a barrier by those who are sexually active and at risk. As a result, DCHD has partnered with Midtown Community Health Center – Davis to offer free/low cost screening to residents through their clinic. Two options are available to the community:

    - Free STD screening clinic: This is a walk-in clinic where individuals can access STD screening Monday – Friday (8:00 – 5:00 pm). Individuals are provided educational materials on STD/ HIV and offered testing – there is no physical exam. Those testing positive are reported to the health department for further investigation and treatment. Testing supplies are provided by the health department. Midtown provides a medical assistant who is responsible for the collection of specimens.

    - Low cost STD examination and testing: Individuals who are symptomatic can receive low cost STD services through the Midtown clinic. Clients are given an appointment to see a medical provider, obtain a physical examination and be tested for chlamydia, gonorrhea, syphilis and HIV. Additional tests are available for an added fee. Testing is provided by Midtown. If test results are positive, Midtown treats the patient with medication provided by the health department and reports the case for further investigation. In 2012, **112** were tested by Midtown through this program

  During 2012, approximately **457** clients received testing through the free screening clinic. Davis County identified **52** positive chlamydia, **four** gonorrhea, and **one** HIV infection - an STD infectivity rate of roughly 12%.

- Traditional HIV testing may take up to 10 days for return of results. To decrease the wait time, Davis County implemented a free rapid HIV clinic day every fourth Wednesday of the month. This clinic was conducted in the Midtown Clinic between 3:00 – 6:00 pm. Results are available within 15-20 minutes. Those performing the tests are trained on giving positive test results and provide important resources to infected clients. Individuals using this clinic can also obtain chlamydia, gonorrhea and syphilis testing.

Tuberculosis Program Highlights:

Residents who have developed active tuberculosis need to receive appropriate treatment for their disease. Failure to comply with the established treatment regimen can result in the development of drug resistance. To prevent this from occurring, treatment must be administered under directly observed therapy (DOT). This requires a health department staff member to observe the patient taking their medication daily or when possible, twice/thrice-weekly. This process

can make it difficult for the clients to maintain normal day-to-day activities and can incur travel costs to the patient and/or health department staff. To address this issue, Davis County has implemented a video-conferencing mechanism where compliant clients can be observed taking their medication via the internet through applications such as Skype or FaceTime. The tuberculosis control nurse conducts periodic face-to-face encounters to ensure that any possible treatment side effect is recognized. Video conferencing will only be considered for individuals who display responsible behaviors and are at low risk for complications.

Overall Division Highlights:

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

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

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

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

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

- The "Ask-A-Nurse" email system was routinely utilized by the public for answers to communicable disease issues. This system is monitored daily by health professionals who can provide information on health issues pertaining to infectious diseases or other reportable conditions. An email link is found on each page of the Communicable Disease and Epidemiology web pages or can be directly accessed at: Ask-A-Nurse@daviscountyutah.gov.

- During 2012, the Communicable Disease and Epidemiology Division participated in additional program activities designed to enhance the Division's ongoing goals:

- **Healthcare Associated Infections (HAI) Training**: Davis County was awarded funding to provide training, in collaboration with UDOH, to the community regarding healthcare associated infections. This training was put together in an effort to raise awareness of the national and Utah's HAI issues, familiarize healthcare facilities with the reporting rules and processes, and improve communication and interactions between DCHD and their community partners.

- **Beta Test site for Community-UTNEDSS:** Utah State maintains a confidential disease reporting system (Utah National Electronic Disease Surveillance System) which local health departments utilize. This system has been supported by an outside agency. To become more cost effective and allow health department users the ability to customize the system to the needs of Utah, an alternative version, supported internally by UDOH, was needed. DCHD was selected as the beta test site. Communicable Disease staff assisted UDOH in testing, identifying problems, and implementing system changes. Due to the efforts of this beta test, UDOH was able to put into place a well-functioning version of Community-UTNEDSS January 1, 2013.

- **Biosense Grant:** Davis County Health Department was awarded a grant the end of 2012 to implement a CDC surveillance program. This surveillance tool provides public health with real-time data regarding the health status of the community. Biosense pulls information on emergency department visits and hospitalizations from multiple sources, which provides users the ability to confidentially track health issues as they evolve. The Communicable Disease Epidemiologist assists UDOH in collecting and analyzing the information obtained from Davis County hospitals. The grant activities are anticipated to be implemented January 2013.

- **Internship Program:** The Communicable Disease and Epidemiology Division launched a new internship program to assist students in gaining the needed work experience necessary to become a strong public health employee. During 2012, three internships were completed. Interns accomplished several projects, under the direction of staff, which assisted the Division in fulfilling some of their public health goals.

Appendix A - Reportable Diseases

REPORTABLE DISEASES

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

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

- Anthrax
- Botulism
- Cholera
- Diphtheria
- *Haemophilus influenzae* (invasive)
- Hepatitis A
- Measles (Rubeola)
- Meningococcal disease
- Plague
- Poliomyelitis (paralytic)
- Rabies (human and animal)
- Rubella
- 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

- Acquired Immunodeficiency Syndrome (AIDS)
- Adverse event resulting after smallpox vaccination
- Amebiasis
- Arbovirus infection, including Saint Louis encephalitis and West Nile virus
- 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
- Giardiasis
- Gonorrhea (sexually transmitted and ophthalmia neonatorum)
- Hansen disease (leprosy)
- Hantavirus infection and pulmonary syndrome
- Hemolytic Uremic Syndrome (post-diarrheal)
- Hepatitis B (cases and carriers)
- Hepatitis C (acute and chronic infection)
- Hepatitis (other viral)
- Human Immunodeficiency Virus (HIV) infection
- Infant botulism
- Influenza-associated hospitalization
- Influenza-associated death in a person less than 18 years of age
- Legionellosis
- Listeriosis
- Lyme disease
- Malaria
- Meningitis
- Mumps
- Norovirus (formerly called Norwalk-like virus) infection
- Pertussis
- Poliovirus infection (nonparalytic)
- Psittacosis
- Q Fever
- Relapsing fever (tick-borne or louse-borne)
- Rubella (congenital syndrome)
- Salmonellosis
- Shiga toxin producing *Escherichia coli* (STEC) infection
- Shigellosis
- Spotted fever rickettsioses (including Rocky Mountain spotted fever)
- Streptococcal disease (invasive, isolated from a normally sterile site)
- Syphilis (all stages and congenital)
- Tetanus
- Toxic-Shock Syndrome (staphylococcal or streptococcal)
- Trichinosis
- Vibriosis

Davis County Health Department - November 2012

Davis COUNTY

Appendix B - Davis County Demographics

Davis County Demographics – 2012

Population: 316,023

Age Group	
Less than 1 year	5,749
1 – 14 years	86,010
15 – 24 years	45,387
25 – 44 years	88,892
45 – 64 years	63,584
65 – 84 years	23,118
More than 85 years	3,283

Gender	
Male	158,703
Female	157,320

Race*	
White	290,620
Black	4,186
American Indian or Alaskan Native	2,076
Asian	5,886
Native Hawaiian or Pacific Islander	2,028
2 or More Races	7,015

*Data by race/ethnicity is only available for 2011 – 311,811

Ethnicity*	
Hispanic or Latino (of any race)	26,799

*Data by race/ethnicity is only available for 2011 – 311,811

Population by City*	
Unincorporated County	564
Bountiful	43,303
Centerville	15,596
Clearfield	30,618
Clinton	20,783
Farmington	18,585
Fruit Heights	5,076
Hill Air Force Base	3,310
Kaysville	27,778
Layton	68,495
North Salt Lake	16,607
South Weber	6,159
Sunset	5,213
Syracuse	24,756
West Bountiful	5,357
West Point	9,679
Woods Cross	9,932

*Population by city was only available for 2011. Population estimates by city for 2011 were obtained from the U.S. Census Bureau. Website: http://www.census.gov/popest/data/cities/totals/2011/SUB-EST2011-states.html. The Hill Air Force Base estimate is for 2010 and was obtained from the U.S. Census Bureau, American Fact Finder: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

Source: Retrieved January 2013 from Utah Department of Health, Center for Health Data, Indicator-Based Information System for Public Health. Website: http://ibis.health.utah.gov/.