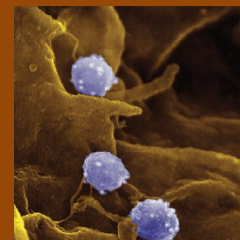
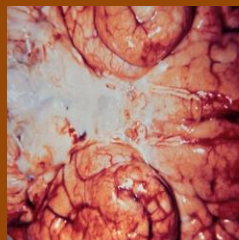
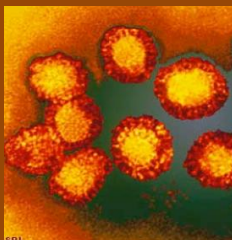
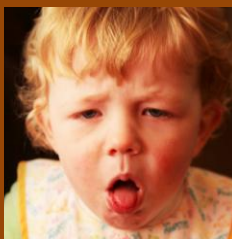
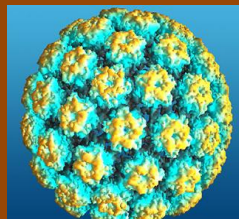


Davis County Health Department



Communicable Disease & Epidemiology Division

Communicable Diseases Davis County 2011



Communicable Diseases Davis County 2011

**Lewis Garrett, APRN, MPH
Health Officer**

**Brian Hatch, MPH, EHS
Communicable Disease & Epidemiology Division Director**

**Wendy Garcia, RN
Communicable Disease & Epidemiology Division Bureau Manager**

**Cindy Burnett, MPH
Epidemiologist**

January 2012

Table of Contents

Executive Summary	1
Introduction	3
Reportable Disease Summary	6
Enteric Diseases	11
Campylobacteriosis	14
Norovirus.....	15
Salmonellosis.....	16
Shiga Toxin Producing <i>Escherichia coli</i> (STEC) Infection.....	19
Vaccine-Preventable Diseases.....	21
Influenza.....	24
Measles.....	26
Pertussis.....	28
Vectorborne/Zoonotic Diseases	30
Rabies	31
Invasive Diseases	32
Invasive Streptococcal Infections.....	33
Other Reportable Diseases/Conditions.....	35
Creutzfeldt-Jakob Disease (CJD).....	36
Hepatitis C.....	37
Legionellosis	38
Seizure Cluster	40
Sexually Transmitted Diseases.....	41
Chlamydia	43
Gonorrhea.....	46
Tuberculosis	48
Program Highlights	53
Appendix A - Reportable Diseases	56
Appendix B - Davis County Demographics.....	58

Executive Summary

This annual communicable disease surveillance report summarizes all communicable diseases reported in Davis County in 2011. 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 2011 was the measles outbreak that occurred in Utah between the months of April and June. During this period, Davis County investigated 16 suspect cases of measles which were all eventually ruled out. As part of these investigations, 302 residents were interviewed, educated, and isolated/quarantined when deemed necessary. Monitoring of isolated/quarantined individuals lasted throughout the incubation period (approximately 21 days) or until the disease could be ruled out (via laboratory tests or medical evaluations). The activities involved in this outbreak required an extensive amount of staff time and resources and resulted in a significant burden on exposed individuals.

Other communicable diseases of concern/interest for 2011 are summarized below:

1. Sexually Transmitted Diseases (STDs) once again provided the largest disease burden in Davis County with chlamydia accounting for 96% (739) of the STD cases reported in 2011 (772). Reported gonorrhea cases were significantly lower in 2011 with 18 cases, as compared to 38 reported in 2010. The majority of gonorrhea cases were also co-infected with chlamydia. Unfortunately, many chlamydia and gonorrhea cases are undiagnosed, making it difficult to describe the true burden in our community. The most affected age groups were 20-24 year olds followed by 15-19 year olds. Syphilis cases for 2011 were also down with 11 cases reported, compared to 13 cases reported in 2010. Some of the 2011 cases were contacts to a 2010 cluster.
2. A Legionellosis outbreak was detected in 2011 at a facility in Davis County. There were three confirmed and four suspect cases identified, all of whom recovered from their illness. Testing of the water systems yielded positive *Legionella* bacteria samples. The facility instituted aggressive control measures, with guidance and supervision from the health department. After months of implementing control measures and on-going cleaning processes, laboratory testing of water specimens from the facility came back negative for *Legionella* bacteria and the health department relinquished maintenance care to the facility.

-
3. In 2011, Davis County experienced steady reporting of enteric diseases, some associated with outbreaks. There was a state-wide outbreak of *Salmonella* Newport linked to the consumption of homemade queso fresco (cheese); a norovirus outbreak associated with a basketball camp; and an outbreak of shiga toxin producing *E. coli* at a scout camp in Idaho. In addition, Davis County noted an increase of campylobacteriosis cases, some of which were associated with the consumption of raw milk.
 4. A case of Creutzfeldt-Jakob Disease (CJD) in a Davis County resident was investigated in 2011. The individual experienced a rapid deterioration, resulting in death. Investigation of the case required collaboration between the private medical community, Utah Department of Health (UDOH), local mortuaries and the National Prion Disease Pathology Surveillance Center (NPDPC). Laboratory testing and autopsy findings confirmed the diagnosis of CJD.
 5. Davis County was notified of a seizure cluster associated with an educational facility. Students reported an unusual occurrence of individuals (students and visitors) experiencing seizures while at the facility. An investigation was conducted by communicable disease and environmental health staff. No causative agent or hazardous situation was identified. The facility was monitored over time, with no new occurrences noted. The administration was provided resources for first aid training to assist them in addressing seizure emergencies.
 6. A resident of Davis County was diagnosed with Vancomycin intermediate-resistant *Staphylococcus aureus* (VISA). This individual was a resident of a long term care facility and had several medical conditions. An investigation was conducted, which included the implementation and assurance that disease-specific control measures were being carried out. No additional cases were identified.
 7. Invasive streptococcal infections were ranked 4th highest in the number of diseases reported in Davis County in 2011. Several cases were noted to cause significant illness, five cases (9%) resulted in death. There are many streptococcal organisms that cause illness, however, those most concerning to public health include Groups A, B, C, G and streptococcal pneumonia.

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 area 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, pelvic inflammatory disease (PID), 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 a 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 (meningitis/encephalitis) or other normally sterile sites (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.

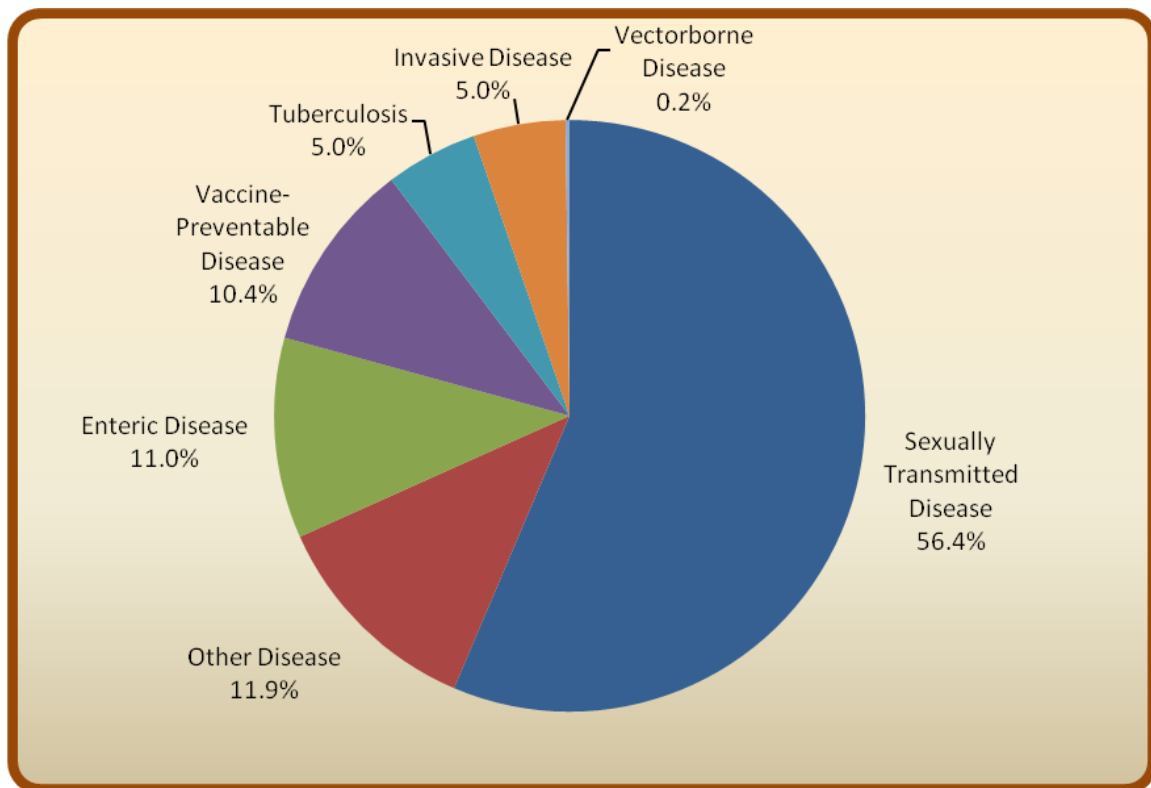
Reportable Disease Summary

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 **1,369** disease reports during 2011, almost a 9% increase from the 1,256 disease reports received in 2010.

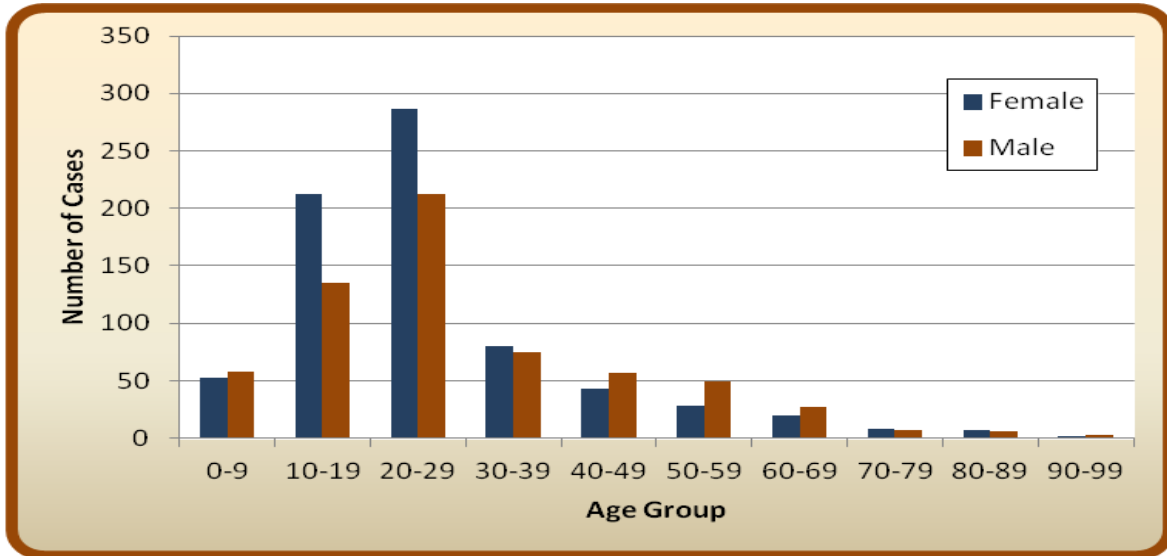
Over half (56.4%) of the diseases reported were sexually transmitted diseases (STDs), followed by other diseases 11.9%, enteric diseases 11.0%, vaccine-preventable diseases (VPDs) 10.4%, tuberculosis infections (TB) 5.0%, invasive diseases 5.0% and vectorborne/zoonotic diseases (VBD) <1%.

Diseases Reported by Type, Davis County, 2011



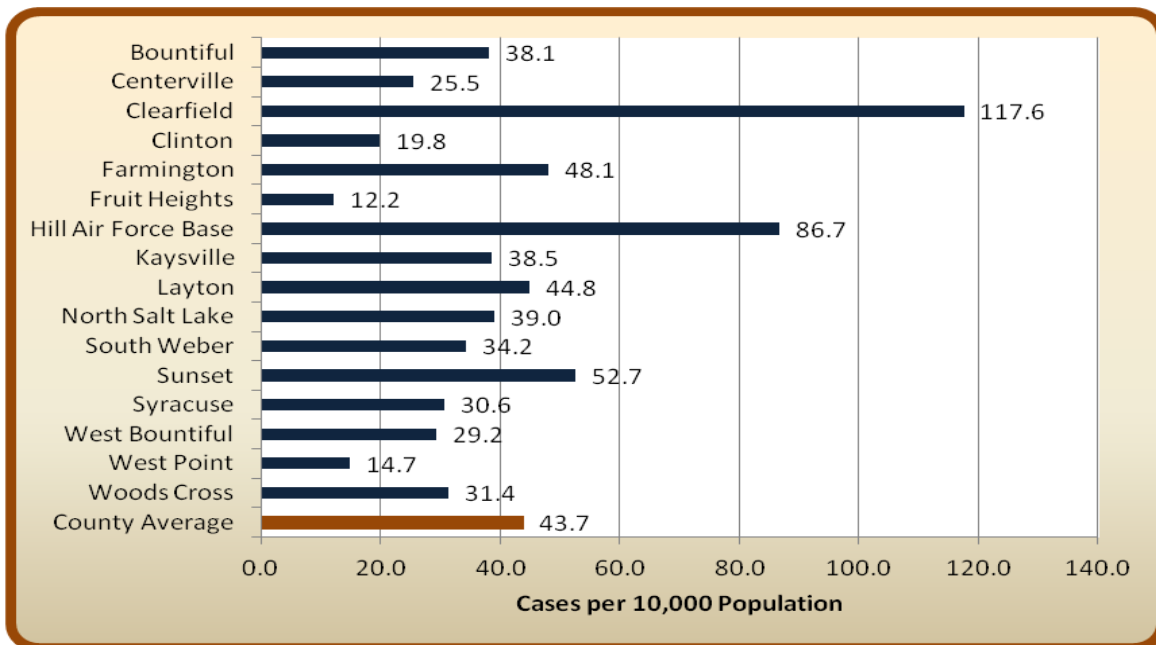
Cases were most often reported among females (54.1%) and among 20-29 year-olds. Sexually transmitted diseases and latent tuberculosis infection had a significant impact on the 20-29 year old age group. Statistically, females are more impacted by sexually transmitted diseases.

Disease Reports by Age Group and Sex, Davis County, 2011



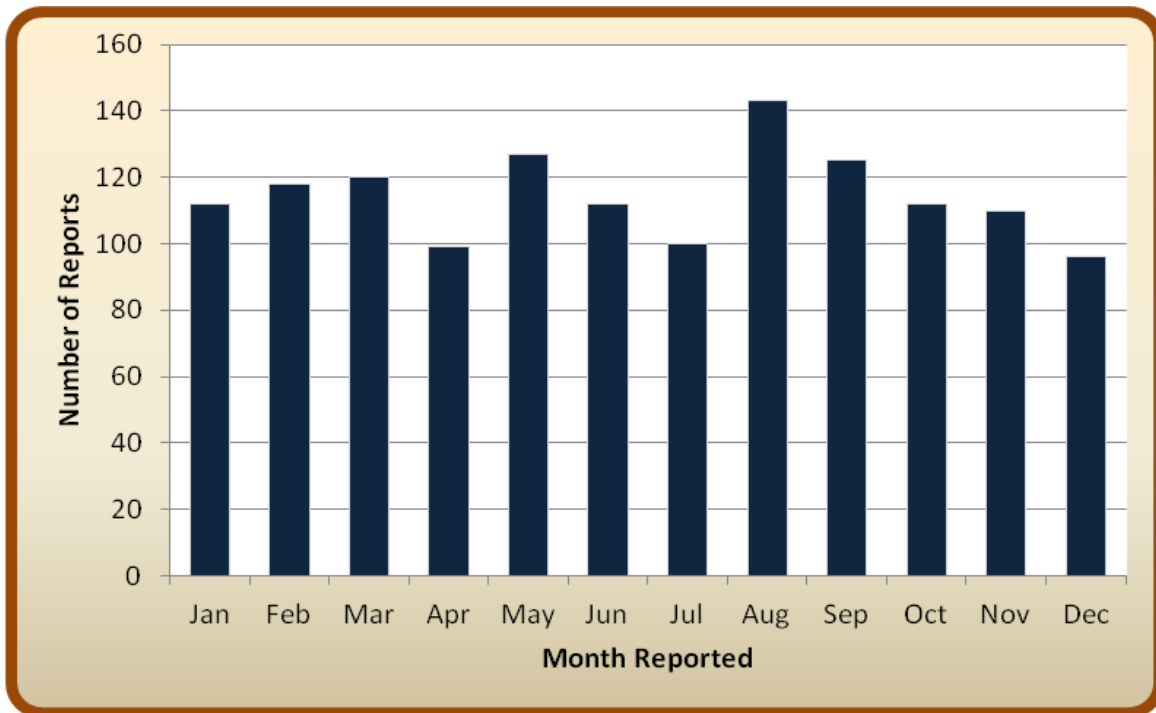
Disease rates by city are identified by the place of residence of the affected individual. These rates do not suggest that one city is better or worse than another, but simply describe the disease burden in each city. Tuberculosis data are not included because most infections were acquired outside of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

Incidence of All Reportable Diseases by City, Davis County, 2011



The disease burden in Davis County normally stays consistent throughout the year. In 2011, an average of 114 diseases were reported each month.

Disease Reports by Month, Davis County, 2011



Top 20 Diseases		
Disease	Rank	Number of Cases
Chlamydia	1	739
Hepatitis C, acute & chronic	2	150
Tuberculosis, latent infections (LTBI)	3	66
Streptococcal disease, invasive	4	57
Influenza, hospitalized cases	5	43
Chickenpox (varicella)	6	42
Salmonellosis	7	39
Campylobacteriosis	8	33
Hepatitis B, acute & chronic	9	26
Pertussis	10	25
Giardiasis	11	23
Norovirus	12	20
Cryptosporidiosis	13	19
Gonorrhea	14	18
Shiga toxin producing <i>E. coli</i> (STEC)	15	12
Syphilis, all stages	16	11
Legionellosis	17	9
Meningitis, aseptic/viral	17	9
HIV/AIDS	19	4
<i>Haemophilus influenzae</i> , invasive disease	20	3

Diseases Reported by Year, 2006 - 2011

Disease	2006	2007	2008	2009	2010	2011	5 Yr Ave (2006-10)
Amebiasis	0	0	0	0	1	1	0.2
Botulism, Infant	2	0	0	0	0	1	0.4
Botulism, Foodborne	0	0	0	0	0	0	0
Brucellosis	0	0	1	0	0	1	0.2
Campylobacteriosis	11	18	60	26	19	33	26.8
Chickenpox	174	111	104	97	62	42	109.6
Chlamydia	510	501	535	735	702	739	596.6
Coccidioidomycosis	2	1	2	3	1	2	1.8
Colorado Tick Fever	0	0	0	0	0	0	0
Creutzfeldt-Jakob Disease (CJD)	0	0	1	2	0	1	0.6
Cryptosporidiosis	0	294	7	3	22	19	65.2
Dengue Fever	2	0	0	0	1	0	0.6
Encephalitis	3	1	0	1	1	1	1.2
Giardiasis	42	47	39	35	31	23	38.8
Gonorrhea	55	48	26	35	38	18	40.4
<i>H. influenzae</i> , invasive disease	0	7	4	4	0	3	3
Hemolytic Uremic Syndrome (HUS)	4	4	0	2	0	1	2
Hepatitis A	0	1	2	1	2	3	1.2
Hepatitis B, Acute & Chronic	29	26	37	31	24	26	29.4
Hepatitis C, Acute & Chronic	100	94	112	115	71	150	98.4
HIV/AIDS	1	6	11	10	9	4	7.4
Influenza, Hospitalized	35	34	55	157	11	43	58.4
Legionellosis	0	3	2	3	0	9	1.6
Listeriosis	2	0	1	1	2	0	1.2
Lyme Disease	0	1	4	1	0	1	1.2
Malaria	1	0	0	0	1	0	0.4
Meningitis, Aseptic/Viral	22	26	19	22	9	9	19.6
Meningitis, Bacterial - Other	7	2	2	2	2	2	3
Meningococcal Disease	1	1	0	1	0	1	0.6
Mumps	0	0	1	1	1	0	0.6
Norovirus	1	17	1	1	7	20	5.4
Pertussis	49	18	13	18	28	25	25.2
Salmonellosis	31	24	27	30	21	39	26.6
Shiga toxin-producing <i>E. coli</i> (STEC)	14	20	12	20	15	12	16.2
Shigellosis	6	4	2	5	4	1	4.2
Streptococcal Disease, Invasive	42	54	56	48	74	57	54.8
Syphilis - All Stages	19	5	13	5	13	11	11
Tuberculosis, Active	1	2	1	3	3	0	2
Tuberculosis, Latent	121	88	79	100	80	66	93.6
Vancomycin Intermediate-Resistant <i>S. aureus</i> (VISA)	0	0	0	0	0	1	0.2
West Nile Virus Infection	11	6	2	0	1	1	4
Yersiniosis	0	0	0	1	0	0	0.2
Total	1298	1464	1231	1519	1256	1369	1353.6

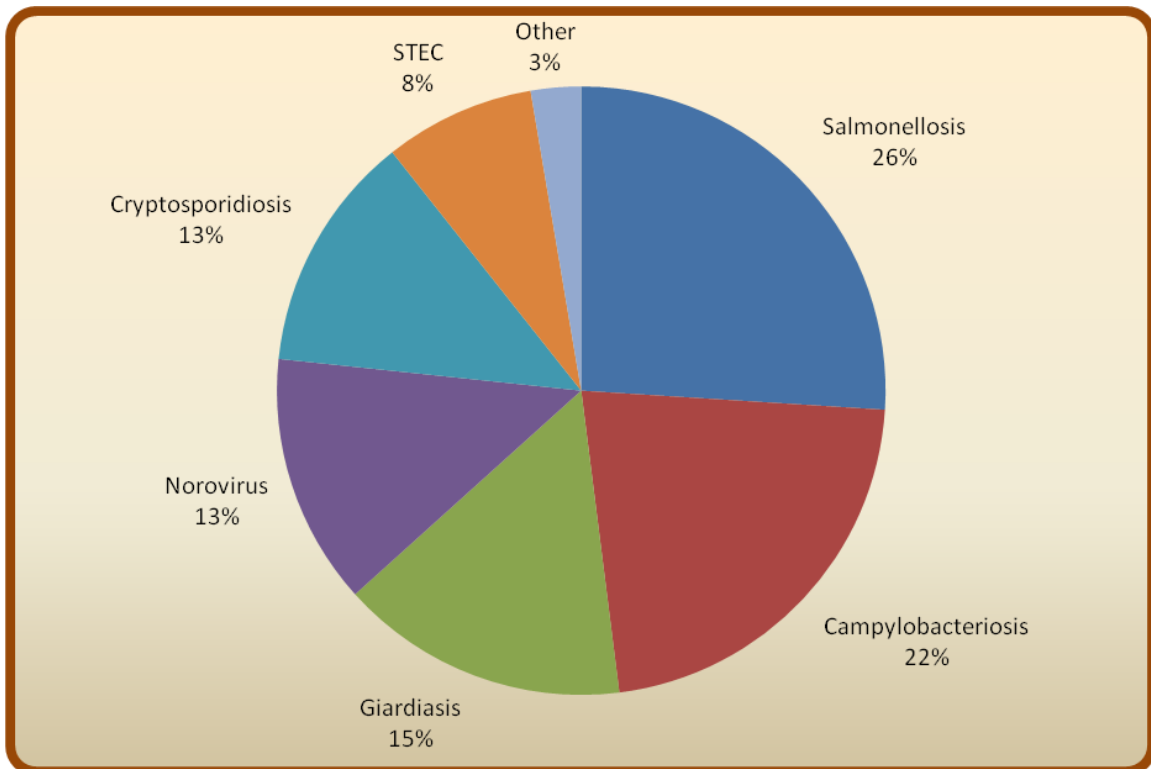
Enteric Diseases

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

There were **150** enteric disease cases reported during 2011. Bacterial diseases were most common, followed by parasitic and viral diseases. Salmonellosis was the most frequently reported enteric disease with **39** cases (26.0%), followed by campylobacteriosis with **33** cases (22.0%), giardiasis with **23** cases (15.3%), norovirus with **20** cases (13.3%) and cryptosporidiosis with **19** cases (12.7%). Norovirus testing is not widely available so most people infected with norovirus are not diagnosed. As a result, norovirus cases are greatly underreported.

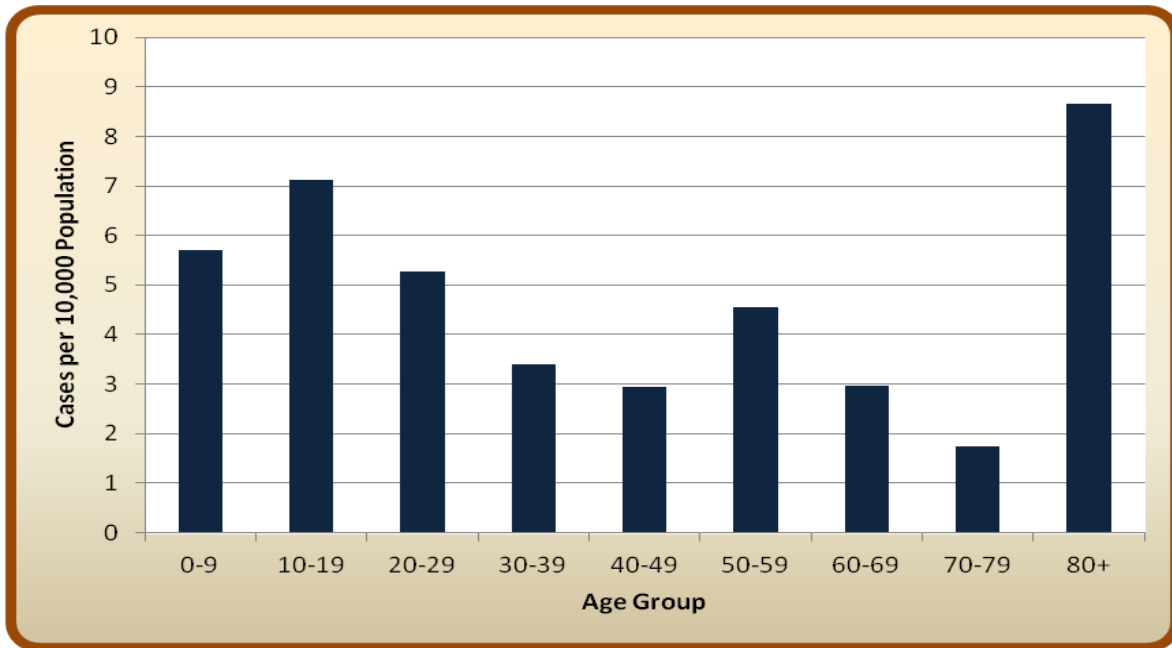
In addition, reports of suspect foodborne illness clusters without an identified etiology were investigated but are not included in these data.

Enteric Diseases, Davis County, 2011



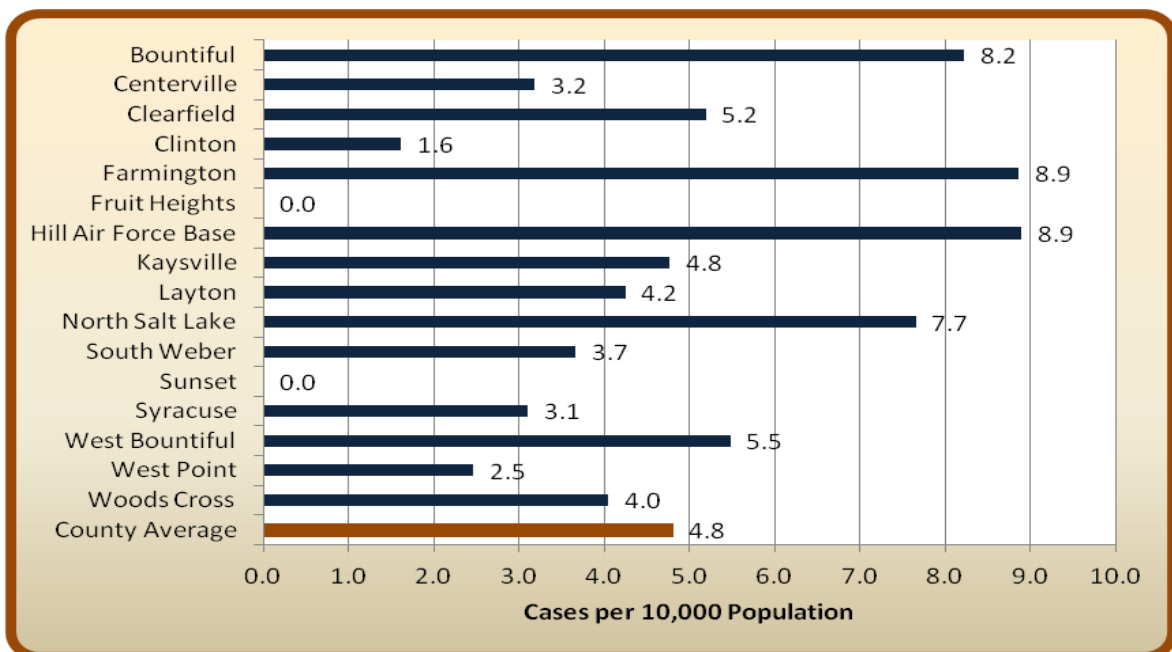
Over half of the cases were males (59.3%) and rates of illness were highest among the young (0-19 years) and the very old (80+) years.

Incidence of Enteric Diseases by Age Group, Davis County, 2011



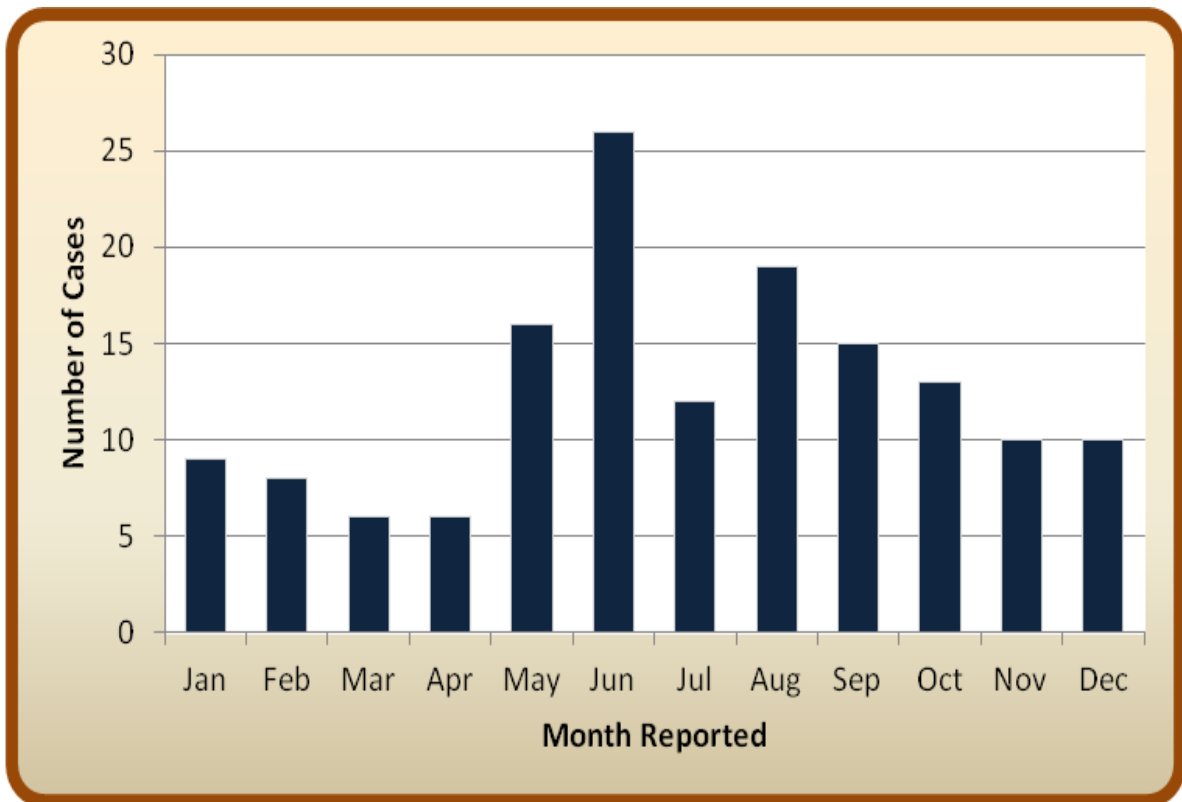
Enteric diseases were reported among residents of every city within Davis County except Fruit Heights and Sunset. The rate by city varied, but the average rate of enteric diseases was 4.8 per 10,000 residents.

Incidence of Enteric Diseases by City, Davis County, 2011



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

Enteric Diseases by Month Reported, Davis County, 2011

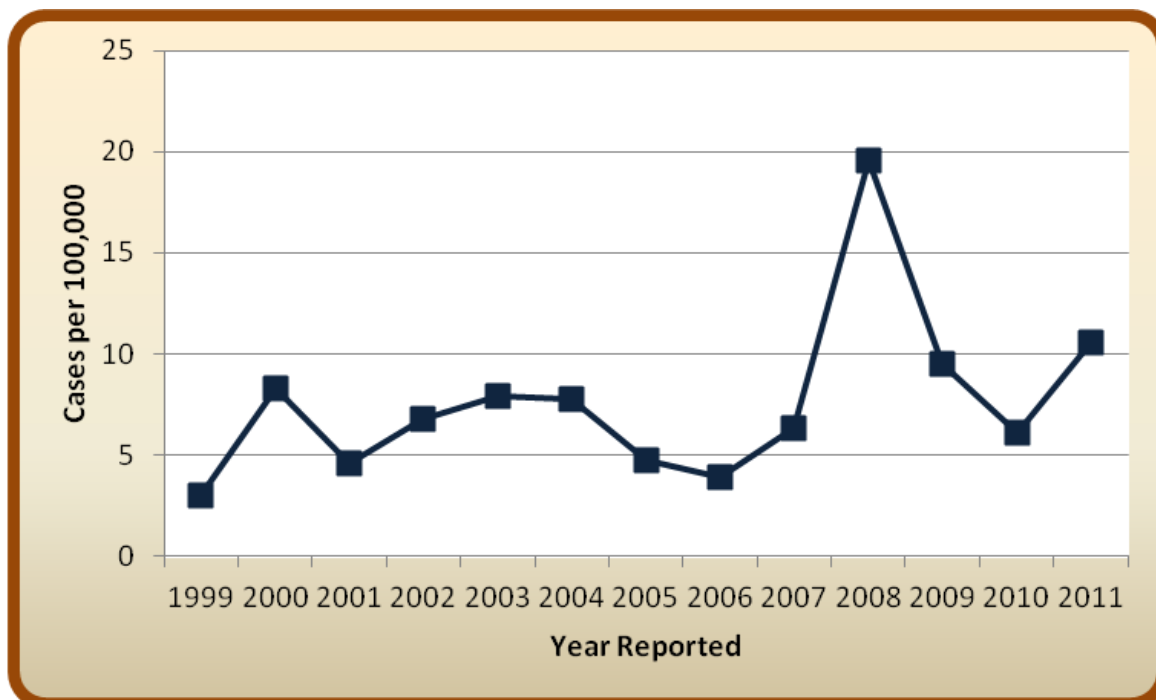


Campylobacteriosis

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 2011, there were **33** cases of campylobacteriosis reported in Davis County.

Incidence of Campylobacteriosis, Davis County, 1999-2011



2011 Disease Highlights:

In 2011, Davis County investigated 33 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 2011.

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 or water or by direct person-to-person contact.

Environmental and fomite contamination may also be a source 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 2011, there were **20** cases of norovirus reported in Davis County. Most of the cases were associated with a basketball camp outside of Davis County.

2011 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:

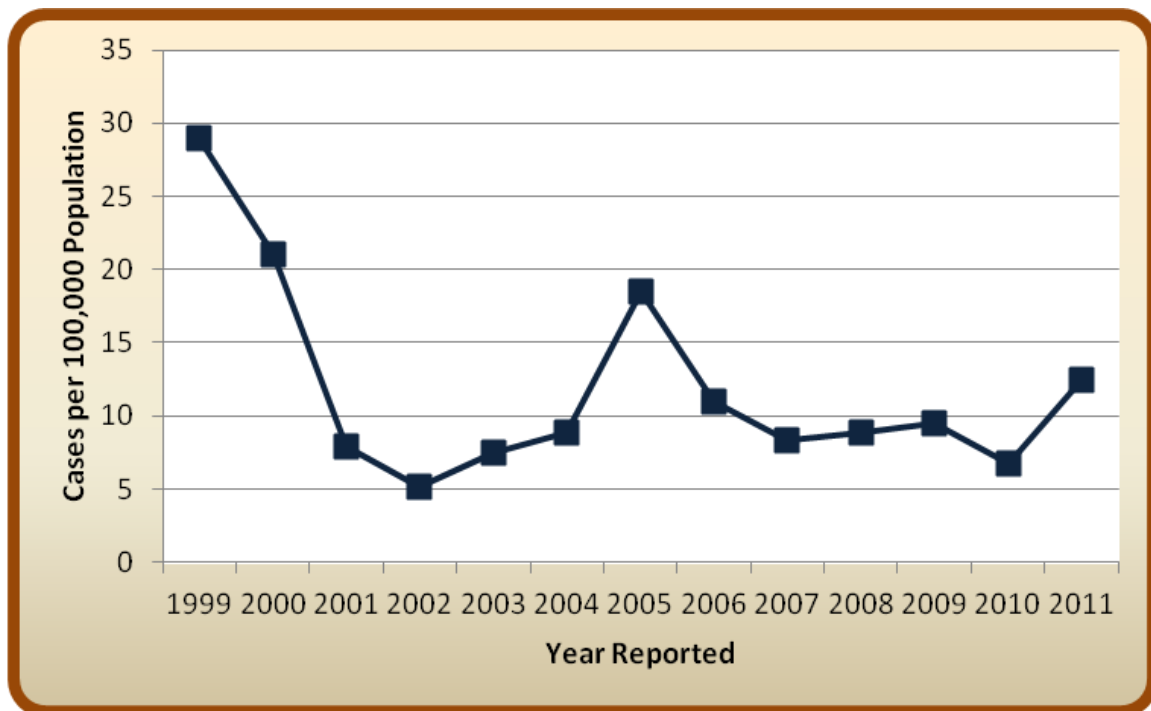
- In June 2011, Davis County was notified of an outbreak of gastrointestinal illness occurring at an out-of-county basketball camp. There were approximately 39 adolescents from Davis County who attended the camp. Camp participants were housed in a dormitory and ate meals in a central cafeteria. 37 of the Davis County participants were interviewed and food/activity histories were obtained. Of these, 17 reported illness – a 46 % attack rate. Stool samples were collected from several ill attendees and submitted for testing. These samples tested positive for norovirus. Symptoms reported by ill attendees were consistent with norovirus infection. None of the Davis County residents were hospitalized and ill attendees recovered. The basketball camp implemented cleaning measures and no additional cases were detected in subsequent sessions.

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 600 persons die each year from salmonellosis.

Davis County experienced a higher than expected number of salmonellosis cases in 2011. A total of **39** cases were reported, an increase of over 85 percent from the 21 cases reported in 2010.

Incidence of Salmonellosis, Davis County, 1999-2011



2011 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 identify 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 Enteritidis was the most commonly reported *Salmonella* serotype during 2011 with **10** cases (25.6%) followed by *Salmonella* Typhimurium with **6** cases (15.4%), *Salmonella* Montevideo with **4** cases (10.3%) and *Salmonella* Newport with **4** cases (10.3%). The number of cases of salmonellosis among Davis County residents by serotype is shown in the table below.

Salmonellosis Serotypes, Davis County, 2011

Serotype	Number of Cases	Percent
Enteritidis	10	25.6%
Typhimurium	6	15.4%
Montevideo	4	10.3%
Newport	4	10.3%
Heidelberg	3	7.7%
Agona	1	2.6%
B:1:-monophasic	1	2.6%
Baildon	1	2.6%
Bareilly	1	2.6%
Braenderup	1	2.6%
Eschberg	1	2.6%
Javiana	1	2.6%
Rough-O:z29	1	2.6%
Saintpaul	1	2.6%
Typhimurium var Copenhagen	1	2.6%
Serotyping not done	2	5.1%
Total	39	100.0%

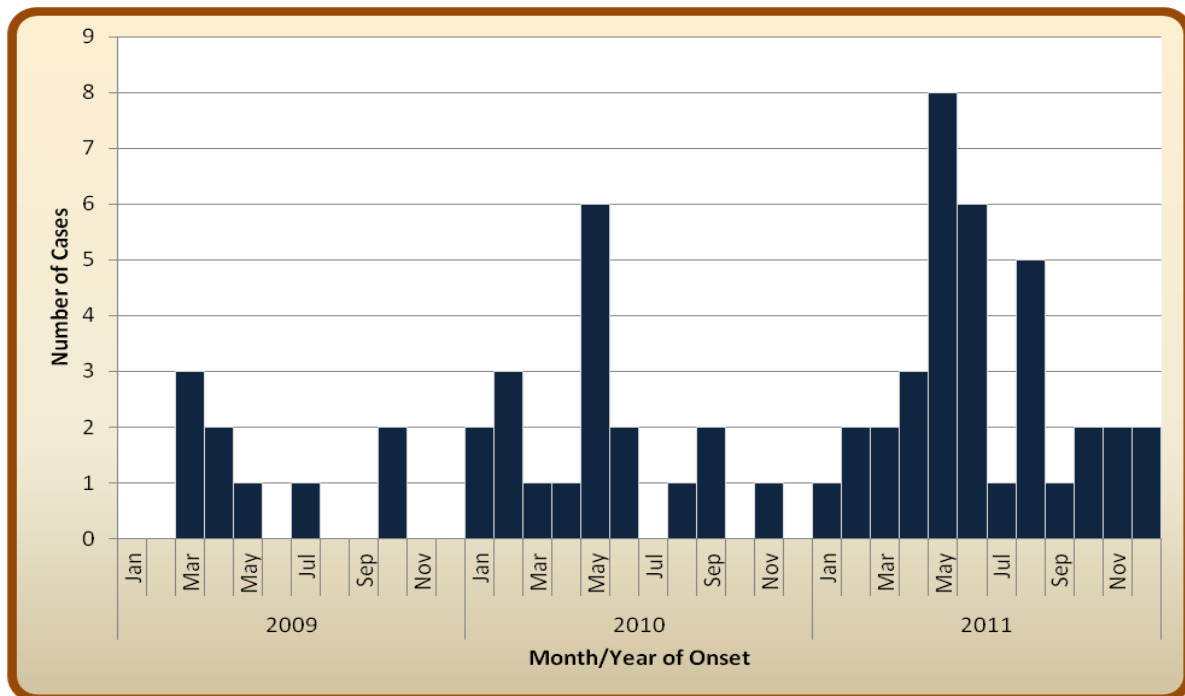
Salmonellosis Clusters

Salmonella Newport

Three of the Davis County salmonellosis cases reported in 2011 were linked by PFGE to a state-wide outbreak of *Salmonella* Newport, which began in 2009. In 2011, Salt Lake Valley Health Department (SLVHD) investigators found that consumption of queso fresco cheese was associated with illness. Infected individuals reported eating queso fresco purchased at a variety of locations including Latino restaurants, markets, and

vendors selling cheese in parking lots. The three Davis County cases reported eating food from restaurants and Latino markets in Salt Lake County that were linked to the outbreak. Through the collaborative efforts of SLVHD and Utah Department of Agriculture (UDAF), an unlicensed vendor who produced cheese in his home was identified. Samples of the homemade cheese obtained from the vendor were positive for *Salmonella* Newport which was indistinguishable by PFGE from the outbreak strain. The vendor was given a “cease and desist” order and fined \$500.00 for manufacturing and distributing without a license. There was a decrease in cases noted for a period of time; however, additional cases have recently been identified, possibly indicating additional manufacturers/distributors in the community.

***Salmonella* Newport Outbreak, Utah, 2009-2011**



Source: Salt Lake Valley Health Department

Salmonella Typhimurium

In addition, two Davis County residents were linked to a state-wide cluster of 14 *Salmonella* Typhimurium infections also matched by PFGE. Cases occurred in residents of five different health districts in April and May of 2011. An extensive investigation was conducted by the Utah Department of Health in conjunction with the affected health districts. However, no common source of infection was identified.

Salmonella Montevideo

A Davis County resident was linked to a national cluster of *Salmonella* Montevideo infections which was investigated by the Centers for Disease Control along with affected state and local health departments. No common source was identified for this cluster.

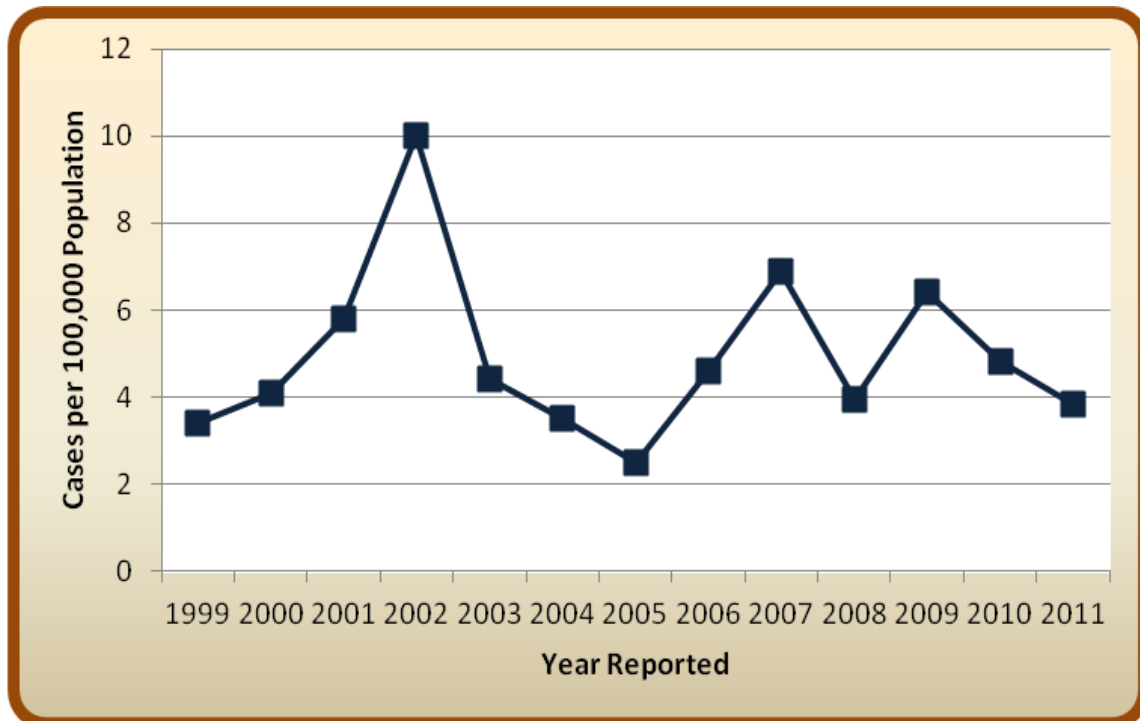
Shiga Toxin Producing *Escherichia coli* (STEC) Infection

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.

In 2011, there were **12** cases of STEC reported.

Incidence of STEC Infections, Davis County, 1999-2011



Shiga Toxin Producing *E. coli* Serotypes, Davis County, 2011

Serotype	Number of Cases	Percent
O26	4	44.4%
O103	2	22.2%
O157:H7	2	22.2%
O121	1	11.1%
Total	9	100.0%

2011 Disease Highlights:

An *E. coli* outbreak was identified at a scout camp in Idaho which was attended by several scout troops from Davis County. At least seven scouts and two adult leaders from Davis County became ill with nausea, vomiting, and bloody diarrhea after attending the camp. Two of the campers tested positive for shiga toxins and one of the isolates was identified as *E. coli* O121. Utah Department of Health (UDOH) notified the Idaho Department of Health of the cases. An assessment of the camp was conducted which included testing water samples. High levels of fecal coliforms were detected in the drinking water at the facility. By the time the testing was completed, the camp had already closed for the season due to the illnesses. Utah Boy Scout troops who attended the camp were notified of the outbreak and educated about the disease. Idaho Department of Health implemented control measures at the facility.

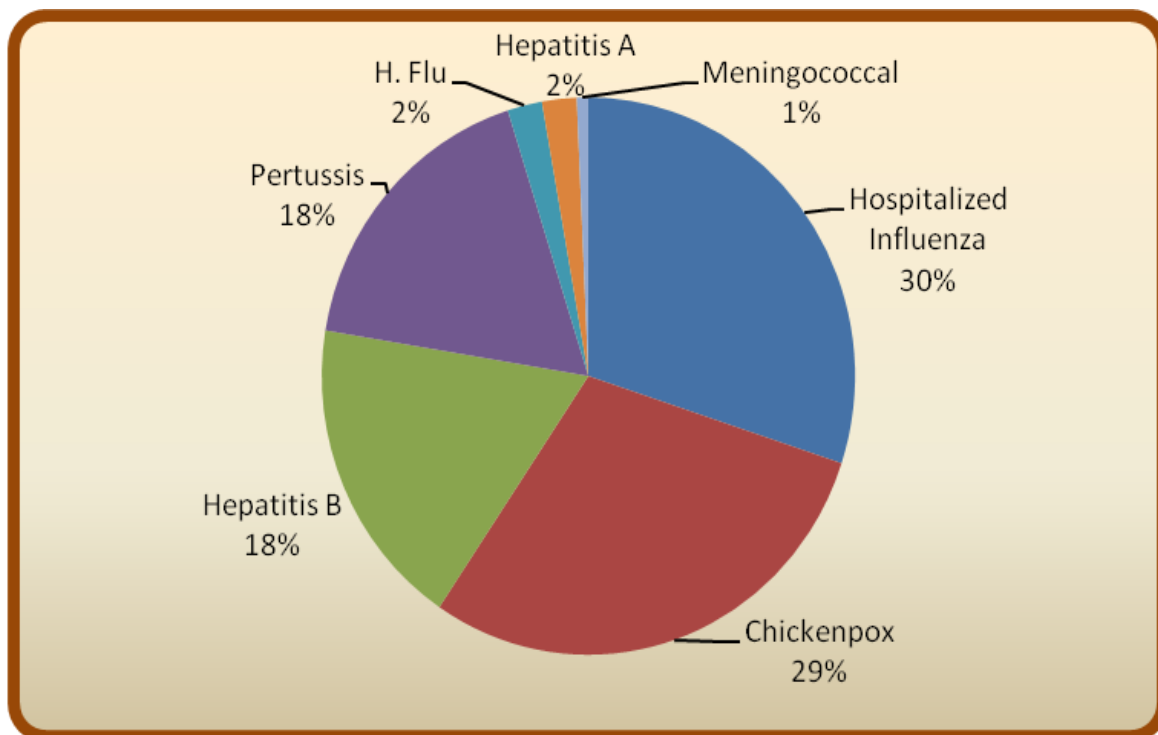
Vaccine-Preventable Diseases

Vaccine-Preventable Diseases (VPD) are diseases that are preventable through the use of immunizations. 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.

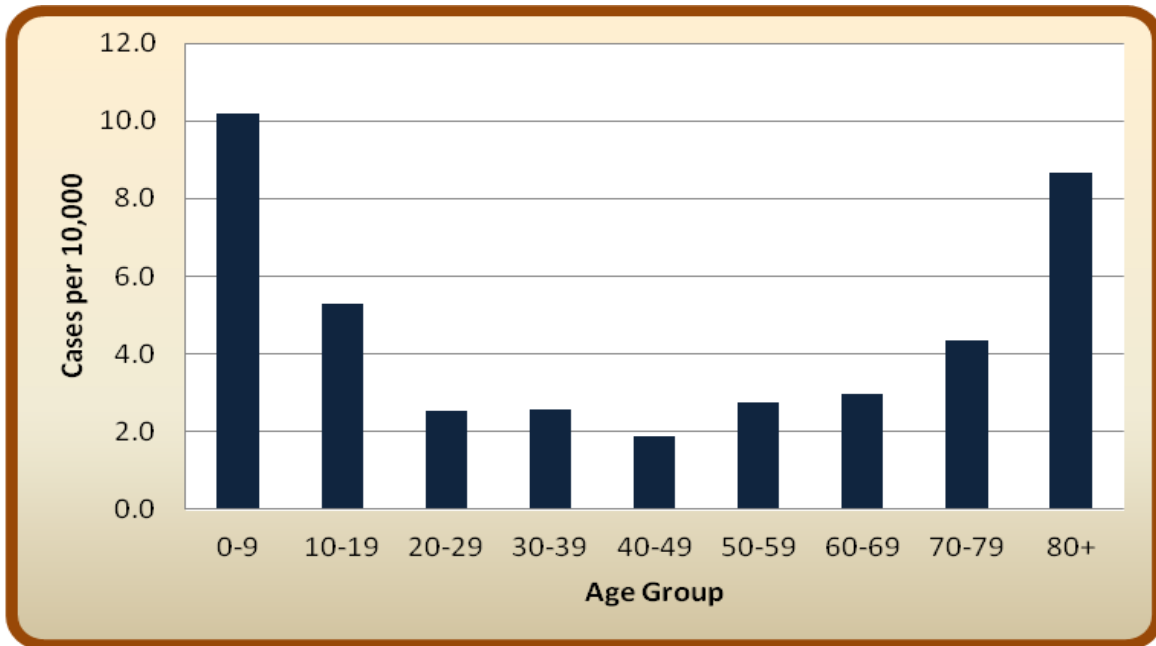
Hospitalized influenza was the disease most often reported in this category with **43** cases (30%), followed by chickenpox with **42** cases (29%), hepatitis B with **26** cases (18%), and pertussis with **25** cases (18%). Cases of *Haemophilus influenzae* invasive disease (H. flu), hepatitis A and meningococcal disease were also reported.

Vaccine-Preventable Diseases, Davis County, 2011



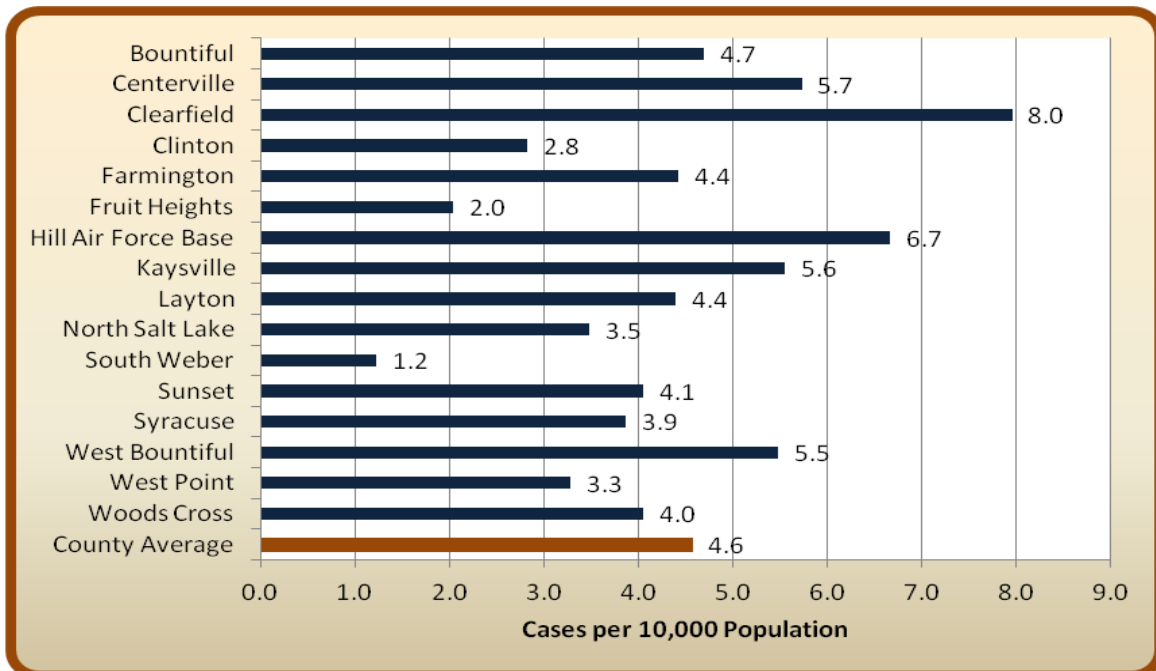
The incidence of vaccine-preventable diseases is highest among children under the age of 10 and the elderly.

Incidence of VPDs by Age Group, Davis County, 2011



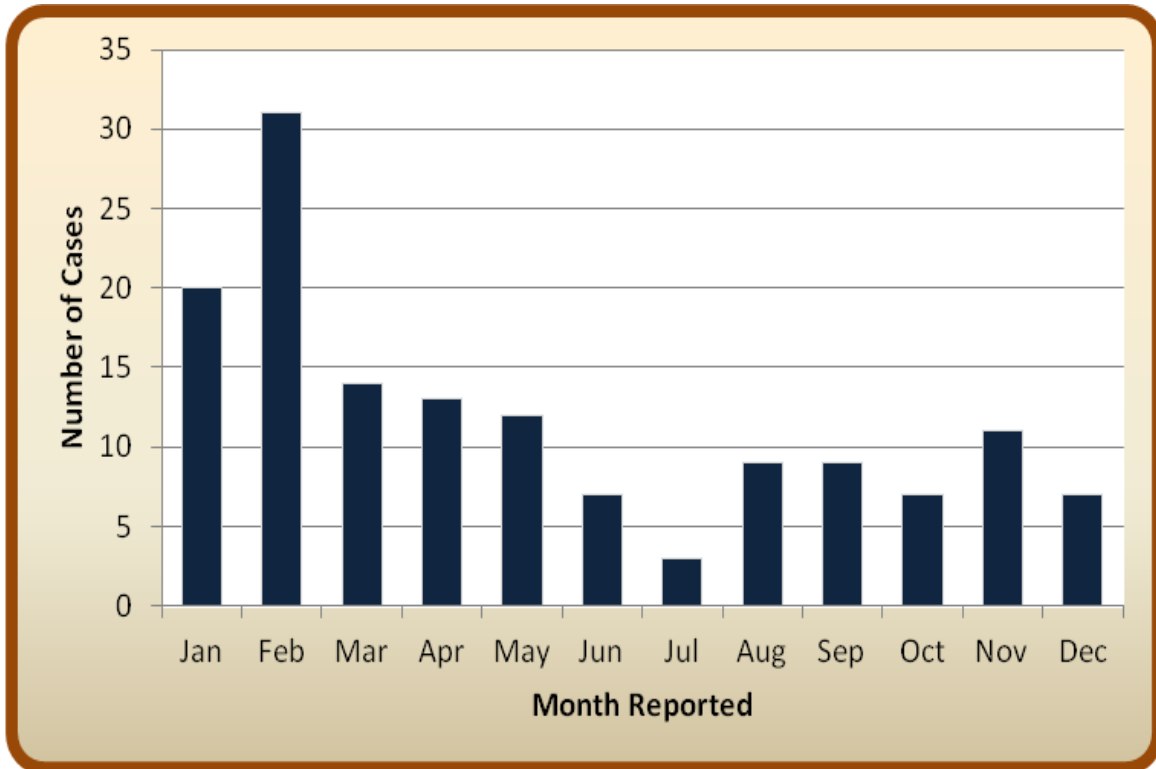
Vaccine-preventable diseases occurred in residents throughout the county. The average rate of vaccine preventable diseases was **4.6** cases per 10,000 residents.

Incidence of VPDs by City, Davis County, 2011



Vaccine-preventable diseases (particularly pertussis and chickenpox) are reported more frequently during the school year. Influenza cases typically peak in February.

VPDs by Month Reported, Davis County, 2011



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.

During the 2010-2011 influenza season, there were **52** cases of hospitalized influenza reported in Davis County.

2011 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 monitored. During the 2010-11 influenza season, two sentinel sites reported cases. For the 2011-12 season the number of sites expanded to 4.

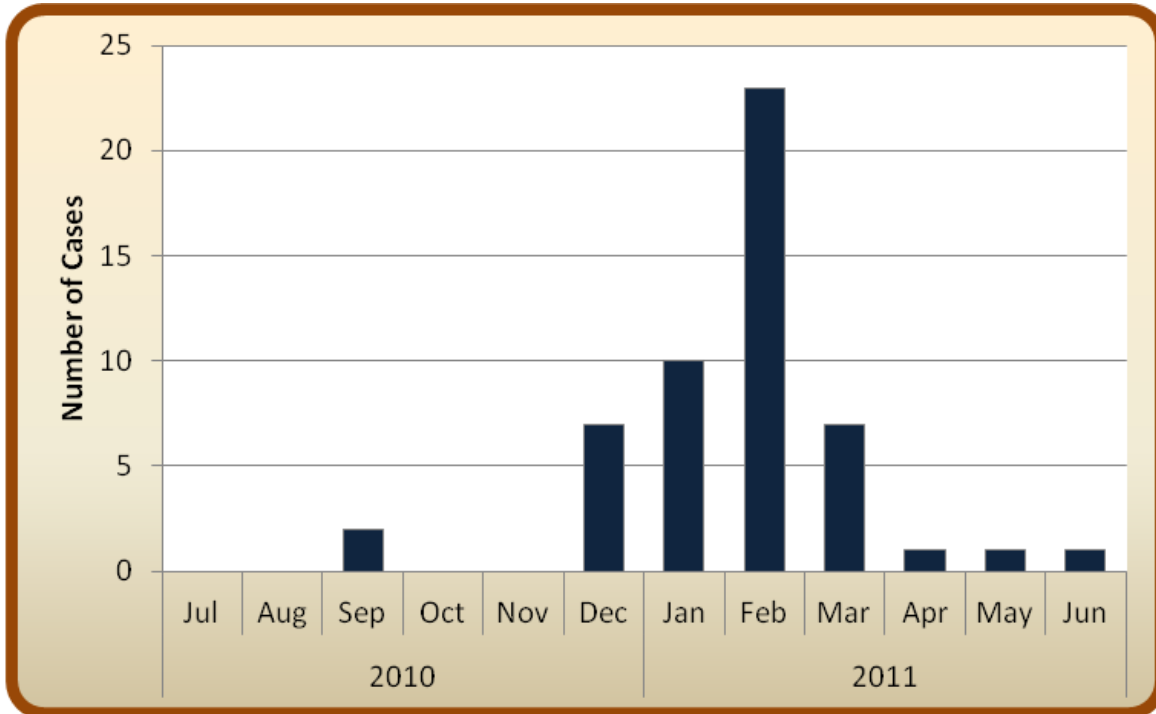
In addition, medical providers, hospitals and laboratories are required by state law to report hospitalized influenza cases and pediatric influenza deaths to the local health department to monitor disease severity.

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.

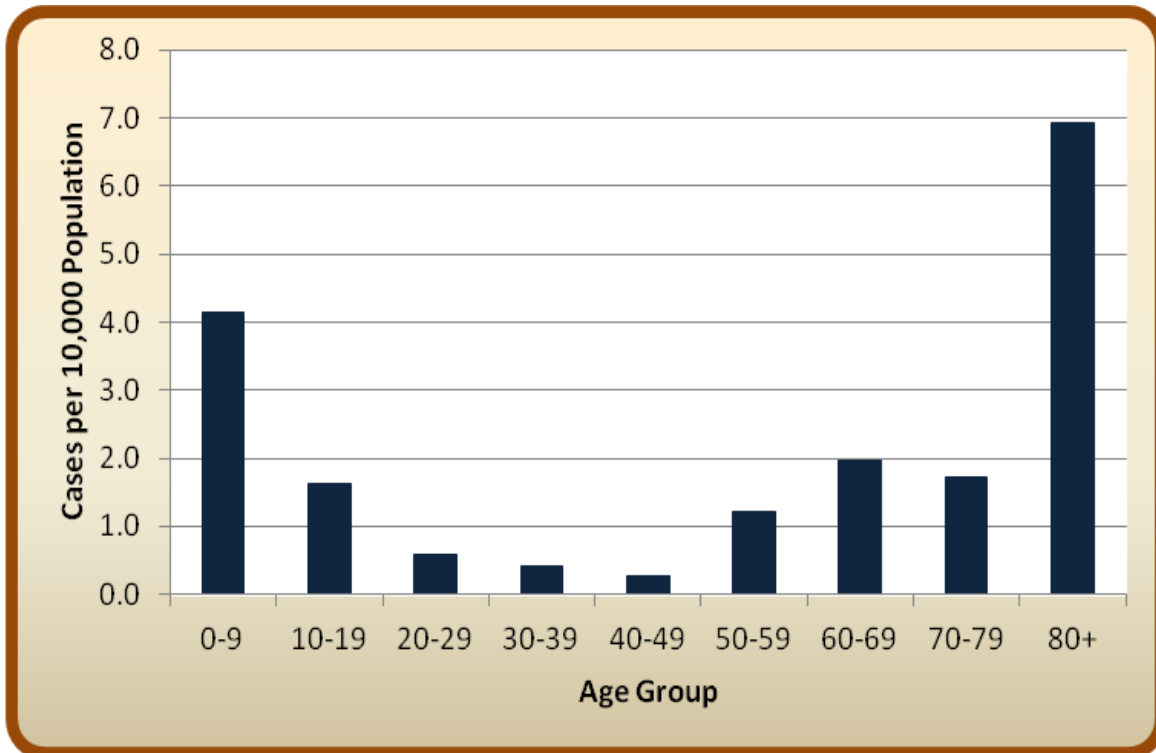
In December of 2011, The Centers for Disease Control and Prevention (CDC) reported that a novel swine-origin influenza strain (H3N2) had been detected in five states (Maine, Pennsylvania, West Virginia, Indiana and Iowa). By the close of the year, 12 cases had been identified. Most of the cases had direct contact with swine; however, some did not, indicating probable human-to-human spread. Davis County notified the medical community of this situation and enhanced surveillance was implemented. An Influenza Newsletter was created and was first distributed in December 2011. To date, no cases of this novel strain have been detected in Utah or in the Western U. S.

During the 2010-2011 influenza season, the incidence of influenza in Davis County was lower than expected.

Hospitalized Influenza Cases by Month, Davis County, 2010-2011 Influenza Season



Incidence of Hospitalized Influenza Cases by Age Group, Davis County, 2010-2011 Influenza Season



Measles

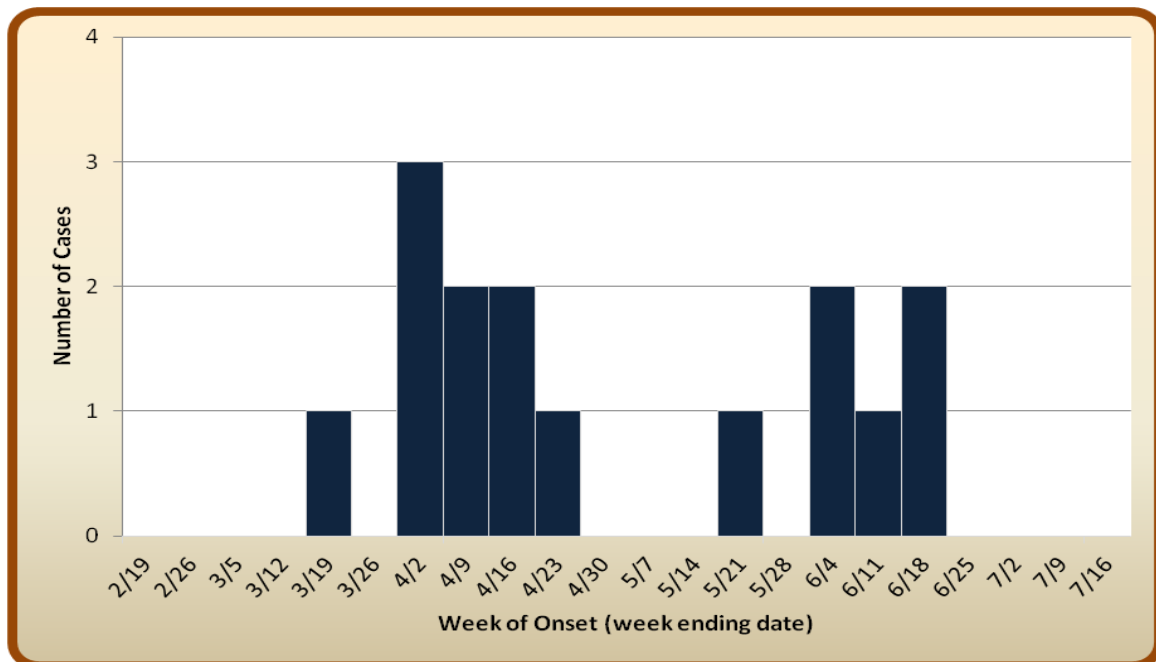
Measles is an acute viral respiratory illness. Although it is one of the most highly infectious diseases known, it is vaccine-preventable. Measles is transmitted by direct contact with infectious respiratory droplets or, less commonly, by airborne spread. Since 1992, the incidence in the U.S. has been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

During 2011, there were **no cases** of measles reported in Davis County.

2011 Disease Highlights:

Measles cases are rarely seen in Utah. Before 2011, the last case noted in Utah was in 2002. A large outbreak occurred in 1996 where more than 100 cases were detected, mostly in a population of unvaccinated individuals. However in 2011, Utah experienced an outbreak in Salt Lake County with secondary cases occurring in Bear River and Central Health District. An unvaccinated family traveled to an endemic country. Upon returning, one member became ill with symptoms consistent with measles – which was later confirmed. This individual was school-aged and attended school during the infectious period of the disease (4 days before rash onset to 4 days after). Once the case was recognized, the ill individual was isolated and the family quarantined. However, the family was not compliant with the quarantine and additional family members and other contacts to this family subsequently developed measles. Most of these contacts were also unvaccinated. In all, 15 cases were identified. Some exposures to these cases occurred outside of Salt Lake, including Davis County.

Measles Outbreak, Utah, 2011



Source: Utah Department of Health, Bureau of Epidemiology

The medical community was informed of the current situation and to request measles testing on patients with symptoms consistent with measles. Medical providers were also reminded to report any suspect case of measles to the health department immediately.

During the outbreak, several suspect cases were reported to Davis County Health Department. Each year, the health department investigates suspect cases, all of which have been ruled out. However, with an outbreak occurring in a neighboring county, there was a higher level of suspicion. Salt Lake Valley Health Department (SLVHD) also reported that a confirmed case had worked at a Davis County facility during the infectious period. The worksite was contacted and control measures implemented, which included the assurance of measles immunity of all persons exposed to the case. Measles immunity was defined as one of the following:

- (2) MMR vaccines given at least 30 days apart
- A measles serology titer indicating immunity
- Born before 1957

During the outbreak period, Davis County investigated **16** suspect cases of measles – all of which were ruled out. Suspect cases were considered a case until laboratory results were negative. Davis County staff identified **302** residents who were exposed to measles cases. These persons were interviewed, monitored for illness and educated about the disease. Of the 302 individuals contacted, only 108 (35.8%) were able to prove immunity. Those who could not prove immunity were vaccinated or quarantined for 18-21 days from exposure (the incubation period for measles).

Of interest, Davis County found that a concurrent outbreak of human parvovirus B19 (Fifth's Disease), a common childhood viral rash illness, was occurring in the community. Fifth's Disease is often referred to as "Slapped Cheek" disease because of the characteristic rash that appears on the face that resembles a slapped cheek. Symptoms of the disease are similar to measles and infection with parvovirus can result in a false-positive measles IgM test. As a result of this finding, suspect cases throughout the state were tested for both human parvovirus B19 and measles IgM, allowing public health workers to rule out several cases that would have been considered measles cases without the additional testing. This prevented unnecessary isolation of cases and quarantine of their contacts.

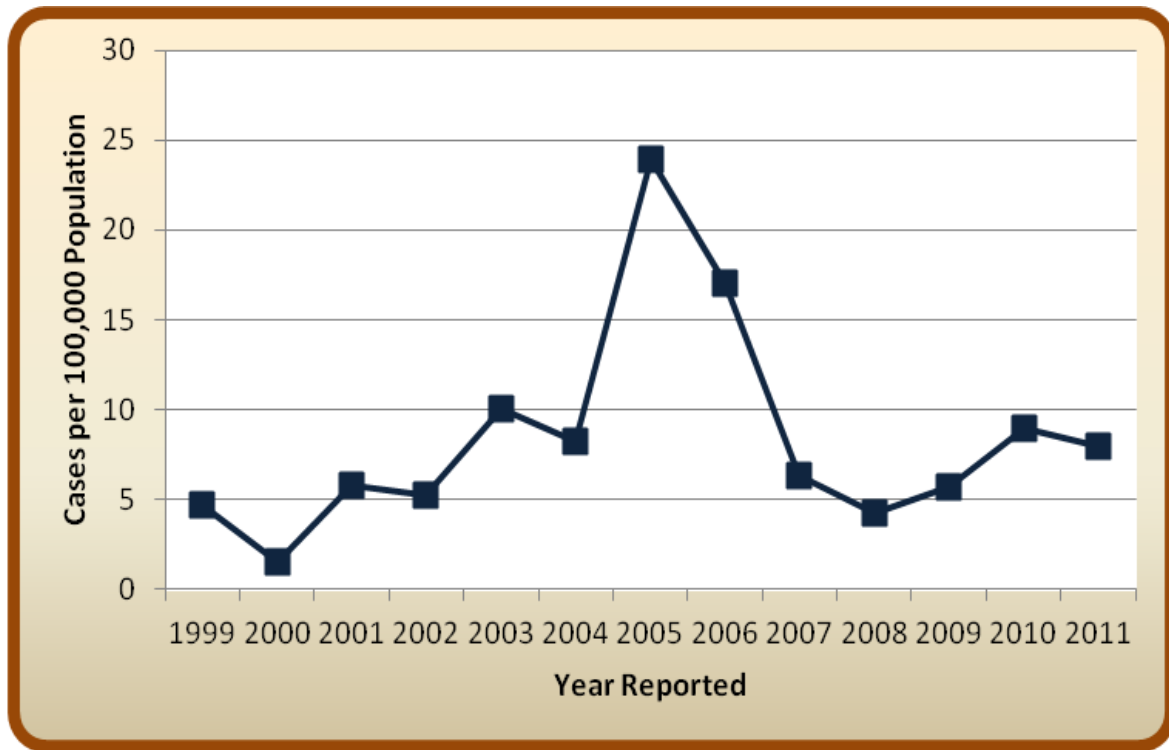
Another important finding in this outbreak was the fact that the general population, and more specifically the medical community, often did not maintain records of their measles immunizations. This caused several exposed individuals unnecessary vaccination or quarantine. As a result, many healthcare facilities are now ensuring better record maintenance for their staff.

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 2011, there were **25** cases of pertussis reported in Davis County, a slight decrease from the 28 cases reported during 2010.

Incidence of Pertussis, Davis County, 1999-2011



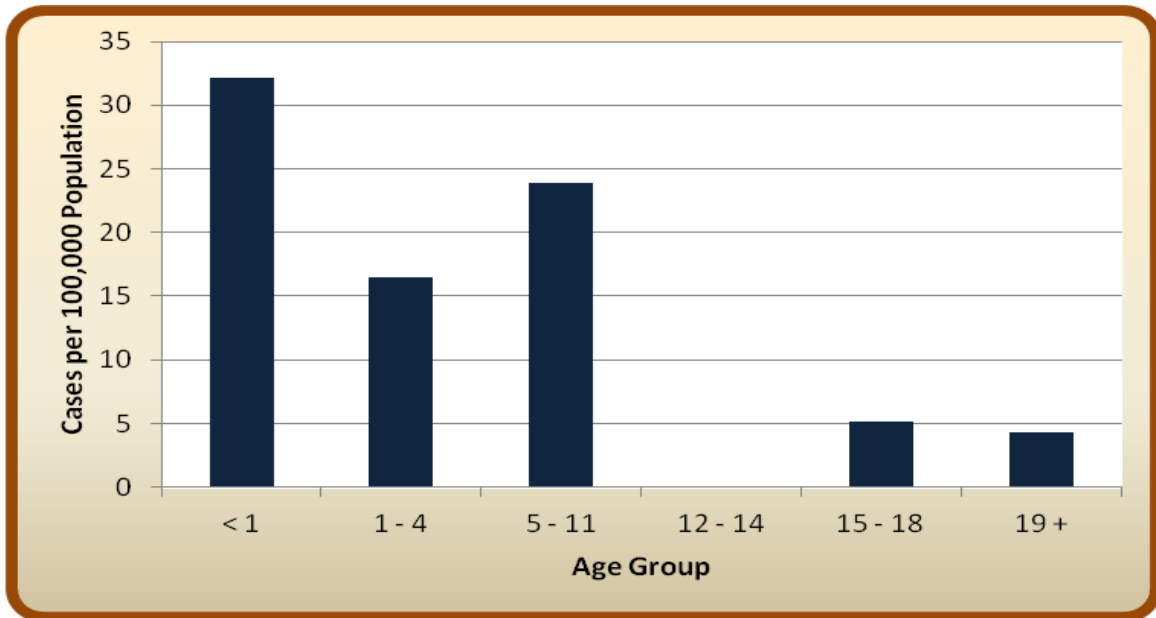
2011 Disease Highlights:

Davis County investigates approximately 25 pertussis cases each year (based on a 5-year average). In 2011, 25 cases were reported. However, surrounding counties experienced outbreaks of pertussis. During the fall of 2011, Davis County noted an increase in pertussis reports, which coincided with some of the outbreaks seen in other counties. November had the highest number of cases reported (5 cases). Due to the mobility of the population, it is not unusual to see outbreaks in one county migrate into neighboring jurisdictions.

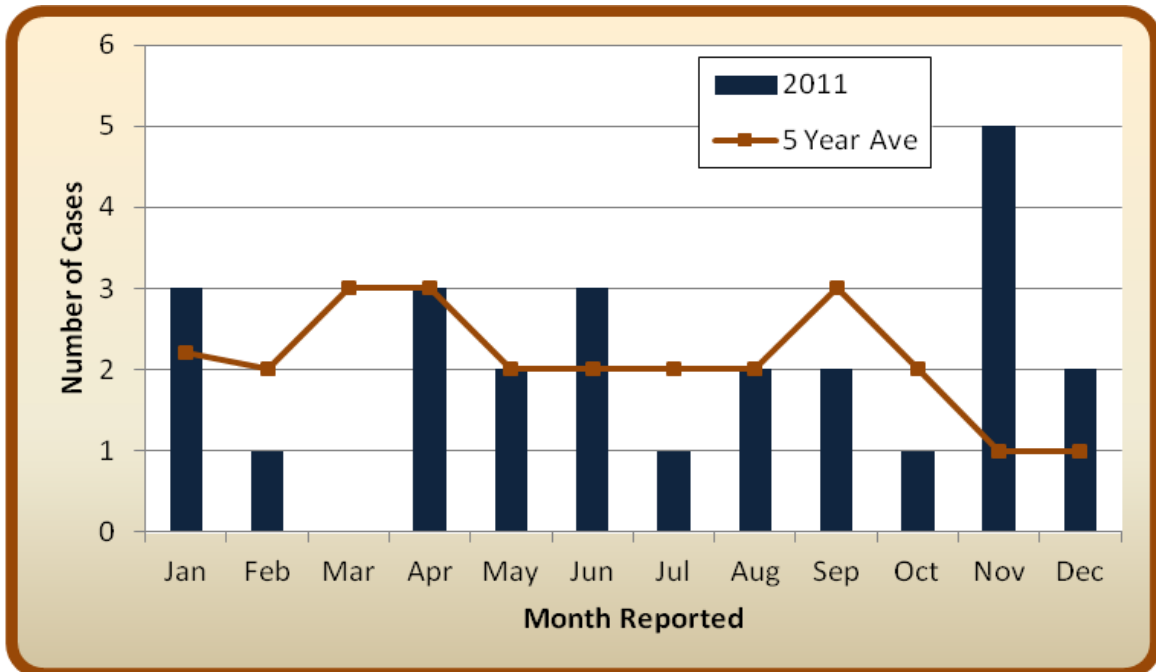
All reported pertussis cases are investigated promptly to stop disease spread. Contacts who experience a prolonged exposure to an infected case may benefit from antibiotic prophylaxis – if the antibiotic is administered in a timely manner. Children are routinely vaccinated against pertussis before entry into the school system. As they enter junior

high, a booster dose is required. The Tdap (tetanus, diphtheria and acellular pertussis) is recommended for anyone 11-64 and is a one-time dose. Tetanus vaccination, however, is recommended every 10 years. The age groups most often affected by pertussis are those which are under-vaccinated including infants/children under five (because they have not completed the full vaccination series) and adolescents/adults (because of waning immunity).

Incidence of Pertussis by Age Group, Davis County, 2011



Pertussis by Month Reported, Davis County, 2011



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 2011, there were **three cases** of vectorborne/zoonotic diseases reported in Davis County.

Vectorborne/Zoonotic Diseases	Location of Exposure	Number of Cases
Brucellosis	Africa	1
Lyme Disease	Out-of-State	1
West Nile Virus, non-neuroinvasive disease	Davis County	1
Total		3

Two of the cases of vectorborne/zoonotic diseases were male and one was female and all of the cases were adults.

Cases lived in Bountiful, Layton and South Weber. However, two of the three cases were likely acquired out-of-state.

Vectorborne/zoonotic diseases are more common in the summer when insect vectors are active and humans are spending more time outdoors and traveling. In 2011, vectorborne/zoonotic diseases were reported in July and August.



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 like 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 2011, there were **no cases** of human or animal rabies reported in Davis County.

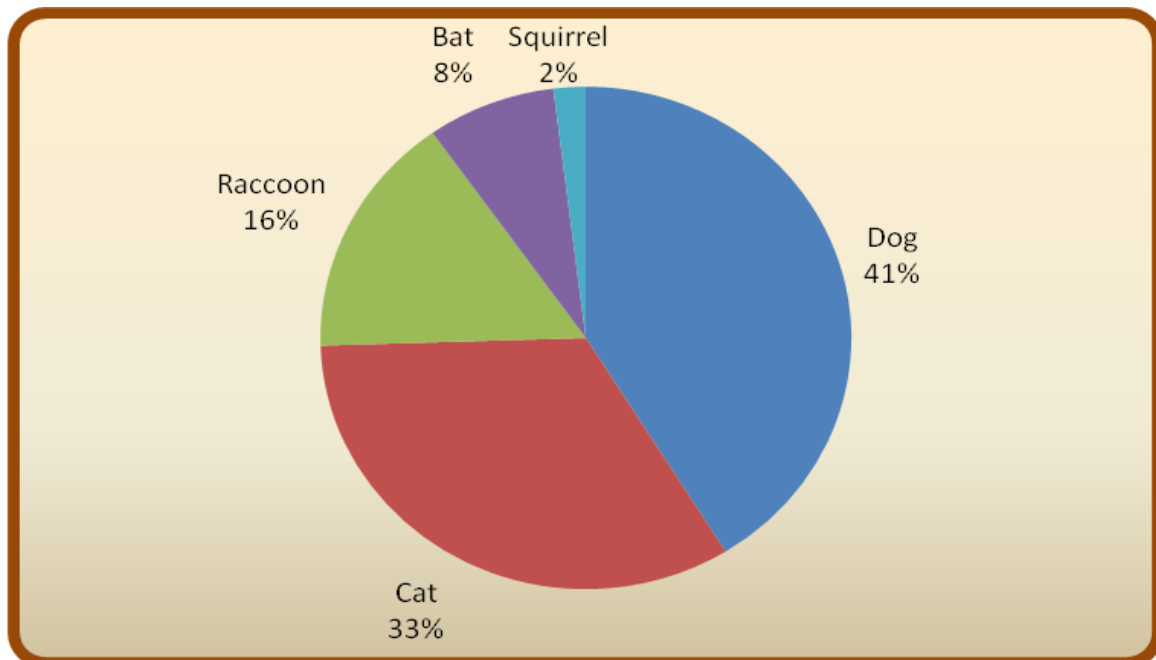
2011 Disease Highlights:

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 2011, the Davis County Environmental Health Division submitted 51 animals for rabies testing; none were positive. Of these, 35 (69%) involved a human exposure and 16 (31%) were animal-to-animal exposures.

Animals Tested for Rabies, Davis County, 2011

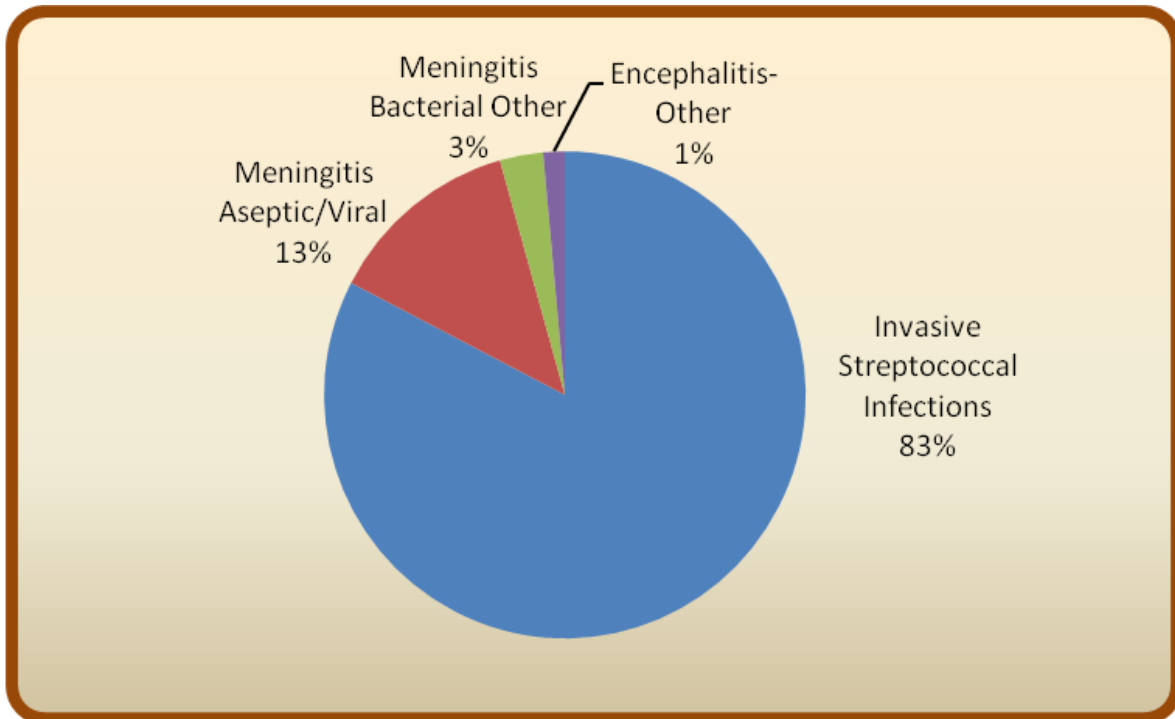


Invasive Diseases

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 Diseases 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 2011 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, 2011



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 2011, there were **57** cases of invasive streptococcal infections reported among Davis County residents (the 5-year average is 55). The majority of cases were due to strains that do not require an investigation or the implementation of public health control measures (i.e. *S. mutans*, *sanguinis* and *mitis*).

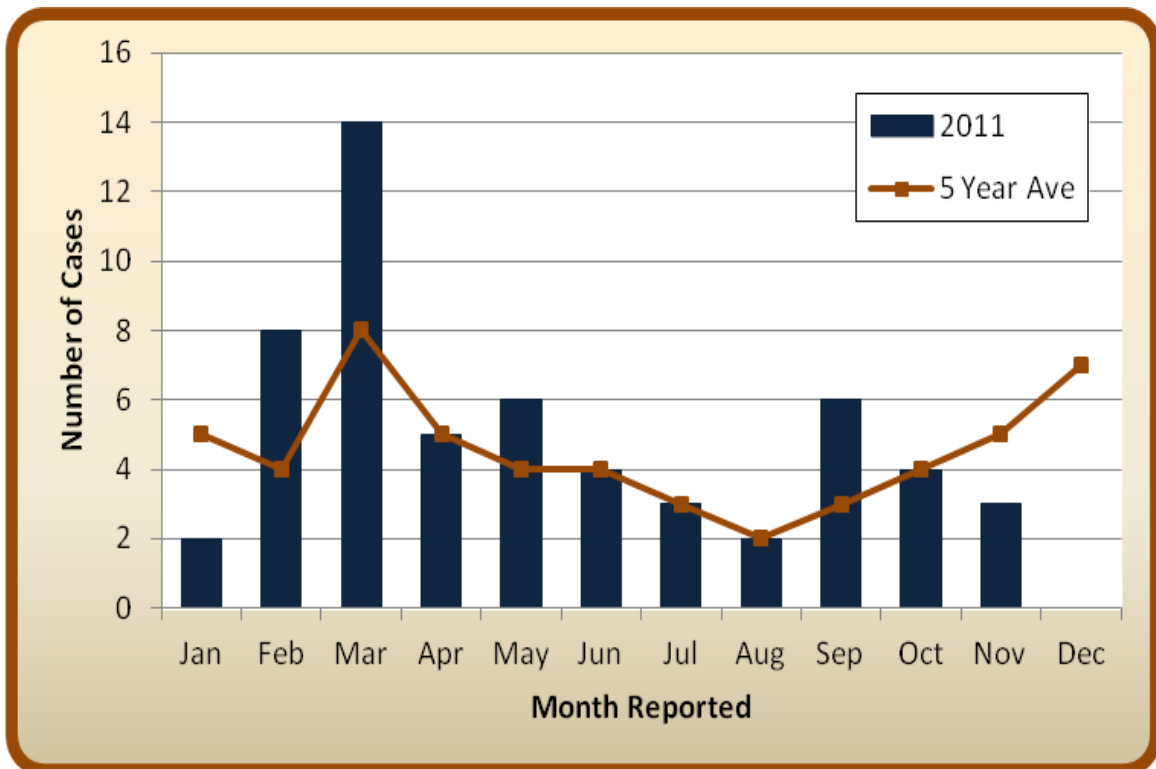
2011 Disease Highlights:

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.

Infection with *Streptococcus pneumoniae* is particularly serious. In 2011, three out of 14 reported *S. pneumoniae* cases were fatal - a case fatality rate of over 21%. 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 pneumococcal bacteria. Fortunately, there are vaccines available to prevent some infections. On February 24, 2010, the FDA licensed the 13-valent pneumococcal conjugate vaccine, which replaced the PVC7 vaccine that had been used since 2000. For infants/children, the PCV13 is given during the primary vaccination series at ages 2, 4, 6, and 12-15 months and protects against 13 of the most severe pneumococcal strains. Individuals ages 2-64 years are vaccinated with the PPSV23, which protects against 23 of the most virulent strains.

During 2011, a special study was conducted, in conjunction with the CDC, regarding children less than 5 years of age who are infected with *Streptococcus pneumoniae*. These cases received additional follow-up. The purpose of this study is to monitor vaccine efficacy in children who are targeted to receive the PCV13 vaccine.

Invasive Streptococcal Infections by Month, Davis County, 2011

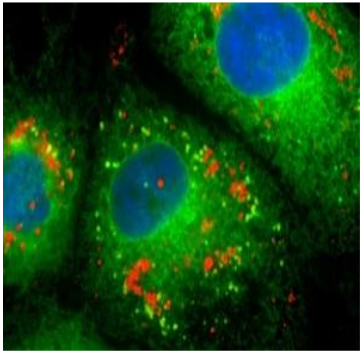


Other Reportable Diseases/Conditions

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 Legionellosis, coccidioidomycosis and Cruetzfeldt-Jakob Disease (CJD).

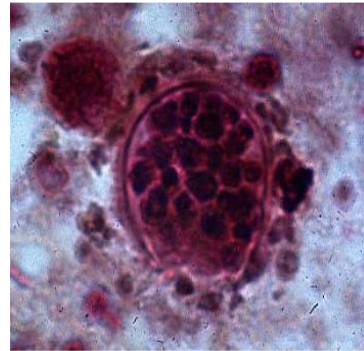
Disease	Number of Cases
Hepatitis C, acute and chronic	150
Legionellosis	9
Coccidioidomycosis	2
Cruetzfeldt-Jakob Disease (CJD)	1



Hepatitis C



Legionella



Coccidioidomycosis

Creutzfeldt-Jakob Disease (CJD)

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

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

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

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

2011 Disease Highlights:

Davis County investigated one case of sporadic Creutzfeldt-Jakob disease (CJD) in 2011. The resident experienced onset of hallucinations, difficulty speaking, forgetfulness and irritability. The severity of these symptoms progressed, and ultimately caused the individual's death. Appropriate post mortem care is critical with any suspect case of CJD. A system is in place to assist family members in obtaining appropriate testing, which includes an autopsy. These services are provided free of charge. An autopsy is required in order to confirm the diagnosis of CJD. Specimens collected during the autopsy are submitted to the National Prion Disease Pathology Surveillance Center (NPDPS) for disease confirmation. Cases of prion disease (e.g. CJD) reported to the NPDPS are examined individually to aid in the timely detection of new or atypical cases and establish more accurate classifications of prion diseases.

CJD is found everywhere in the world, but it is very rare. Only one in a million people each year will get this disease. Since 2000, 19 Utahans have died of CJD. This number is not higher than expected. Utah averages two cases of CJD a year.

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, muscle aches, nausea, jaundice, loss of appetite and abdominal pain.

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

In 2011, Davis County received reports on **150** cases, which was more than double the cases reported in 2010 (71 cases).

2011 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 the appropriate genotype can benefit from interferon treatment.

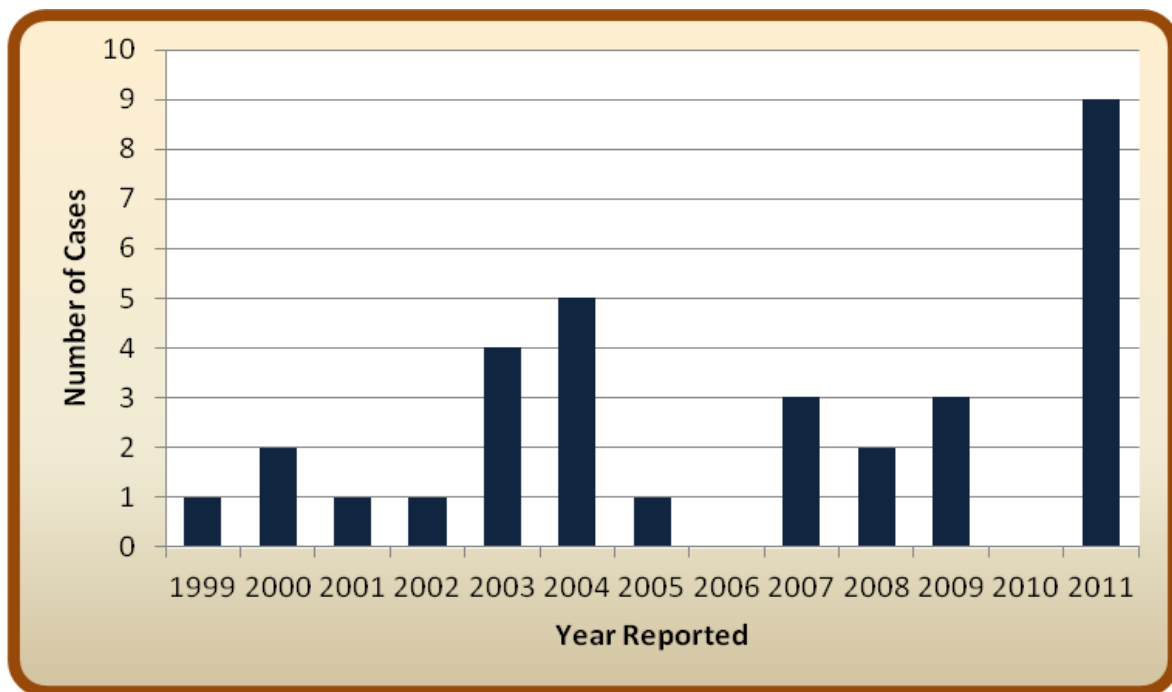
Legionellosis

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 and 10%-20% can be linked to outbreaks.

During 2011, there were **9** cases of Legionellosis reported in Davis County.

Legionellosis Cases, Davis County, 1999-2011



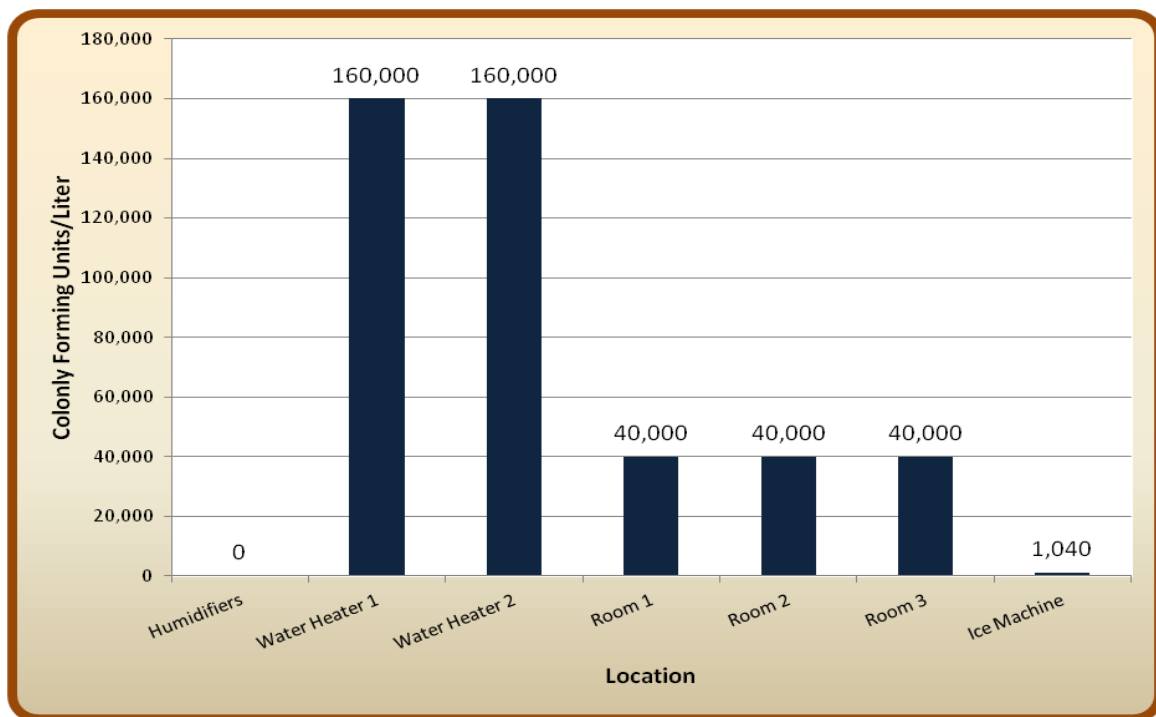
2011 Disease Highlights:

In January of 2011, the Communicable Disease and Epidemiology Division received reports of two Legionellosis cases. During the investigation, it was noted that both individuals resided in the same facility. Communicable disease and environmental health staff visited the facility, conducted an environmental assessment, collected water samples, and provided recommendations for remediation. During the remediation process, one additional Legionellosis case was identified, as well as four suspect cases. Other individuals who resided in the facility that developed symptoms consistent with Legionellosis were also tested; however, the tests were negative.

The remediation process took place between January and May, 2011 and included the collection of multiple water samples, water system treatments (hyperchlorination and heat challenge), and the installation of disposable shower filters. The facility also installed a copper-silver ionization system. This system introduces positively-charged ions (silver/copper) into the water system. These ions then bond to the negative sites on the bacteria cell and change the structure of the proteins. Over time, the ionization destroys the biofilms that harbor *Legionella* bacteria.

In May, after all water samples collected were negative for *Legionella*, oversight was given back to the facility which implemented a long-term remediation plan that included routine sampling and monitoring of the system. To date, no additional Legionellosis cases have been detected among residents of the facility.

Water Testing for *Legionella* Bacteria, Facility A, 2011



Seizure Cluster

2011 Disease Highlights:

On March 25, 2011, Davis County received a report from a student at a training/educational facility who expressed concerns about an unusual occurrence of seizures. The report indicated that those affected were both students and clients. A team of health department staff conducted a site visit and interviewed members of the administration. An environmental assessment was conducted. No obvious causative agent was identified. Names of those who experienced a seizure were collected and some of those individuals were interviewed. During the interview, it was noted that some had a history of epilepsy or were currently under medication treatment for their seizure disorder. The others declared no prior history of seizures and were in the process of receiving a medical evaluation for this incident.

The administration agreed to conduct surveillance for a period of time to identify further occurrences. No new seizure activity was noted. The facility was referred for first aid training on how to handle seizure emergencies.

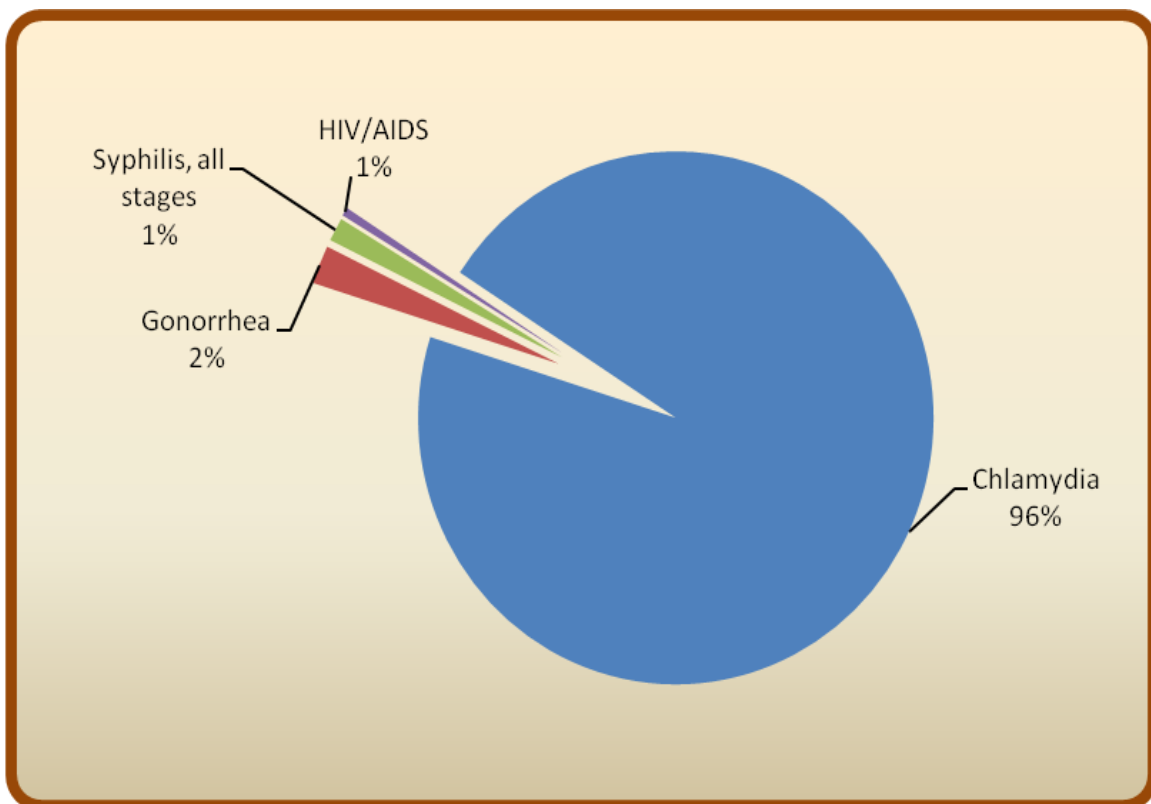
Seizures can have many causes, including medicines, high fever, head injuries and certain diseases. It is rare that an external environmental exposure would cause a seizure. It is estimated that 1 in 10 people will experience a seizure in their lifetime. The Epilepsy Foundation has determined that approximately 70% of those newly diagnosed with epilepsy are due to unknown causes.

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 (i.e. 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 (i.e. urine testing) have made chlamydia and gonorrhea testing more acceptable and convenient.

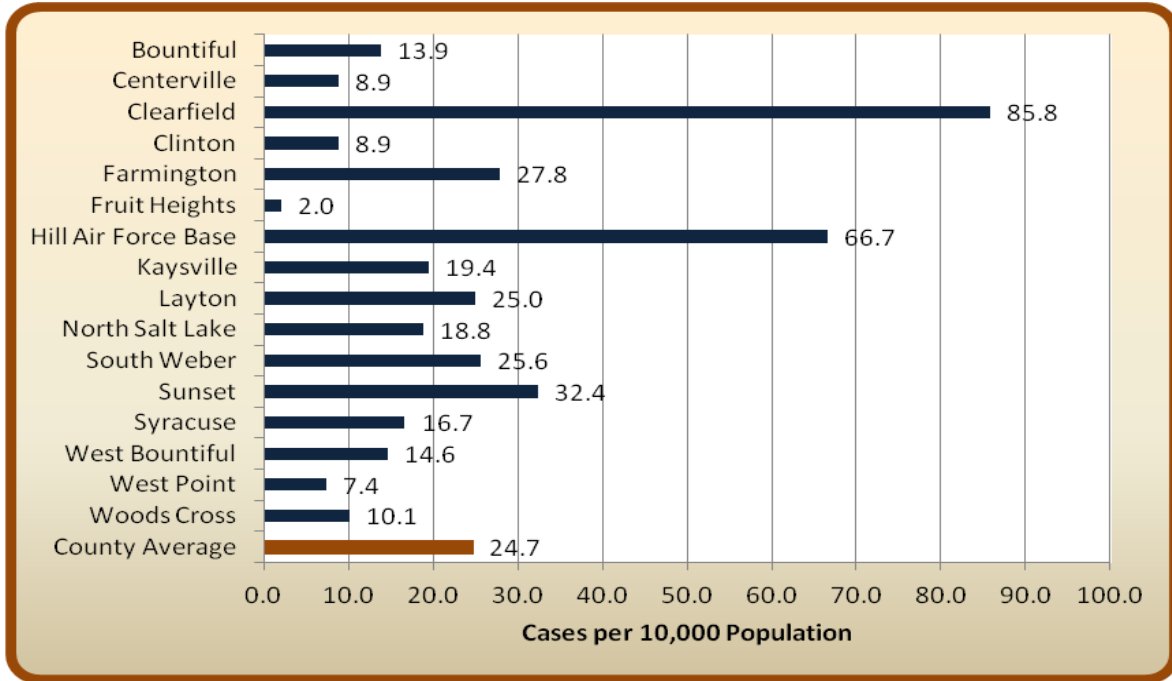
Sexually transmitted diseases reported during 2011 included chlamydia, gonorrhea, syphilis, and HIV/AIDS. Chlamydia was the most commonly reported STD with **739** cases, followed by gonorrhea with **18** cases.

Sexually Transmitted Diseases, Davis County, 2011



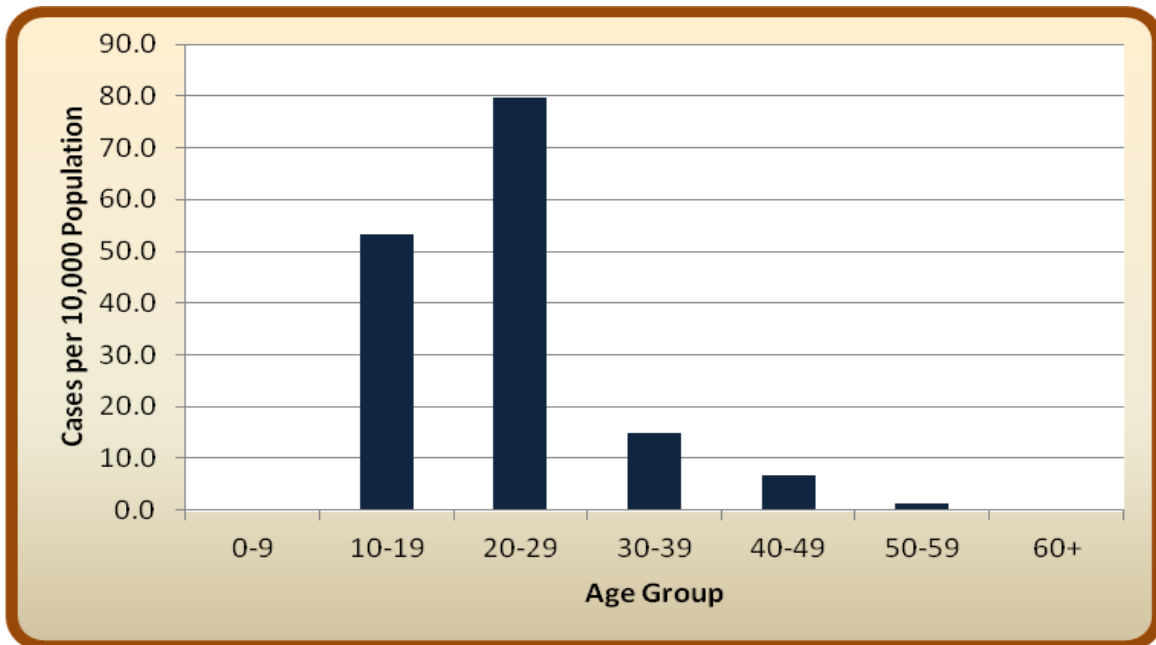
Sexually transmitted diseases occurred among residents of every city in Davis County. The average rate in the county was **24.7** cases per 10,000 residents.

Incidence of all STDs by City, Davis County, 2011



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, 2011



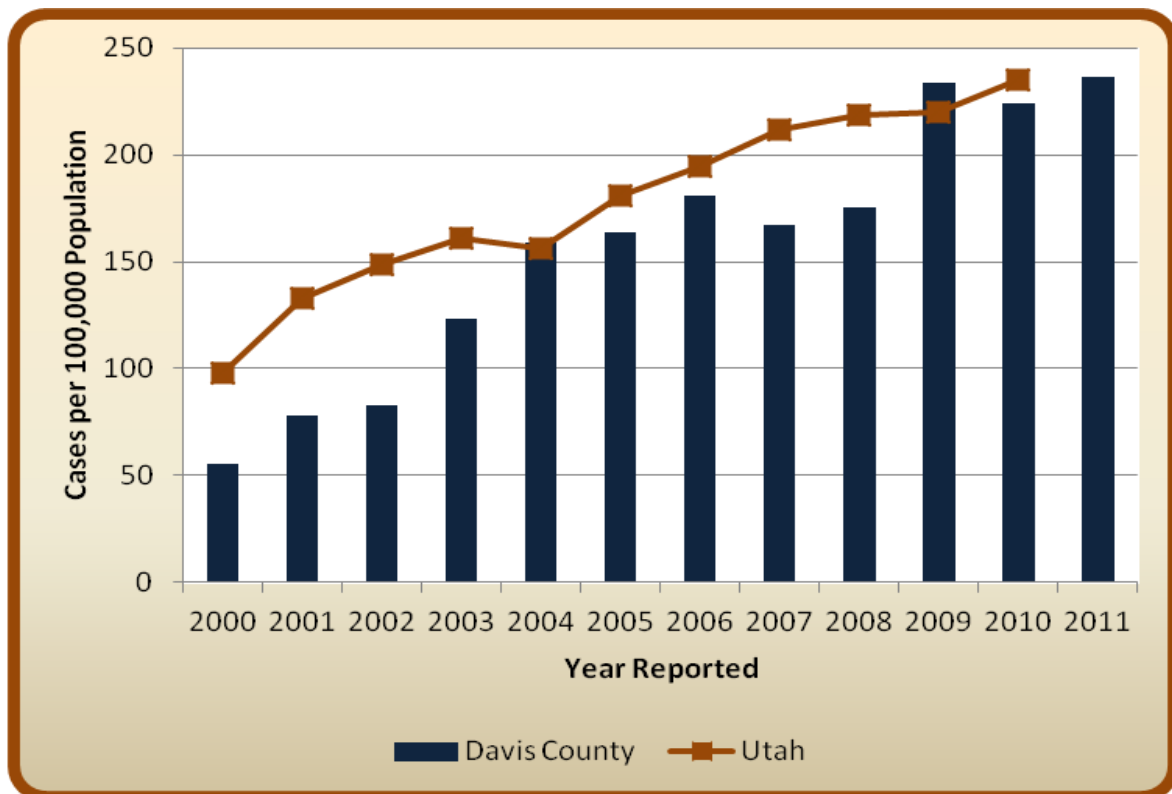
Chlamydia

Chlamydia is a sexually transmitted bacterial 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 2011, there were **739** cases of chlamydia reported in Davis County, an increase from the 702 cases reported in 2010.

Incidence of Chlamydia, Davis County & Utah, 2000-2011



2011 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

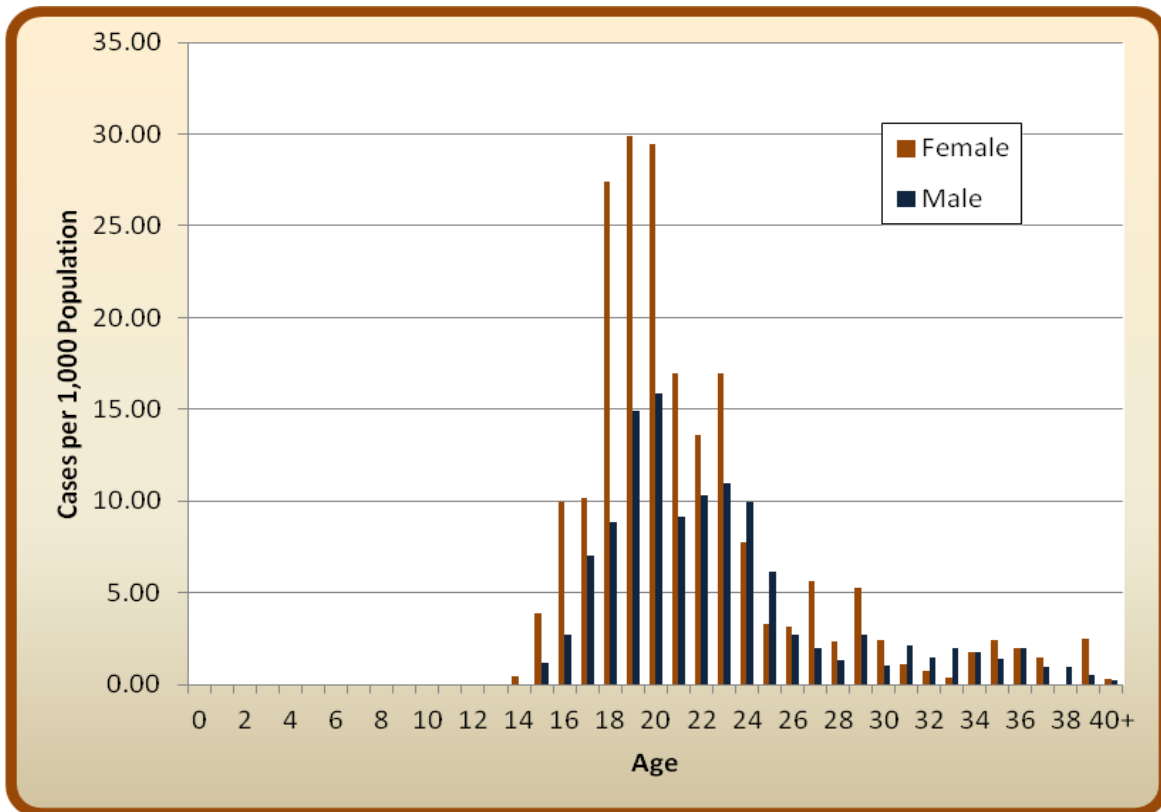
anonymous partners, and anal sex. A more recent trend was noted this past year which was increased participation in group sex. Several disease clusters were linked to groups of teens sharing sexual partners.

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.

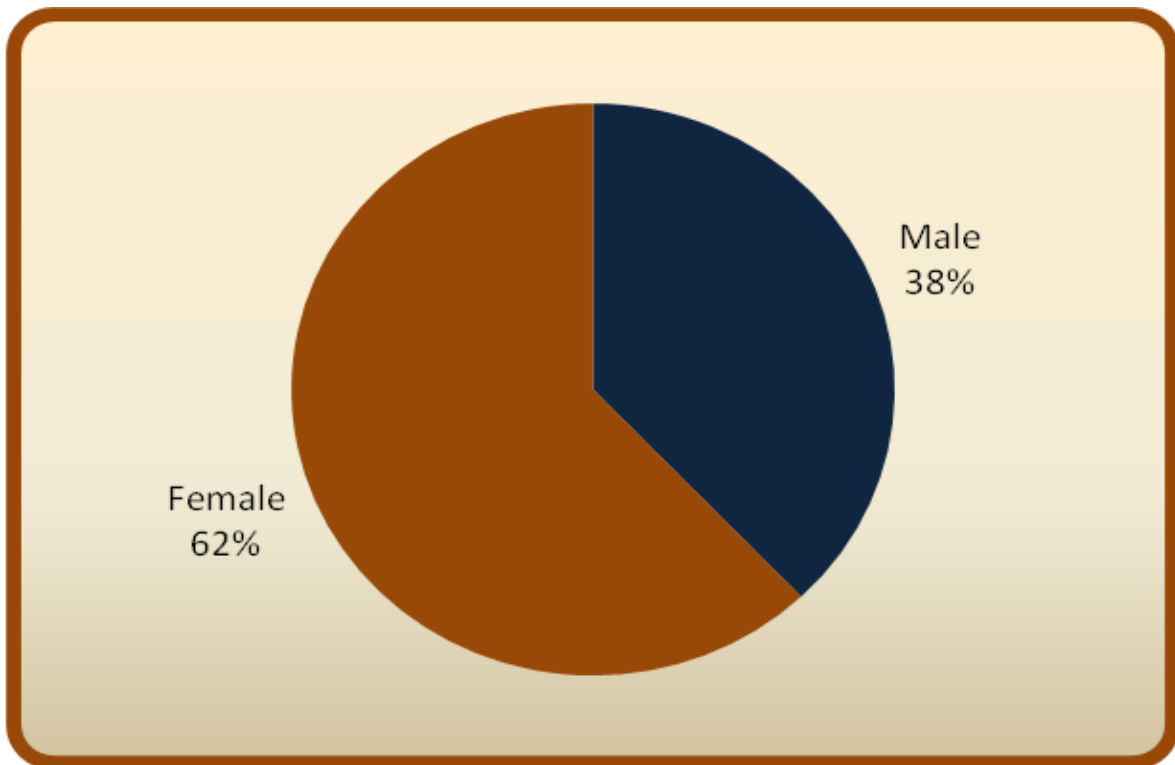
Because the majority of infected individuals have no symptoms of an STD, it is important for public health to encourage the medical community to routinely test their sexually active patients, especially those under the age of 25. Efforts were made this past year to keep medical providers up-to-date with 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.

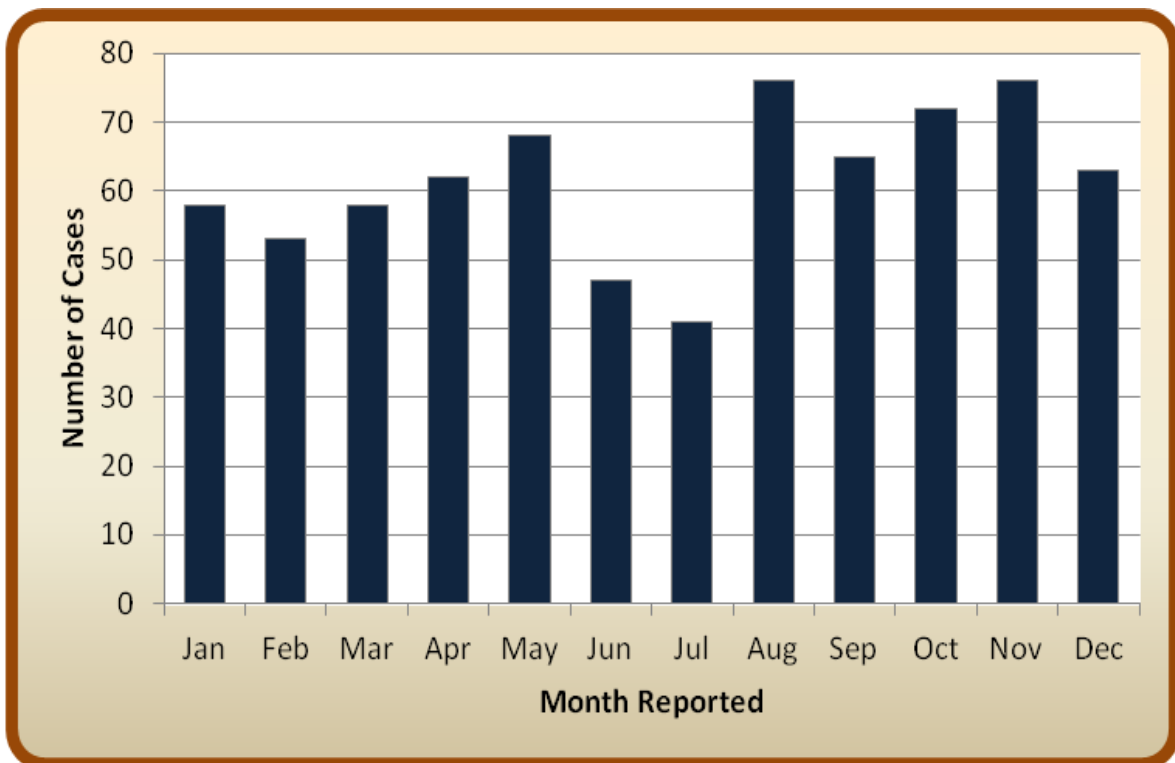
Incidence of Chlamydia by Age and Gender, Davis County, 2011



Chlamydia by Gender, Davis County, 2011



Chlamydia by Month Reported, Davis County, 2011

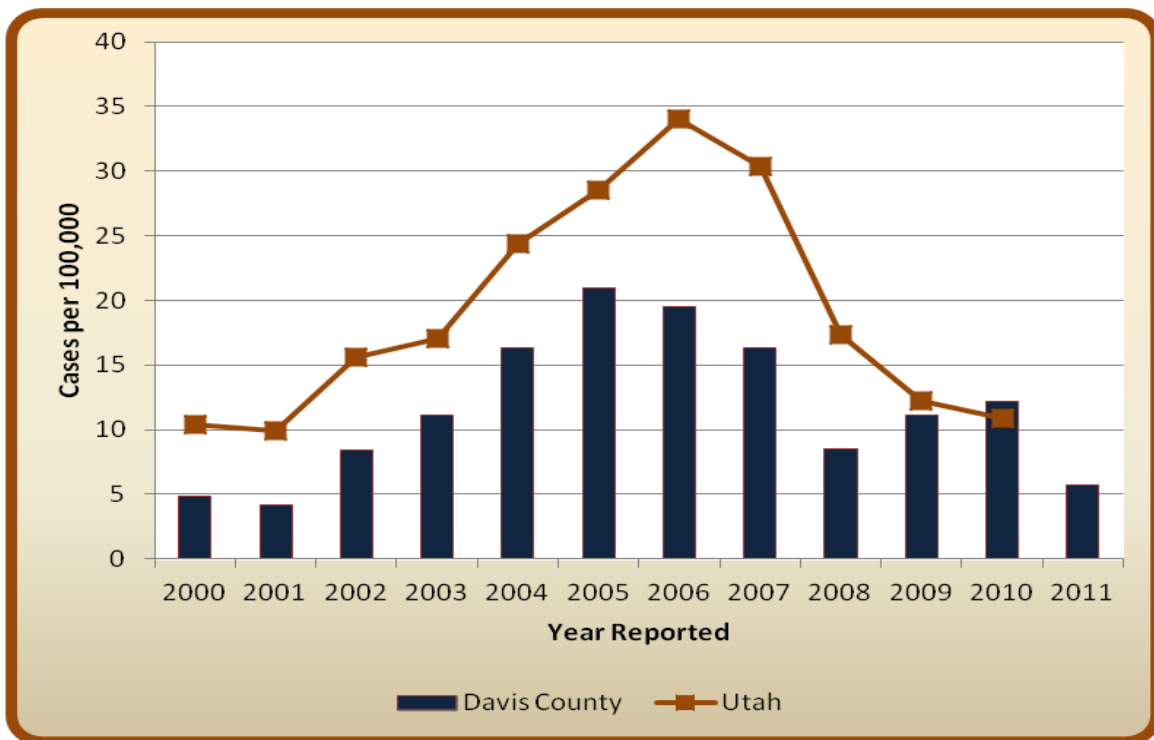


Gonorrhea

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 2011, there were **18** cases of gonorrhea reported in Davis County, a significant decrease from the 38 cases reported during 2010.

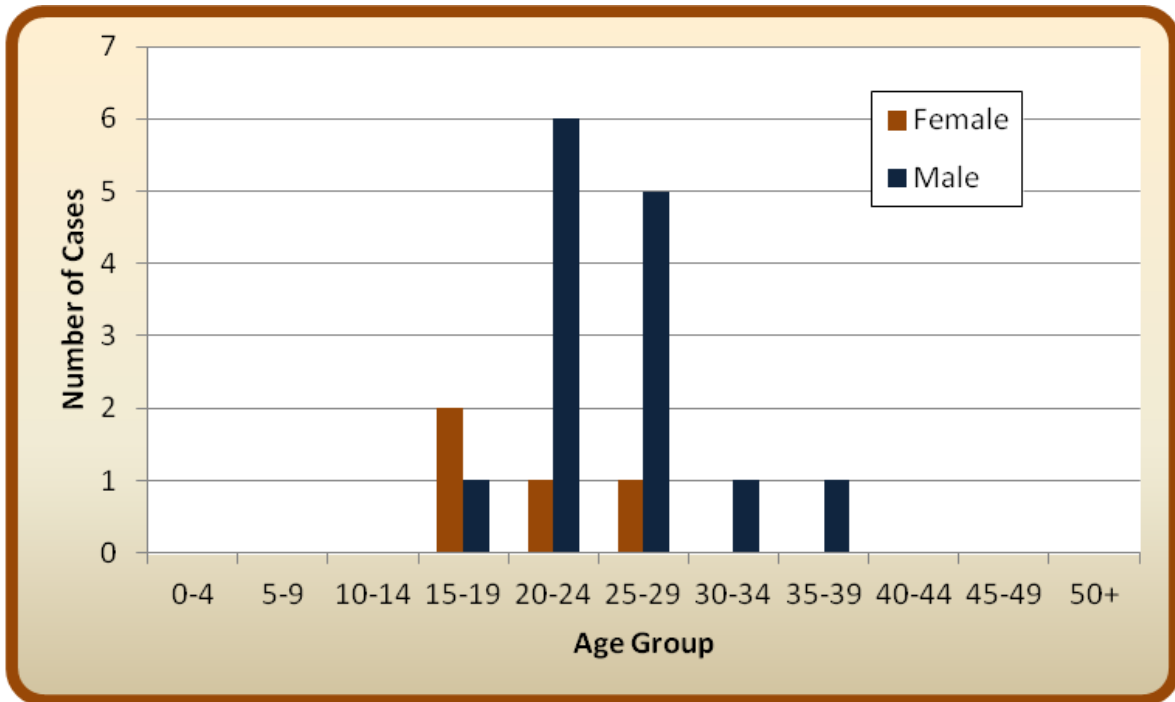
Gonorrhea Rates by Year, Davis County & Utah, 2000-2011



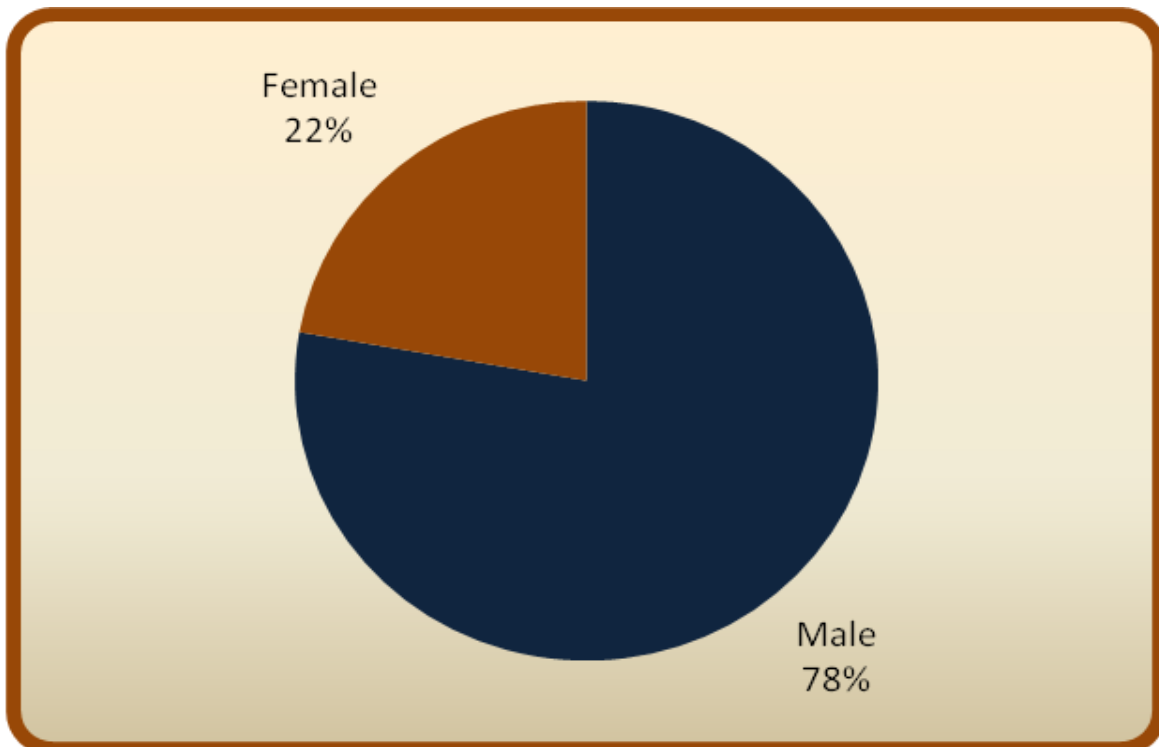
2011 Disease Highlights:

In 2011, Davis County noted a significant decrease 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. New 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 intercourse, some STDs will be missed by using the urine test alone. Educating the medical community on the importance of including rectal and oral swabs (if their clients are engaging in oral or anal intercourse) began in 2011 and will continue into 2012.

Gonorrhea by Age and Gender, Davis County, 2011



Gonorrhea by Gender, Davis County, 2011



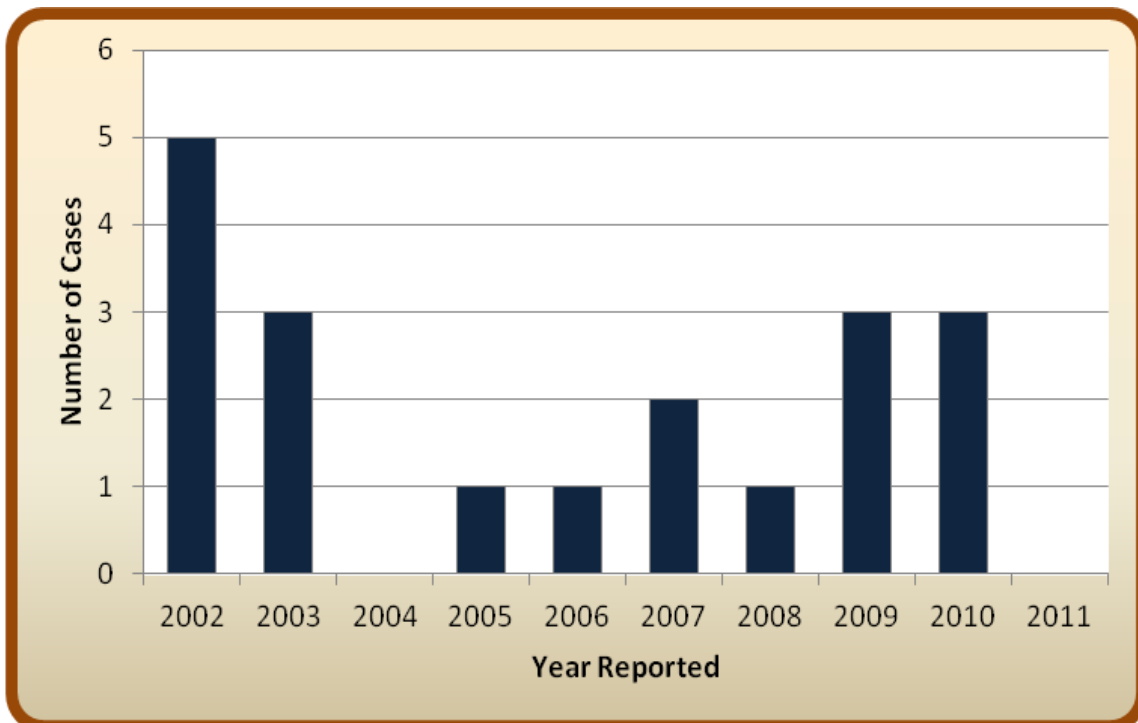
Tuberculosis

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 11,182 TB cases in the United States in 2010 (3.6/100,000) – a 3.1% decline compared to 2009. Utah had 34 (1.2/100,000) cases reported in 2011. Since the 1992 TB resurgence peak in the United States, the number of TB cases reported annually has decreased by 58%.

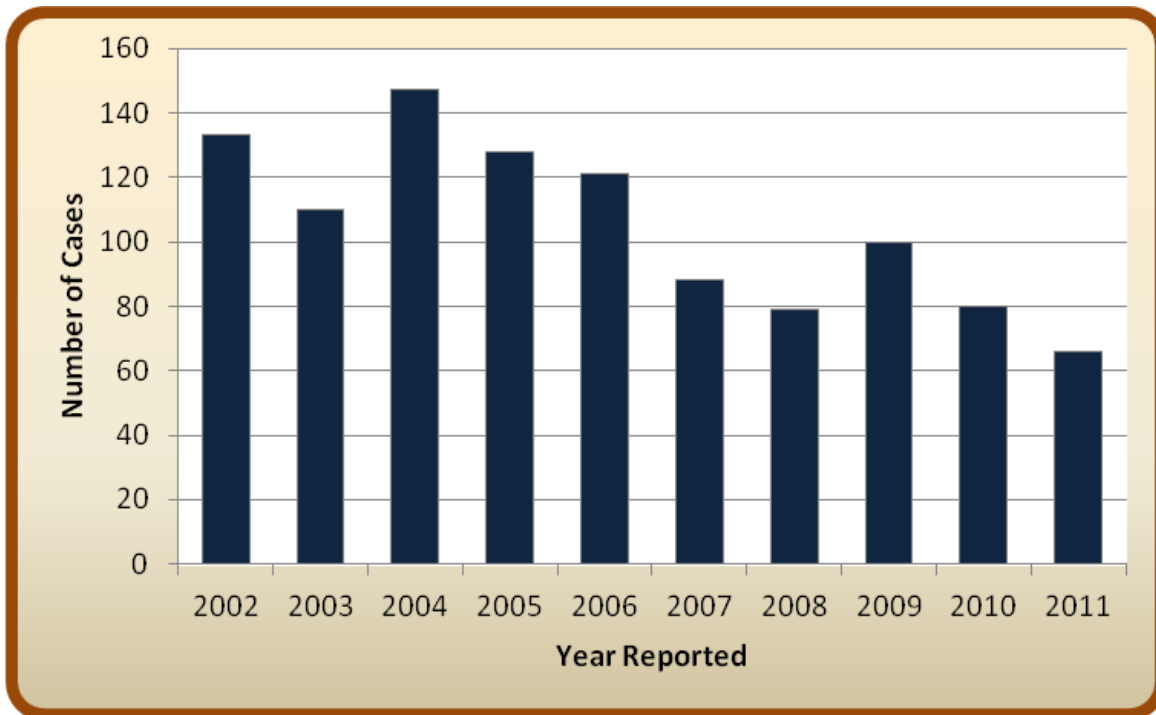
By the early 1980s, TB was considered to be under control and many states and cities redirected TB prevention and control funds to other programs. As a result of this, the country experienced a resurgence of TB, with a 20% increase in cases reported between 1985 and 1992. Many of these were persons with 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 **no new active tuberculosis disease cases** in 2011 and **66 LTBI cases**.

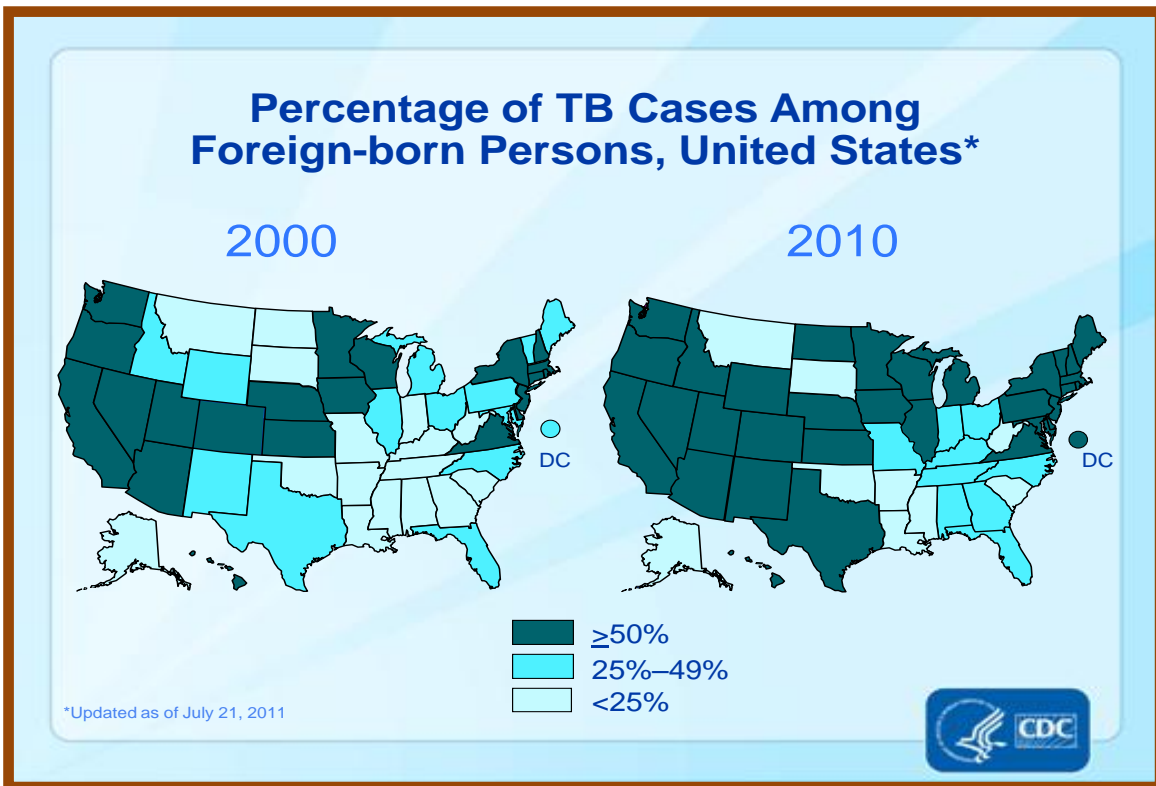
Active Tuberculosis Cases by Year, Davis County, 2002-2011



Latent Tuberculosis Cases by Year, Davis County, 2002-2011



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

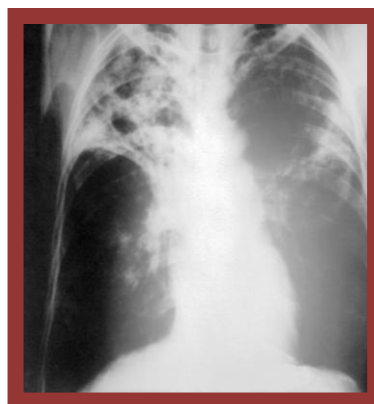
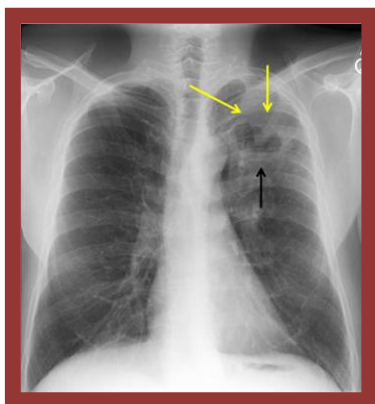
Tuberculosis (TB) is caused by a type of bacteria called *Mycobacterium tuberculosis*. The bacteria usually attack the lungs (pulmonary) but may attack any part of the body (extrapulmonary). TB is typically spread through the air when a person with TB disease of the lungs or throat expels tiny airborne 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 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 2011, Davis County had **no new cases** of active tuberculosis compared the three cases in 2010.

2011 Disease Highlights:

On average, Davis County investigates two cases of active tuberculosis a year. In 2011, there were no new active TB cases reported. However, case management of a resident infected with extrapulmonary tuberculosis identified in 2010 carried over into 2011 and involved nine months of therapy due to the type of tuberculosis identified (joint TB). Pulmonary TB typically requires six months of treatment. Management of active tuberculosis cases requires close collaboration between several agencies including the local health department, 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 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 **919** tuberculin skin tests to the public in 2011. However, these numbers only account for a small percentage of all TB tests performed in the community.

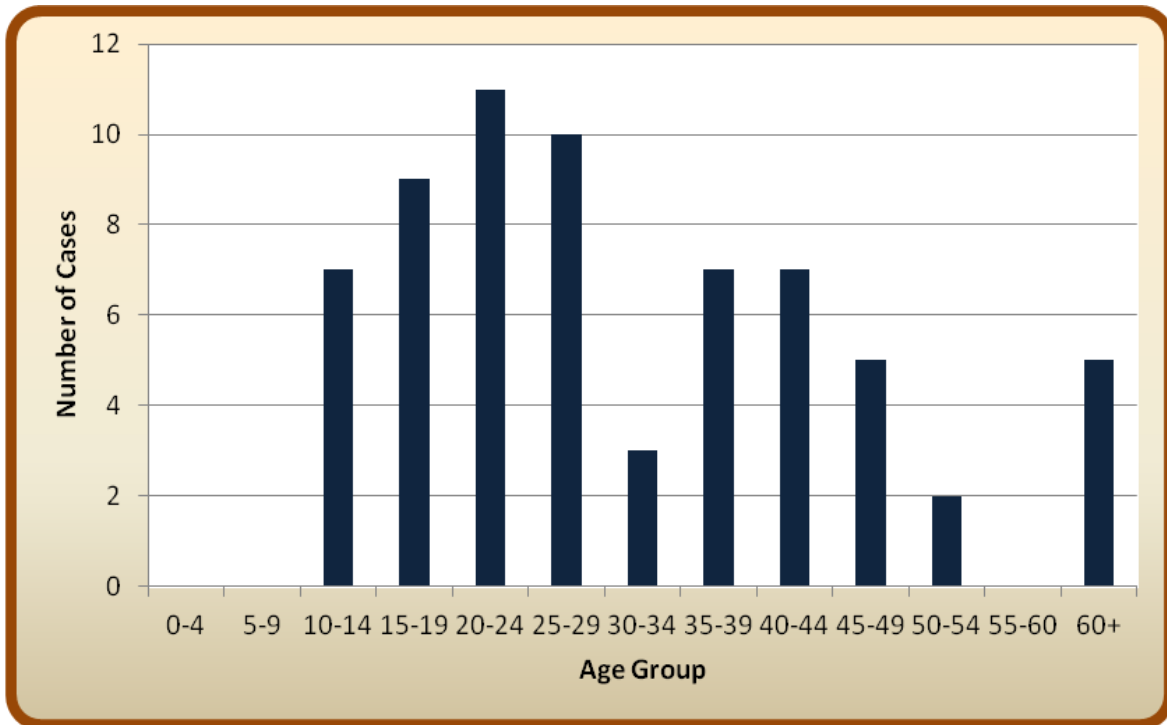
2011 Disease Highlights:

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 2011, Davis County managed **66** 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. 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. On average, the county manages **33** patients a month with LTBI.

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 referred to the health department for evaluation and treatment. LTBI is not a reportable condition, but free services are available for the community.

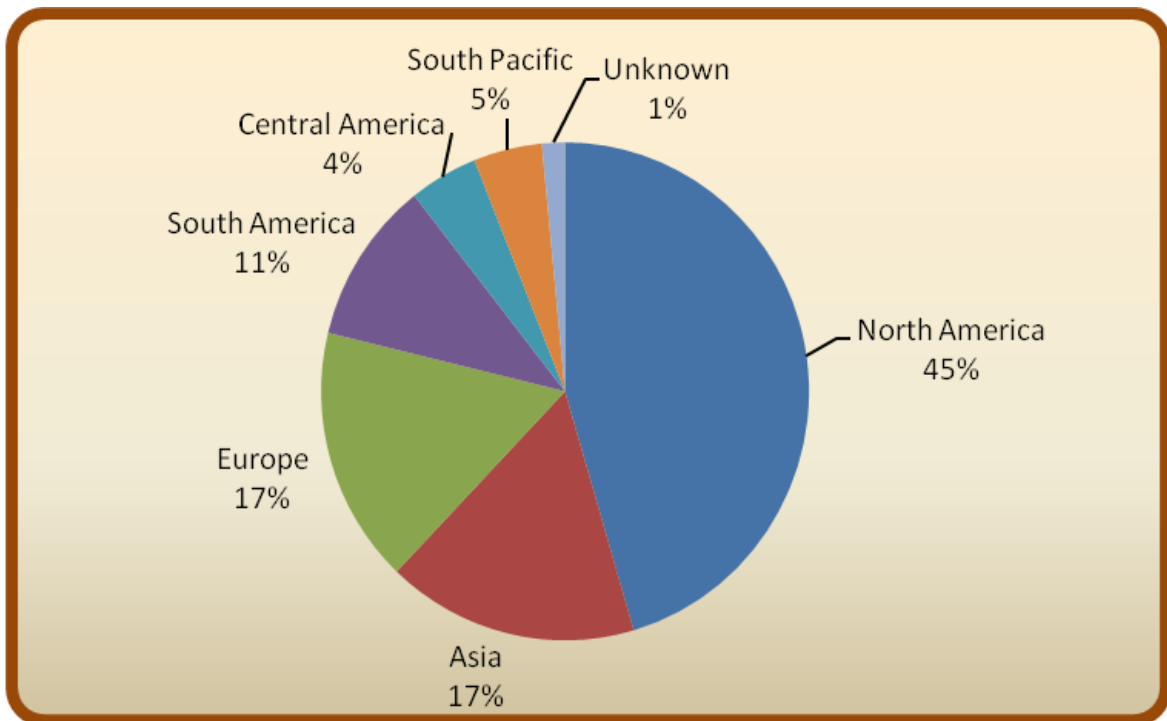


LTBI by Age Group, Davis County, 2011



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, 2011



Program Highlights

During 2011, several program activities were implemented to address disease trends and enhance community education.

STD/HIV Program Highlights:

- Davis County Health Department (DCHD) was awarded a grant in 2011 supporting correctional facility STD testing and education. DCHD partnered with the Davis County jail to provide chlamydia, gonorrhea, syphilis and HIV testing, as well as client centered risk-reduction education to inmates. Grant activities began in April 2011 and continued through the end of the year. Over the year, 27 classes were taught, including two Spanish-speaking classes. Of the 176 inmates tested, 33% were ethnic minorities. The testing identified 19 inmates who were infected with chlamydia (an infectivity rate of 11%) - most of whom were asymptomatic. These inmates were treated for their infection and given risk-reduction education. They were also interviewed to identify sexual partners who were exposed. As an incentive, participating inmates receive a release packet upon discharge from the jail. The packet includes STD educational literature, free condoms, testing locations, and a donated Deseret Industries voucher for \$20.00. Data is collected on all participants. Risk behaviors identified among participants included: injecting drug use, unprotected sex while intoxicated or high, the exchange of sex for drugs or money, group sex, and sexual activity with an anonymous partner. This grant was extended through 2012.
- To help address the STD disease burden among adolescents, DCHD partnered with Davis School District to provide STD/HIV education to secondary schools. 102 presentations were conducted this year – reaching 3,549 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).

To ensure continuity of STD/HIV materials presented to students, DCHD conducted a “Train-the-Trainer” course for Davis School District health education teachers. Packets containing STD/HIV disease information, the power point presentation, a presentation script and other resources were provided to the 33 teachers who were trained.

Davis County is also home to two Job Corps Centers (Clearfield and Weber Basin). Students are screened for STDs upon admission to the facilities. One of the orientation classes offered to students includes an STD/HIV presentation, which is provided by the health department. In 2011, a total of 54 presentations

were conducted, reaching 1,352 students, 52 % of whom are members of ethnic minority groups.

- Access to STD testing has been noted as a barrier to getting tested 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). There is no physical exam. Individuals are provided educational materials on STD/ HIV and offered testing. If test results are positive, Midtown treats the patient with medication provided by the health department and reports the case for further investigation. 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 a 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.

During 2011, approximately 500 clients received testing through the free screening clinic. Davis County identified 44 positive chlamydia cases, two gonorrhea cases, and three HIV infections, an STD infectivity rate of almost 10%.

- 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 is 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-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 developed 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. This new process began in 2011 and was an instrumental tool in the completion of therapy for an active tuberculosis case diagnosed in 2010. 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 was launched in the fall of 2011.

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.

- To provide an additional venue for the public to communicate with the health department, a new email function was created. Individuals can email the health department and receive communication back through the new “Ask-A-Nurse” email address. 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.

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
- Syphilis (primary and secondary)
- 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 infection
- 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-diarreal)
- Hepatitis B (cases and carriers)
- Hepatitis C (acute and chronic infection)
- Hepatitis (other viral)
- Human immunodeficiency Virus (HIV) infection
- Influenza-associated hospitalization
- Influenza-associated death in a person less than 18 years of age
- Legionellosis
- Listeriosis
- Lyme disease
- Malaria
- Meningitis
- Mumps
- Norovirus (formerly called Norwalk-like virus) infection
- Pelvic inflammatory disease (PID)
- Pertussis
- Poliovirus infection (nonparalytic)
- Psittacosis
- Q Fever
- Relapsing fever (tick-borne or louse-borne)
- Rocky Mountain spotted fever
- Rubella (congenital syndrome)
- Salmonellosis
- Shiga toxin producing *Escherichia coli* (STEC) infection
- Shigellosis
- Streptococcal disease (invasive, isolated from a normally sterile site)
- Syphilis (early latent, latent, and congenital)
- Tetanus
- Toxic-Shock Syndrome (staphylococcal or streptococcal)
- Trichinosis
- Vibriosis



Davis County Health Department - October 2010

Appendix B - Davis County Demographics

Davis County Demographics – 2011*

Population: 312,918

Age Group	
Less than 1 year	6,220
1 – 14 years	77,016
15 – 24 years	45,568
25 – 44 years	94,357
45 – 64 years	63,774
65 – 84 years	23,578
More than 85 years	2,405

Gender	
Male	157,855
Female	155,063

Race*	
White	282,242
Black	4,526
American Indian or Alaskan Native	1,939
Asian	5,420
Native Hawaiian or Pacific Islander	1,236
2 or More Races	5,464

*Race/ethnicity data is only available for 2009 – 300,827

Ethnicity*	
Hispanic or Latino (of any race)	23,553

*Race/ethnicity data is only available for 2009 – 306,683

Population by City*	
Unincorporated County	1,370
Bountiful	42,573
Centerville	15,703
Clearfield	28,901
Clinton	24,806
Farmington	15,799
Fruit Heights	4,906
Hill Air Force Base	4,500
Kaysville	25,205
Layton	68,283
North Salt Lake	14,370
South Weber	8,189
Sunset	4,938
Syracuse	25,817
West Bountiful	5,476
West Point	12,203
Woods Cross	9,879

*City population data is estimated using totals from the Utah Department of Health (IBIS) and distributions from the Utah Governor’s Office of Planning and Budget 2010 Population Projections: www.governor.utah.gov/dea/demographics. The Hill Air Force Base estimate was provided by Hill Air Force Base.

*Source: Governor’s Office of Planning and Budget. Retrieved January 2012 from Utah Department of Health, Center for Health Data, Indicator-Based Information System for Public Health. Website: <http://ibis.health.utah.gov/>. 2010 population estimates are the most recent available. The U.S Bureau of the Census has released 2010 census data, however, 2011 population estimates are not available. 2010 population estimates were used to calculate 2011 incidence rates so that the rates would be consistent with previous years. The rates will be updated when the 2011 population estimates are available. However, we do not expect that the rates will change significantly.