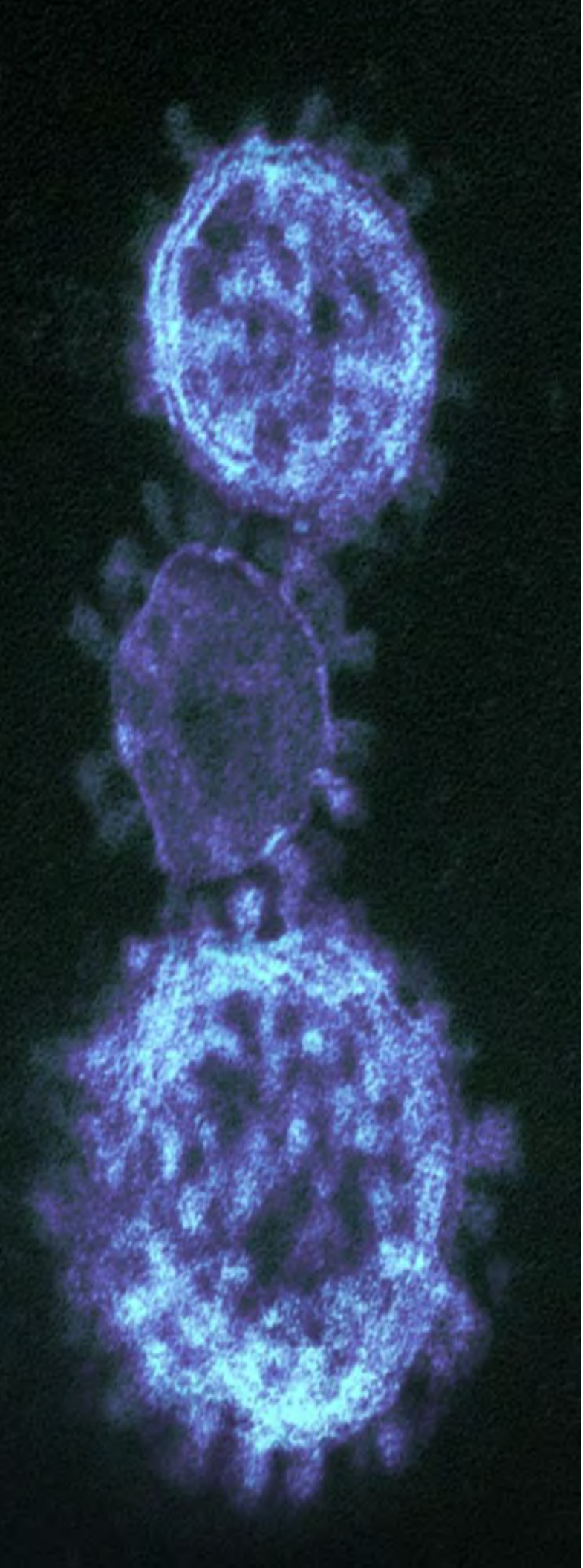

2023 Annual Report

Division of Communicable Disease & Epidemiology

Davis COUNTY HEALTH DEPARTMENT

Mission

Promote and protect the health and well-being of the Davis County community.

Vision

Healthy Choices. Healthy People.

Healthy Communities.

Values

Collaboration and Partnership.

Communication. Health Equity.

Public Health Excellence. Quality Service.

Knowledgeable, Professional, and Friendly Employees.

Prepared by the Division of Communicable Disease & Epidemiology

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2023 Highlights

This report summarizes all communicable diseases reported in Davis County, Utah, during 2023. It provides an overview of the burden and trends of infectious disease in the county and highlights important events. The Division of Communicable Disease and Epidemiology (CD/Epi) within the Davis County Health Department (DCHD) responded to several notable events during 2023. These are summarized below.

Continued Outbreak of *Pseudomonas aeruginosa*

In August 2022, DCHD was notified of a case of carbapenem-resistant *Pseudomonas aeruginosa* (CRPA) bacteria in an individual who resided at a health care facility. This was unusual because it was a rare carbapenemase-producing strain (Verona integron-mediated mettalo-β-lactamse [VIM]) that had never been reported in the US. It was ultimately part of a larger outbreak of 81 cases of VIM-CRPA across 18 states. Specific brands of artificial tear products have been identified as a common exposure in many VIM-CRPA cases.[1]

CD/Epi collaborated with the Utah Department of Health and Human Services (DHHS) and the Centers for Disease Control Prevention (CDC) to help contain the outbreak and stop the spread of VIM-CRPA at the facility. This included screening patients to find additional cases (i.e. point prevalence surveys), reviewing infection control procedures, evaluating water infection risks, and submitting product samples for testing.

The outbreak continued into 2023 as additional cases were found in Davis County. Additional point prevalence surveys were conducted before declaring the outbreak over in July 2023. CD/Epi assisted with a total of six point prevalence surveys: two in 2022 and four in 2023. Despite the end of the outbreak, the facility continues to screen new patients upon admission for any drug-resistant organism, per their policy. Additionally, when patients are discharged to other facilities, the receiving facility is notified to keep patients in contact precautions to prohibit further transmission within the facility.

Cryptosporidiosis Outbreak

There was an outbreak of cryptosporidiosis in Utah that began during summer 2023. For context, during the last five years (2018-2022), there was an annual average of 174 cryptosporidiosis cases in Utah. In 2023 alone, there were 673 cases across the state.[2]

In Davis County, the outbreak began mid-August and peaked during early September. Cases returned to baseline by mid-October. However, there were still more cryptosporidiosis cases than usual during the final three months of the year, even after the outbreak ended.

Of the 117 cryptosporidiosis cases in 2023 in Davis County, 99 (84.6%) occurred during the outbreak period. CD/Epi nurses and Disease Intervention Specialists (DIS) interviewed all cases to identify potential exposures, find additional unreported cases, explain treatment options, and educate on ways to prevent further disease transmission. No single point source was identified as the cause of the outbreak. However, the majority of cases were associated with recreational water facilities such as pools, splash pads, and water parks.

CD/Epi collaborated with the Davis County Health Department (DCHD) Division of Environmental Health when a case had an exposure at a permitted pool facility. The Division of Environmental Health worked closely with each of the pool operators to ensure that the pool was effectively treated before opening back up for public swimming. In total, there were 12 permitted pool facilities in Davis County that were impacted by the outbreak.

Norovirus Outbreak

CD/Epi responded to 2 norovirus outbreaks in 2023, each in a different healthcare facility. The first outbreak had a total of 54 cases and the second outbreak had 12 cases. CD/Epi provided guidance on infection control and prevention to the facility staff. In addition, CD/Epi conducted site visits at both locations in partnership with the Environmental Health Division. The facilities' kitchen, dining, and laundry areas were evaluated, along with advising on best practices for cleaning.

End of the Coronavirus disease 2019 (COVID-19) Public Health Emergency

The federal Public Health Emergency for COVID-19 ended on May 11, 2023.[3] While CD/Epi had already begun to scale back certain aspects of its COVID-19 response during 2022 and 2023, the end of the Public Health Emergency represents an acknowledgement that COVID-19 is endemic and emergency response is no longer necessary. During 2023, CD/Epi discontinued the remaining parts of its COVID-19 response, which included:

- Case investigations;
- The COVID-19 data dashboard (COVID-19 data have been rolled in to the Respiratory Illness Report);
- Daily case counts for schools (both Davis School District and charter schools); and
- Dedicated phone lines and teams for reporting and following up at schools and community hotspots.

However, this does not mean that COVID-19 will no longer be a problem. COVID-19 is expected to continue spreading year-round and increase during the respiratory illness season in the winter months. It will still result in emergency department visits, hospitalizations, and deaths. Fortunately, effective treatments and vaccines are available to help prevent and contain the spread of COVID-19, along with a better understanding of the virus's characteristics.

Despite these changes, CD/Epi continues to monitor COVID-19 trends and severity. CD/Epi also continues to help control and prevent outbreaks in long-term care facilities, such as nursing homes, skilled nursing, and assisted living facilities. This way, we can still help protect the health of vulnerable members of the community and their caregivers.

Clinical Services

CD/Epi operates a clinic on the first floor of the Clearfield building, adjacent to the immunization clinic. Here, CD/Epi nurses attend to patients for screening, testing, treatment and education services related to sexually-transmitted infections (STIs) and tuberculosis (TB). In addition, baseline testing for emergency medical services (EMS) personnel are provided.

In 2023, CD/Epi had 323 STI screening clinic appointments, 100 sexual partner contact appointments, 101 tuberculosis testing appointments, and 42 appointments for other communicable disease testing needs. In addition, 40 individuals completed all EMS bloodborne pathogen screening and training requirements.

Personal Responsibility Education Program Outreach

Between the three outreach classes that CD/Epi staff conducted, there was a total of 695 students who participated. For the Making Proud Choices! (MPC!) and Sexual Health and Adolescent Risk Prevention Courses (SHARP), approximately 22% of participants indicated an increased intent to use condoms, and approximately 21% of participants indicated an increased intent to get regularly tested for STIs.

Division Overview

Overview

The DCHD CD/Epi Division works in partnership with the medical community and neighboring health jurisdictions to control and prevent the occurrence and spread of communicable diseases in Davis County (see Appendix 1 for county demographics). This is accomplished through disease surveillance, disease investigation, coordination of prevention efforts, treatment, education, training, and policy development. The Division aims to:

- Interrupt and contain the spread of communicable diseases within the community;
- Conduct surveillance for over 80 communicable diseases and syndromes;
- Provide education to infected and exposed individuals;
- Facilitate appropriate treatment and preventive therapy;
- Enforce measures that protect the community (e.g. isolation); and
- Develop and advocate for policies to address priority health issues.

The CD/Epi Division is organized into seven main program areas: sexually-transmitted infections (STI)/human immunodeficiency virus (HIV), TB control, infectious disease, disease surveillance, health education, outbreak response, and EMS support.

Infectious Disease Program

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

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

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

- Enteric Diseases: bacterial, viral, and parasitic diseases involving the gastrointestinal tract
- Invasive Diseases: bacterial or viral infections of the blood stream, cerebral spinal fluid (e.g. meningitis, encephalitis) or other normally sterile sites (e.g. synovial, pleural, or pericardial fluid)
- Vaccine-Preventable Diseases: diseases that are preventable with vaccines

- Vector-borne/Zoonotic Diseases: diseases transmitted by insects, animals, or birds
- Other reportable diseases/conditions: diseases that do not fall under the above categories

STI/HIV Program

STIs affect men and women of all ages, backgrounds, and economic statuses. The United States (US) has made progress in identifying cases through better testing procedures, sexual partner testing and treatment, and risk-reduction education. The STI/HIV Program strives to ensure that infected individuals are interviewed by a trained communicable disease nurse or DIS to:

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

TB Control Program

The Davis County 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 TB in Davis County is largely due to the following program activities:

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

EMS Support

The Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.1030 mandates that all employees who are at risk for bloodborne pathogen exposure receive training and have annual updates. In an effort to assist the Davis County Sheriff's Office and other EMS agencies within Davis County, CD/Epi provides baseline testing services for bloodborne pathogens to EMS employees and volunteers. This baseline testing includes HIV, hepatitis B, and hepatitis C. In addition, CD/Epi administers a bloodborne pathogen prevention training for EMS personnel.

Outbreak Response

An outbreak is generally defined as an increase of disease among a specific population in a geographic area during a specific period of time. An outbreak can occur anywhere: schools, the workplace, daycares, health facilities, and more.

In particular, long-term care facilities face a higher risk of outbreaks. These facilities provide a variety of services, both medical and personal care, to people who are unable to live independently. While these facilities provide important care, there is a higher risk of outbreaks and severe disease due to the typically high proportion of older or medically vulnerable individuals living in close proximity.

Regardless of where an outbreak occurs, CD/Epi remains ready to respond. Should one arise, CD/Epi's efforts include:

- Building rapport with facility staff,
- Maintaining open communication,
- Providing up-to-date CDC guidance on infection prevention and control recommendations, including assisting with Infection Control Assessment and Response (ICAR) tools,
- Following up on identified cases,
- Recommending testing based on exposure, and
- Assisting with reporting requirements.

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;
- Monitoring trends of infectious disease activity;
- Using a variety of data sources such a notifiable disease reports, syndromic data, school absenteeism, and sentinel physician reports; and
- 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 Administrative Code (R386-702). Prompt reporting of confirmed and suspect cases helps ensure necessary control and preventive actions. All reports required by rule are confidential and are not open to public inspection. Appendix 2 provides the list of all diseases that are required to be reported in Utah.

Entities required to report confirmed or suspected diseases are physicians, hospitals, healthcare facilities, laboratories, schools, long-term care facilities, skilled nursing facilities, and daycares. All case reports should include basic demographic information to initiate an investigation, if needed.

Disease surveillance data received from hospitals, clinics, and laboratories are used to complete case investigations and minimize the spread of infectious disease. These data are maintained in EpiTrax—a secure, online database that allows epidemiologists, nurses, and DIS to access case information statewide. Figure 1 shows how data are

transferred in the National Notifiable Disease Surveillance System. In short, when someone has a laboratory test performed, it is reported to DCHD. These data are de-identified and reported to CDC, which then helps us understand disease patterns around the country.

Personal Responsibility Education Program Outreach

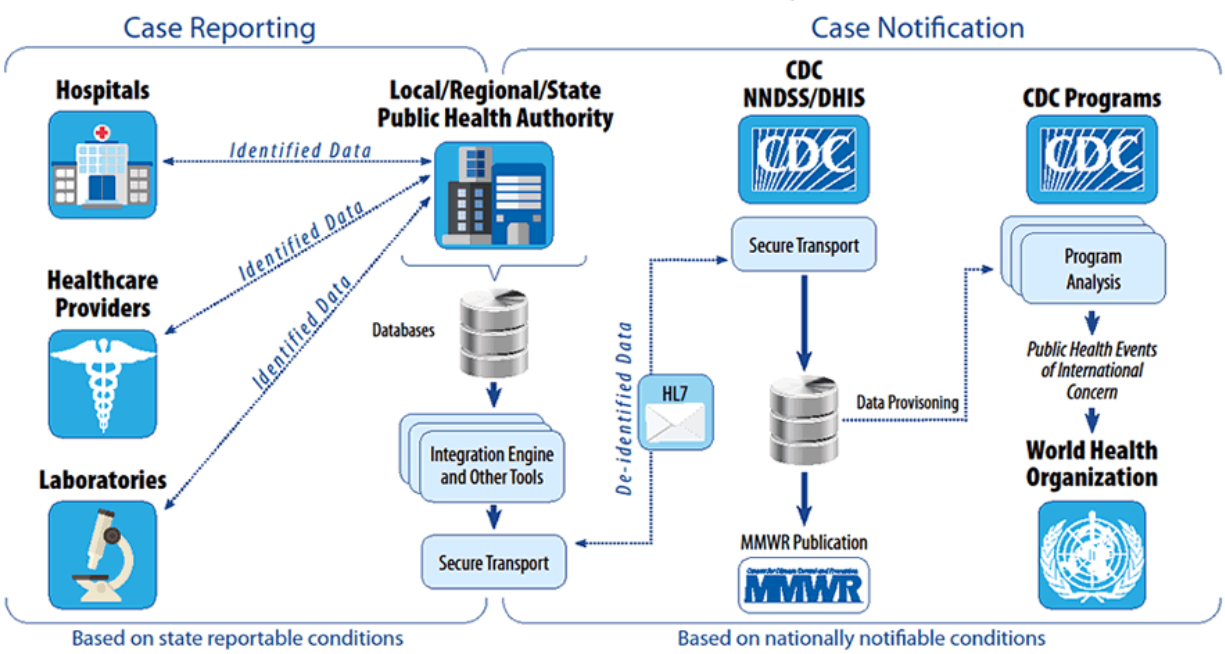
CD/Epi staff teach multiple health education classes that are designed to help adolescents and young adults make informed choices about the lives they want to live.

Since 2019, CD/Epi has partnered with the Clearfield Job Corps Center (CJCC) to teach MPC!. MPC! is a positive and safer-sex approach to teen pregnancy and HIV/STI prevention. This program is designed to empower teens to change their behavior to reduce their risk of becoming infected with STIs and decrease their likelihood of being involved in unintended pregnancies. Throughout the entire time CD/Epi has partnered with CJCC to teach MPC!, over 1,600 students have completed the curriculum.

In 2023, CJCC underwent adjustments that no longer allowed the amount of time it takes to teach MPC!. Due to this change, CD/Epi staff received training on a different curriculum called SHARP. This program is focused on preventing HIV and STIs by deepening STI/HIV knowledge, improving correct condom use, reducing sexual risks and alcohol use, and setting long-term goals to utilize knowledge and skills learned from the curriculum. The switch to teaching SHARP occurred in July 2023.

In addition, CD/Epi completed it first Teen Outreach Program (TOP) club. TOP is a 32-week curriculum that typically runs throughout the school year. It is a positive youth development program created to build educational success, life and leadership skills, healthy behaviors, and healthy relationships through curriculum and community service learning. The first TOP club was completed during the 2022-2023 school year at Mercy Housing. For the 2023-2024 school year, CD/Epi added Career Path High as an additional community partner and began running a second TOP club.

Figure 1. National Notifiable Disease Surveillance System Data Flow



Social Determinants of Health

Overview

Social determinants of health (SDOH) are the nonmedical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.[4] These conditions can play an important role in the incidence and transmission of disease. When looking at population health, communities with higher income and education are healthier, as is the case in Davis County. When compared to Utah and the US, Davis County is above state and national averages for health outcomes and other factors such as health behaviors, clinical care, and social and economic factors.[5] However, this does not mean that these factors are distributed evenly across the county. To see how SDOH impact infectious disease, we must look at smaller areas like neighborhoods. To help with this, the DHHS partnered with the Public Health Alliance of Southern California to create the Utah Healthy Places Index (HPI).[6] The complete Utah HPI may be accessed at https://dhhs.utah.gov/utahhpi/.

Utah Healthy Places Index

In short, the Utah HPI tool evaluates the relationship between 22 identified key drivers of health and life expectancy at birth — which can vary dramatically by neighborhood. Based on that analysis, it produces a score ranking from 1 to 99 that shows the relative impact of conditions in a selected area compared to all other such places in the state. The Utah HPI scores and compares geographies across the state with the ability to view data neighborhood-by-neighborhood in order to provide a granular view of community well-being.[7] The 22 indicators can be organized into eight thematic groups: education, transportation, housing, social, clean environment, neighborhood, healthcare access, and economics.[6] In this report, we evaluated the HPI score ranking for each census tract in Davis County.

Methodology

Each census tract in Davis County was grouped into quartiles based on their HPI score and given a rank based on the community health conditions: least, less, moderately, and most healthy. Figure 2 presents a map of Davis County census tracts with the respective HPI ranking. City boundaries are included as a visual aid. Census tract rankings were only compared within Davis County and not the rest of the state. As such, a given census tract's overall ranking may differ than what is found on the official Utah HPI website. Census tracts were included if they had a population of 1,500 or greater and a group quarters population less than 50% of the total population. Given that, some census tracts were excluded from analysis. Table 1 shows the total population of each HPI rank area along with its percent of the total county population.[8]

All Davis County disease reports from 2023 were geocoded using the patient's address at diagnosis. Records were geocoded using tools from the Utah Geospatial Resource Center. Records were then assign to their respective census tract and corresponding HPI rank. There was a total of **2,470** disease reports in 2023. Of these, **2,399** records had sufficient address information to successfully geocode (**97.1%**).

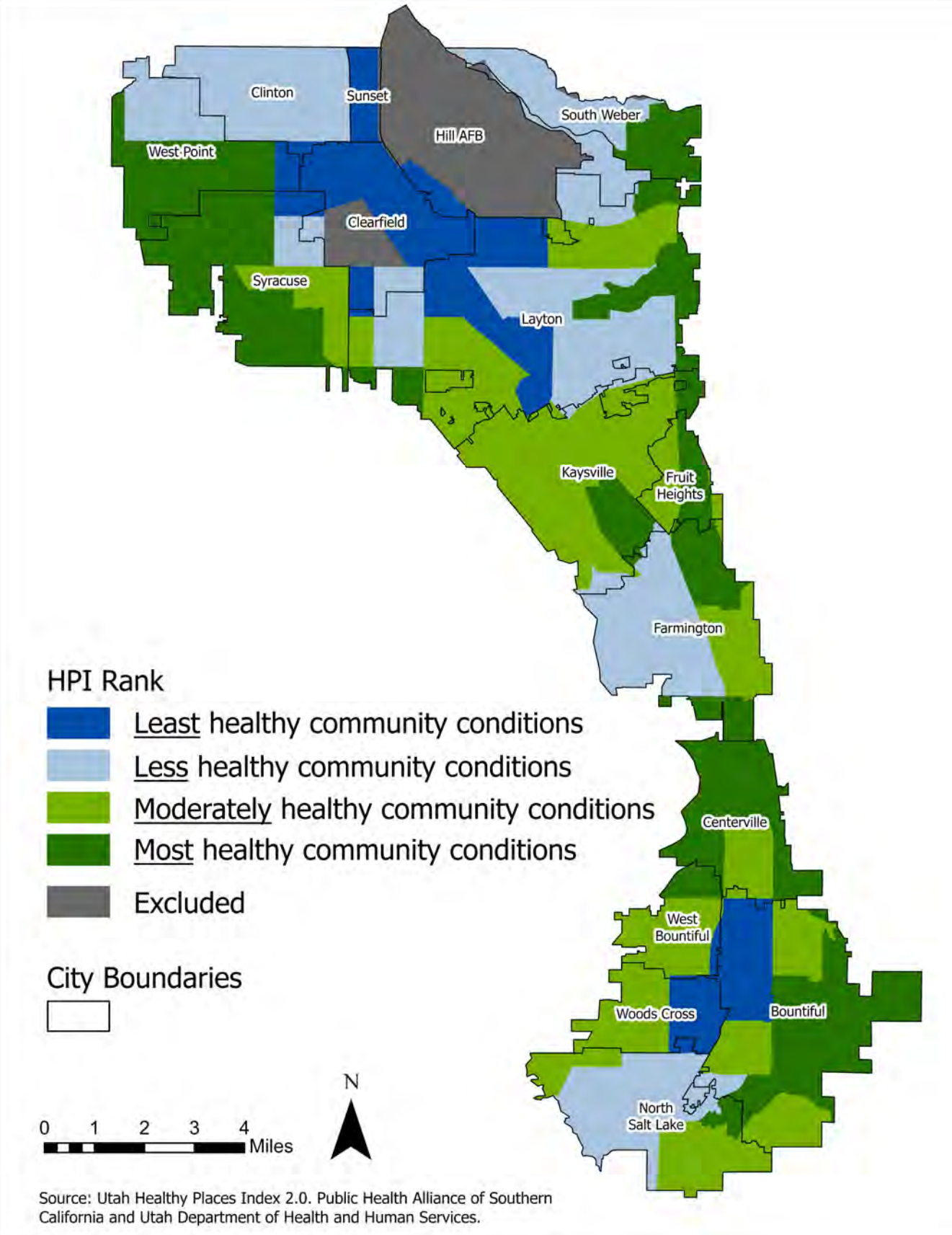
Analysis

This 2023 annual report presents analyses using the HPI. Throughout this report, incidence rates of major disease categories will be stratified by the four HPI rank areas. Further uses of the HPI will be evaluated for future analyses as well.

Table 1. Population of HPI Rank Areas, Davis County, 2024

HPI Rank	Population	Percent of County Population
Least healthy	77,020	21.3%
Less healthy	98,893	27.3%
Moderately healthy	103,629	28.6%
Most healthy	82,348	22.8%

Figure 2. Utah Healthy Places Index Ranking of Census Tracts, Davis County, 2024



Reportable Disease Summary

This section presents an overview of this year's communicable disease reporting in Davis County. In 2023, there was a total of **2,470** reported illnesses. Due to the end of the COVID-19 public health emergency, COVID-19 case counts are no longer being reported. Information on COVID-19 emergency department visits and hospitalizations is found on page 29.

Figure 3 displays the percentage of disease reports that fall into one of eight major categories. STIs constituted the largest proportion at 47.8% of all disease reports. This is a pattern that has been observed for many years.

Figure 4 shows the rate of disease reports by age and sex. The high rates observed in the 15 -24 age group are primarily driven by STIs. This is another pattern that has been observed for many years. A disparity is seen between males and females. While the exact reason is not known, one plausible explanation is that more STIs may be found among women due to regular female health checkups and prenatal exams. Given this, it is likely that disease reporting (particularly STIs) among males ages 15-24 is underreported.

The high rates observed in males age 85+ is primarily driven by respiratory illness hospitalizations and a relatively low population count.

Figure 3. Percent of All Diseases Reported, by Category, Davis County, 2023

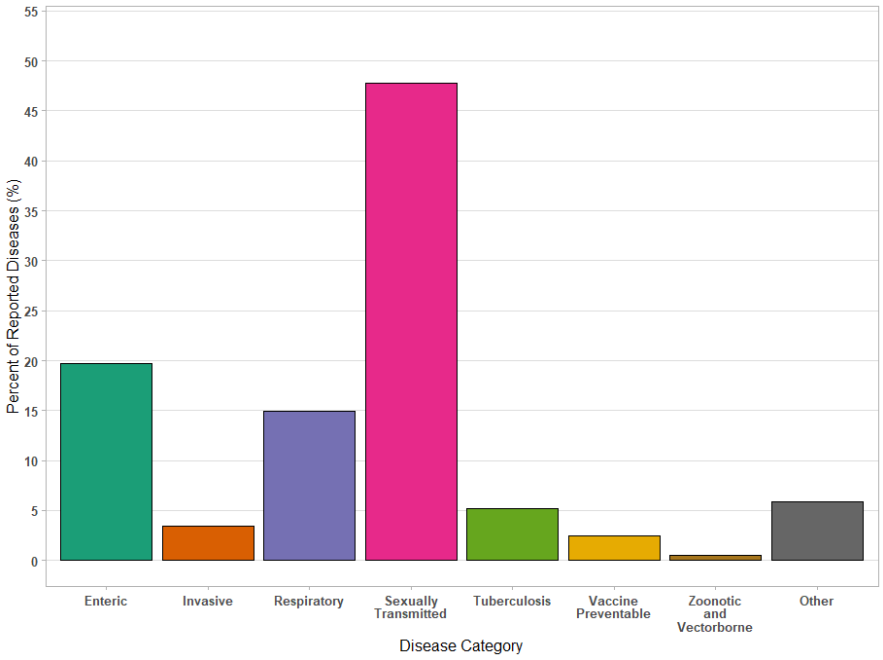


Figure 4. Rate of Disease Reports by Age Group and Sex, Davis County, 2023

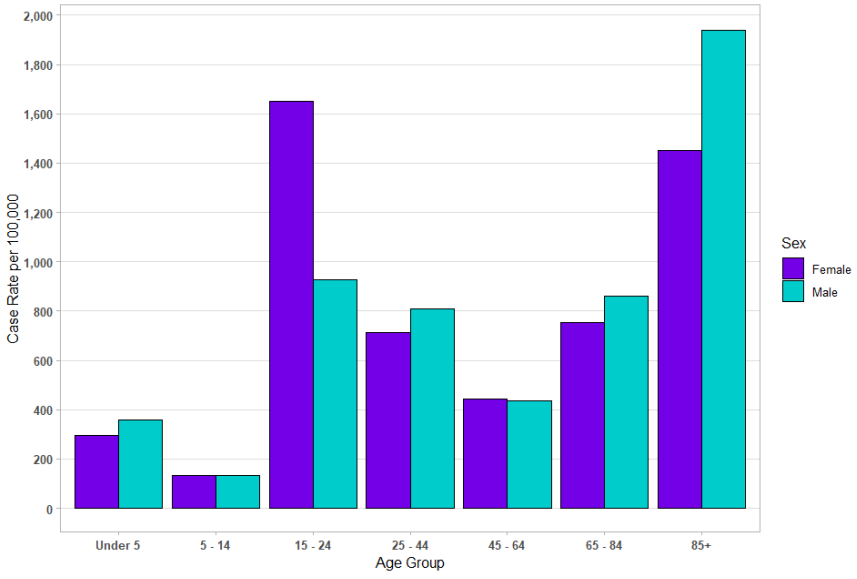


Figure 5. Rate of Disease Reports, by City, Davis County, 2023

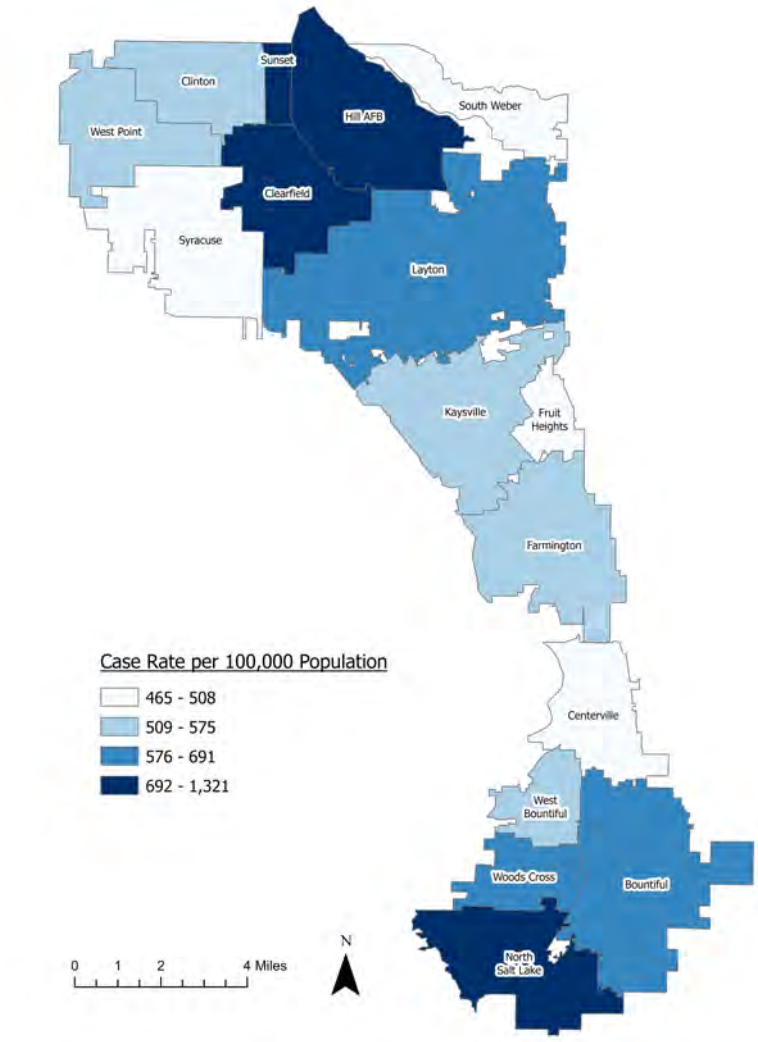


Figure 6. Rate of Disease Reports, by HPI Rank, Davis County, 2023

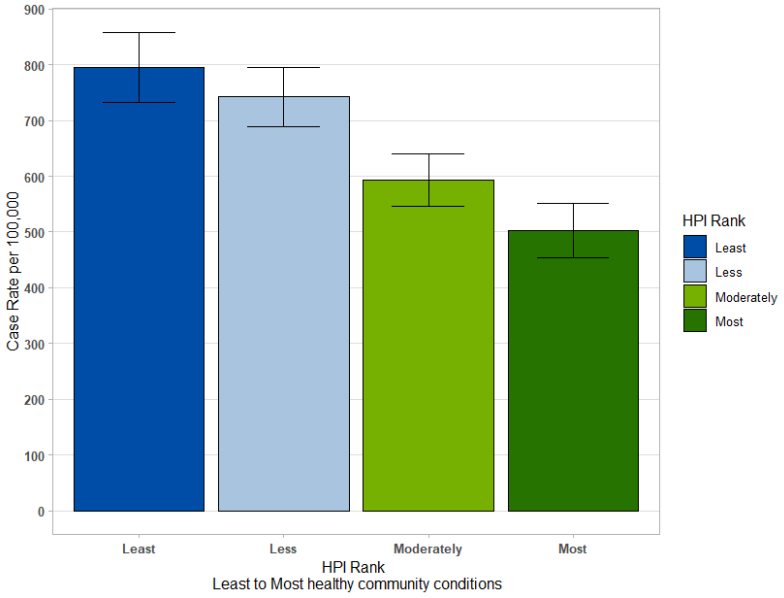


Figure 5 presents rates of disease reporting for each of the 15 cities in Davis County and Hill Air Force Base (Hill AFB). Disease rates by city are identified by the affected individual's address of residence at the time of diagnosis. TB data are not included because most infections are acquired outside of Davis County.

Clearfield, Hill AFB, North Salt Lake, and Sunset had the highest rates of reportable diseases, while Centerville, Fruit Heights, South Weber, and Syracuse had the lowest rates.

These rates do not suggest that one city is better or worse than another, but simply describe the disease burden in each city. As described in the previous section ("Social Determinants of Health," page 7), many factors can influence the transmission and identification of disease.

Figure 6 shows the rate of reportable diseases by HPI rank. When the data are viewed this way, a pattern emerges: as healthy community conditions improve, disease rates decrease. In the least healthy area, the rate was 794.6 cases per 100,000 people. This is 28.5% higher compared to the rest of the county.

Conversely, the most healthy area had a rate of 502.8 cases per 100,000 people, which is 28.3% lower compared to the rest of the county. While this may seem intuitive, the Utah HPI helps to paint a clearer picture of infectious disease burden in Davis County.

Summary Tables

On the following pages, Table 2 shows case counts and incidence rates per 100,000 people of reportable disease in Davis County from 2018 to 2023.

Reportable Disease Summary

Table 2. Disease Report Summary, Counts and Rates per 100,000 People, by Year, Davis County, 2018 - 2023

Disease	2018 Count	2018 Rate	2019 Count	2019 Rate	2020 Count	2020 Rate	2021 Count	2021 Rate	2022 Count	2022 Rate	2023 Count	2023 Rate
African Tick Bite Fever	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3
Botulism, infant	0	0.0	0	0.0	1	0.3	1	0.3	0	0.0	0	0.0
Botulism, wound	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0	0	0.0
Brucellosis	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0
COVID-19-associated hospitalization	0	0.0	0	0.0	539	148.6	1,042	283.7	428	115.7	278	75.1
Campylobacteriosis	46	13.1	50	14.1	46	12.7	48	13.1	52	14.1	69	18.7
Carbapenem-Resistant Organisms (CRO)	12	3.4	86	24.2	73	20.1	104	28.3	67	18.1	43	11.6
Chickenpox (Varicella)	24	6.8	13	3.7	9	2.5	9	2.5	17	4.6	12	3.2
Chikungunya	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Chlamydia	1,158	329.2	1,160	326.3	954	263.0	940	255.9	986	266.5	973	263.0
Coccidioidomycosis	3	0.9	15	4.2	6	1.7	10	2.7	8	2.2	10	2.7
Colorado Tick Fever	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0	1	0.3
Creutzfeldt-Jakob Disease (CJD)	1	0.3	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0
Cryptosporidiosis	9	2.6	15	4.2	14	3.9	20	5.4	21	5.7	117	31.6
Cyclosporiasis	2	0.6	2	0.6	1	0.3	1	0.3	1	0.3	4	1.1
Dengue Fever	1	0.3	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0
E-cigarette or vaping use-associated lung injury (EVALI)	0	0.0	13	3.7	0	0.0	0	0.0	0	0.0	0	0.0
Encephalitis	1	0.3	1	0.3	3	0.8	0	0.0	0	0.0	0	0.0
Giardiasis	22	6.3	20	5.6	15	4.1	20	5.4	16	4.3	13	3.5
Gonorrhea	223	63.4	229	64.4	238	65.6	260	70.8	237	64.1	158	42.7
H. influenzae, invasive disease	4	1.1	7	2.0	4	1.1	3	0.8	4	1.1	6	1.6
Hansen's Disease (Leprosy)	0	0.0	0	0.0	0	0.0	1	0.3	1	0.3	1	0.3
Hepatitis A	6	1.7	1	0.3	0	0.0	1	0.3	1	0.3	0	0.0
Hepatitis B, acute and chronic	23	6.5	22	6.2	19	5.2	11	3.0	15	4.1	22	5.9
Hepatitis C, acute and chronic	118	33.6	97	27.3	101	27.8	127	34.6	120	32.4	88	23.8
Hepatitis C, perinatal	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0	0	0.0
Highly Pathogenic Avian Influenza	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0

Table 2. Disease Report Summary, Counts and Rates per 100,000 People, by Year, Davis County, 2018 - 2023 (continued)

Disease	2018 Count	2018 Rate	2019 Count	2019 Rate	2020 Count	2020 Rate	2021 Count	2021 Rate	2022 Count	2022 Rate	2023 Count	2023 Rate
Human immunodeficiency virus (HIV)	12	3.4	11	3.1	8	2.2	12	3.3	13	3.5	9	2.4
Influenza-associated hospitalization	178	50.6	171	48.1	115	31.7	3	0.8	188	50.8	92	24.9
Legionellosis	3	0.9	3	0.8	3	0.8	1	0.3	7	1.9	5	1.4
Leptospirosis	1	0.3	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0
Listeriosis	0	0.0	0	0.0	1	0.3	0	0.0	0	0.0	2	0.5
Lyme disease	1	0.3	7	2.0	3	0.8	0	0.0	3	0.8	7	1.9
Malaria	2	0.6	0	0.0	0	0.0	1	0.3	1	0.3	1	0.3
Meningitis, bacterial and other	4	1.1	6	1.7	1	0.3	3	0.8	5	1.4	1	0.3
Meningitis, viral (aseptic meningitis)	30	8.5	19	5.3	1	0.3	5	1.4	7	1.9	5	1.4
Mpox (Monkeypox)	0	0.0	0	0.0	0	0.0	0	0.0	17	4.6	0	0.0
Mumps	3	0.9	3	0.8	0	0.0	0	0.0	0	0.0	1	0.3
Norovirus	35	10.0	157	44.2	7	1.9	36	9.8	73	19.7	181	48.9
Pertussis	37	10.5	22	6.2	16	4.4	7	1.9	9	2.4	26	7.0
Q fever, acute and chronic	1	0.3	1	0.3	0	0.0	0	0.0	1	0.3	1	0.3
Salmonellosis	40	11.4	36	10.1	38	10.5	31	8.4	41	11.1	44	11.9
Shiga toxin-producing E. coli (STEC)	18	5.1	12	3.4	17	4.7	33	9.0	17	4.6	40	10.8
Shigellosis	4	1.1	7	2.0	3	0.8	6	1.6	2	0.5	14	3.8
Spotted Fever Rickettsiosis	3	0.9	1	0.3	1	0.3	0	0.0	1	0.3	0	0.0
Streptococcal disease, invasive	92	26.2	84	23.6	86	23.7	107	29.1	77	20.8	70	18.9
Syphilis (all stages)	36	10.2	42	11.8	24	6.6	36	9.8	44	11.9	40	10.8
Toxic-shock syndrome, Streptococcal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5
Tuberculosis, active	0	0.0	3	0.8	6	1.7	1	0.3	4	1.1	1	0.3
Tuberculosis, latent	163	46.3	91	25.6	51	14.1	74	20.1	104	28.1	127	34.3
Tularemia	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0
Vibriosis	1	0.3	2	0.6	0	0.0	2	0.5	0	0.0	3	0.8
West Nile Virus disease	0	0.0	5	1.4	2	0.6	9	2.5	1	0.3	2	0.5
Zika virus	1	0.3	1	0.3	1	0.3	0	0.0	0	0.0	0	0.0

Enteric Diseases

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

Figure 7. Percent of Enteric Diseases Reported, by Category, Davis County, 2023

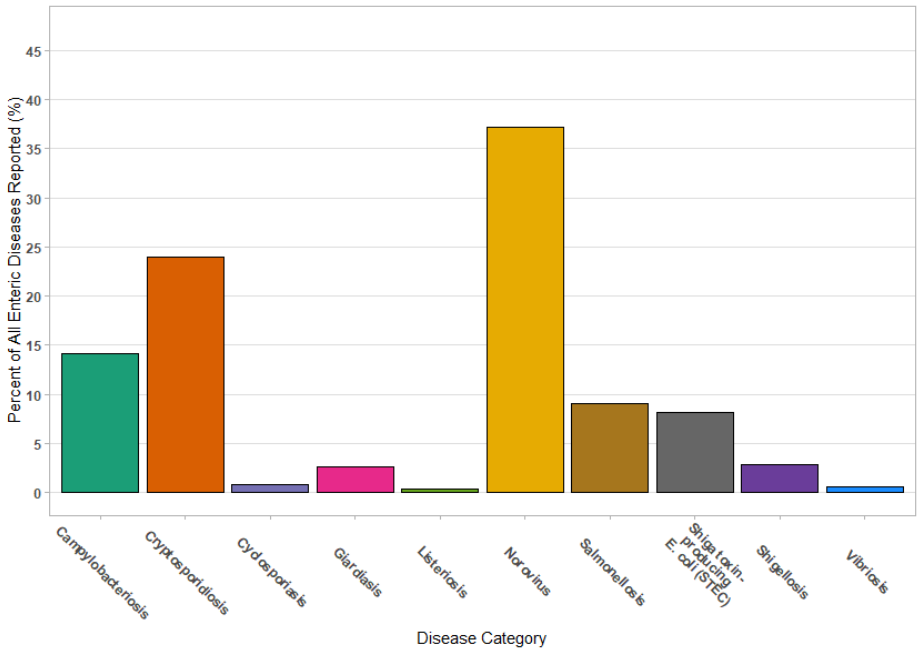
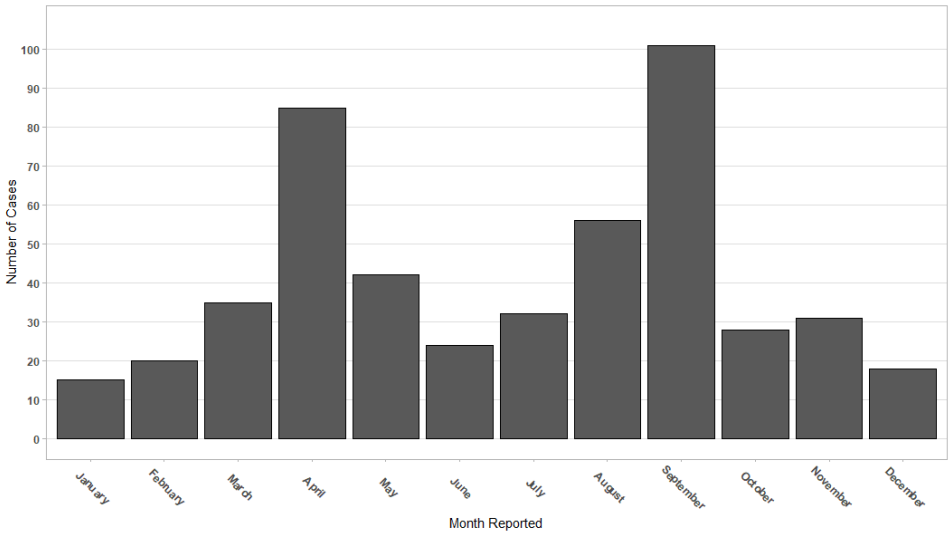


Figure 8. Number of Enteric Diseases Reported, by Month, Davis County, 2023

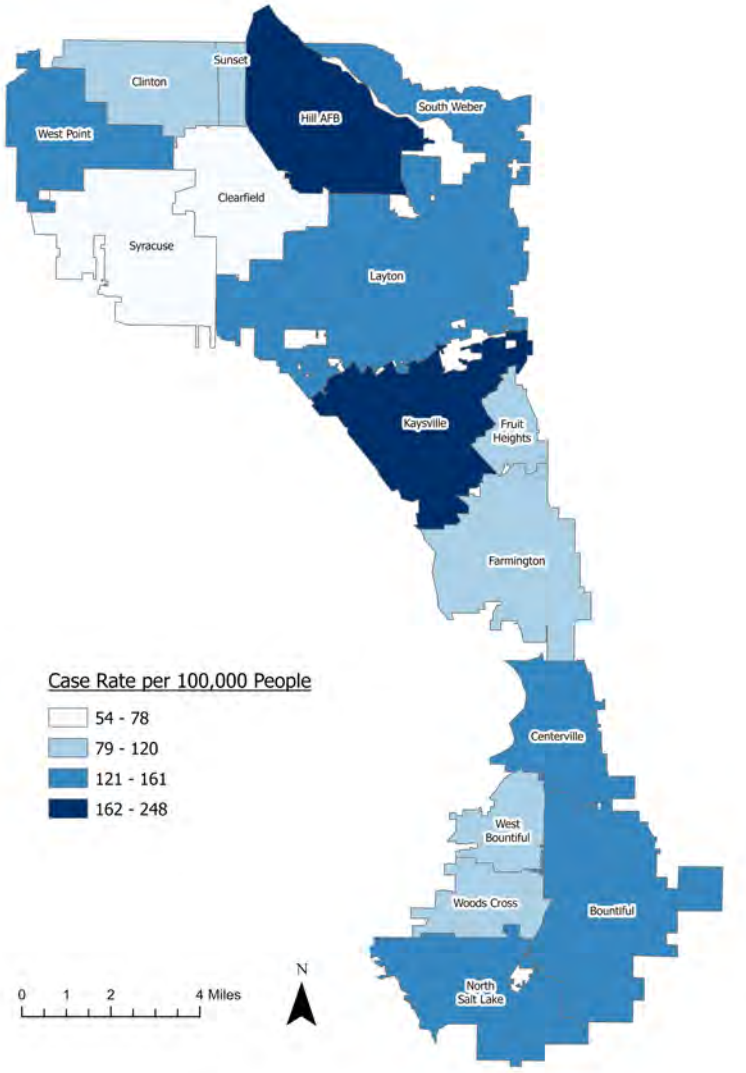


Enteric diseases are caused by bacterial, viral, or parasitic organisms that are shed in feces and can be spread person-to-person or through contaminated food and water. Enteric diseases are generally characterized by gastrointestinal symptoms such as nausea, vomiting, and diarrhea.

There were **487** enteric disease cases reported during 2023. Figure 7 presents the percentage of all enteric disease reports attributed to each specific disease. Norovirus was the most frequently reported enteric disease with **181** cases (37.2%), followed by cryptosporidiosis with **117** cases (24.0%), campylobacteriosis with **69** cases (14.2%), salmonellosis with **44** cases (9.0%), Shiga-toxin-producing *E. coli* (STEC) with **40** cases (8.2%), shigellosis with **14** cases (2.9%), giardiasis with **13** cases (2.7%), cyclosporiasis with **four** cases (0.8%), vibriosis with **three** cases (0.6%), and listeriosis with **two** cases (0.4%).

Enteric diseases are reported year-round, but higher rates usually occur in the summer months. However, this year Davis County saw an earlier-than-usual increase in enteric diseases that began in March. Figure 8 presents the number of enteric diseases reported by month.

Figure 9. Rate of Enteric Diseases by City, Davis County, 2023



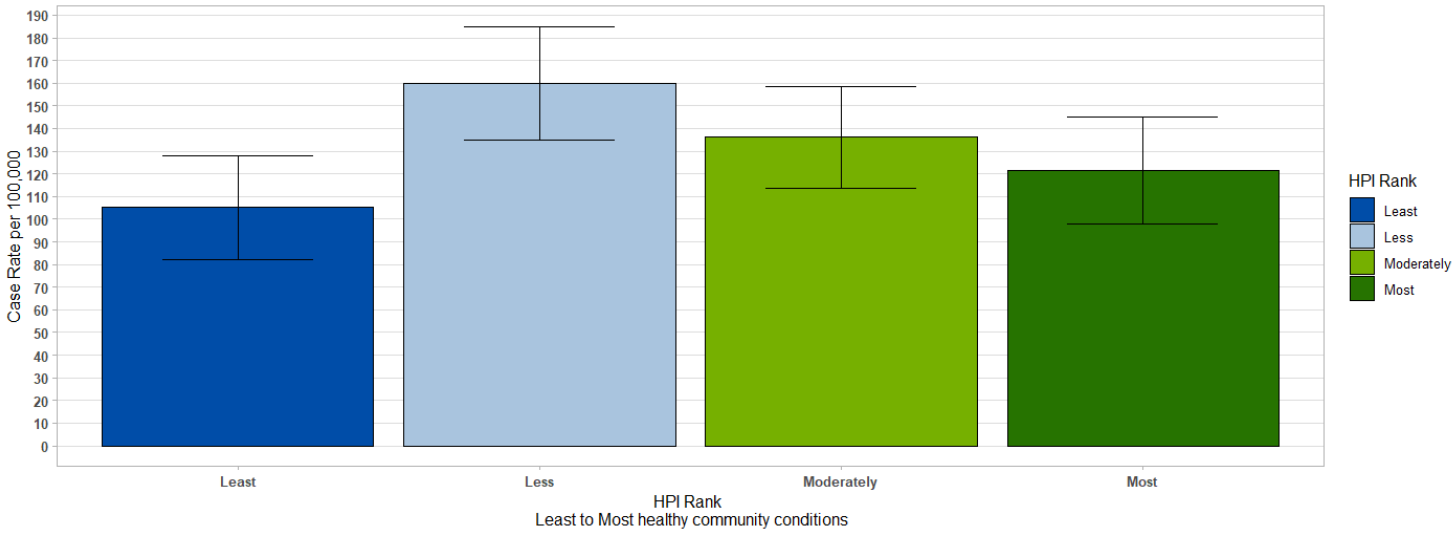
In 2023, enteric diseases were reported within every locality in Davis County. Figure 9 presents the incidence rate of enteric diseases reported by city per 100,000 people.

Hill AFB and Kaysville had the highest rates of enteric disease, while Clearfield and Syracuse had the lowest rates.

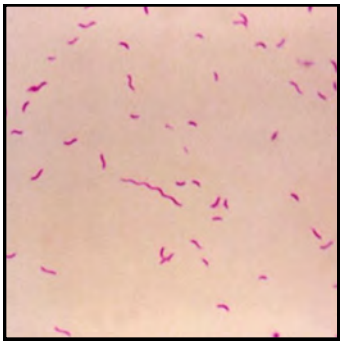
Figure 10 displays the rates of enteric disease stratified by HPI rank area. These data do not show a relationship between enteric disease rates and healthy community conditions. In fact, the lowest rates were observed in the least healthy community conditions area at 105.2 cases per 100,000 people. This is 24.8% lower compared to the rest of the county.

The exact reasons for this pattern is unknown, but there is likely a confluence of multiple interrelated factors. Possible explanations could include access to healthcare, healthcare seeking behavior, dietary choices, and travel (in particular, international travel). Also, the location of enteric disease outbreaks may result in certain HPI areas being overrepresented.

Figure 10. Rate of Enteric Diseases, by HPI Rank, Davis County, 2023



Campylobacteriosis



Campylobacter *is one of the most common bacterial causes of diarrheal illness in the US.*

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 most common sources of infection. *Campylobacter* is one of the most common bacterial causes of diarrheal illness in the US.[9]

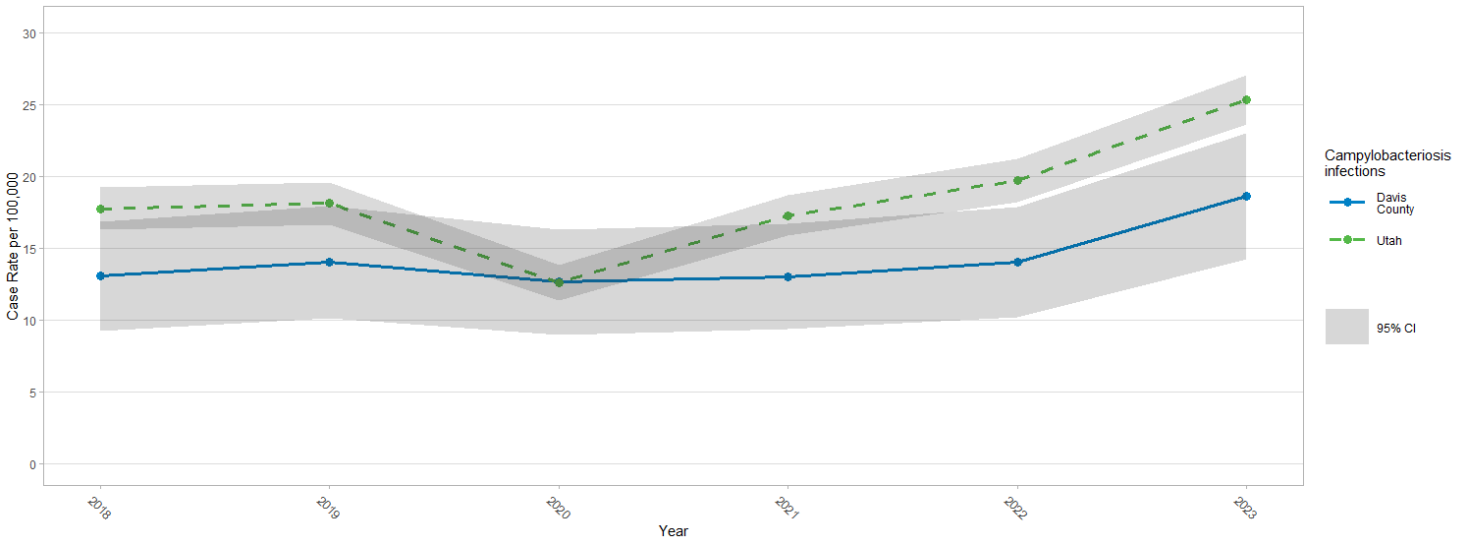
Virtually all cases occur as isolated or sporadic events and are not usually associated with an outbreak. Active surveillance through CDC indicates that about 20 cases are diagnosed each year per 100,000 people. Many more cases go undiagnosed or unreported. Campylobacteriosis is estimated to affect over 1.5 million people every year.[9]

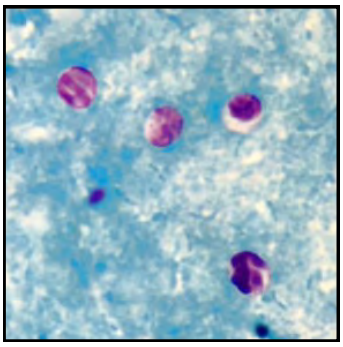
People with Campylobacter infection usually have diarrhea (often bloody), fever, and stomach cramps. Nausea and vomiting may accompany the diarrhea. Symptoms usually start two to five days after infection and last about one week. Some people experience complications, such as irritable bowel syndrome, temporary paralysis, and arthritis. In people with weakened immune systems, such as those with a blood disorder, with AIDS, or receiving chemotherapy, Campylobacter occasionally spreads to the bloodstream and causes a life-threatening infection.[9]

Occasionally, secondary infections occur from campylobacteriosis. One of these is Guillain-Barré Syndrome (GBS).[9] GBS occurs when an immune response is triggered by an infection. People with GBS often require intensive medical attention due to muscle weakness and sometimes paralysis that often lasts for weeks. While most people with GBS recover completely, some experience permanent nerve damage. CDC estimates that about one in every 1,000 people with *Campylobacter* infections in the US gets GBS.[10]

During 2023, there were **69** cases of campylobacteriosis reported in Davis County. Figure 11 presents the incidence rates per 100,000 people of campylobacteriosis in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, Davis County's rate has generally remained lower than the rest of the state, but still followed the same trend.

Figure 11. Rate of Campylobacteriosis Infections, by Year, Davis County and Utah, 2018-2023





Cryptosporidium spp. oocysts stained with modified acid-fast.

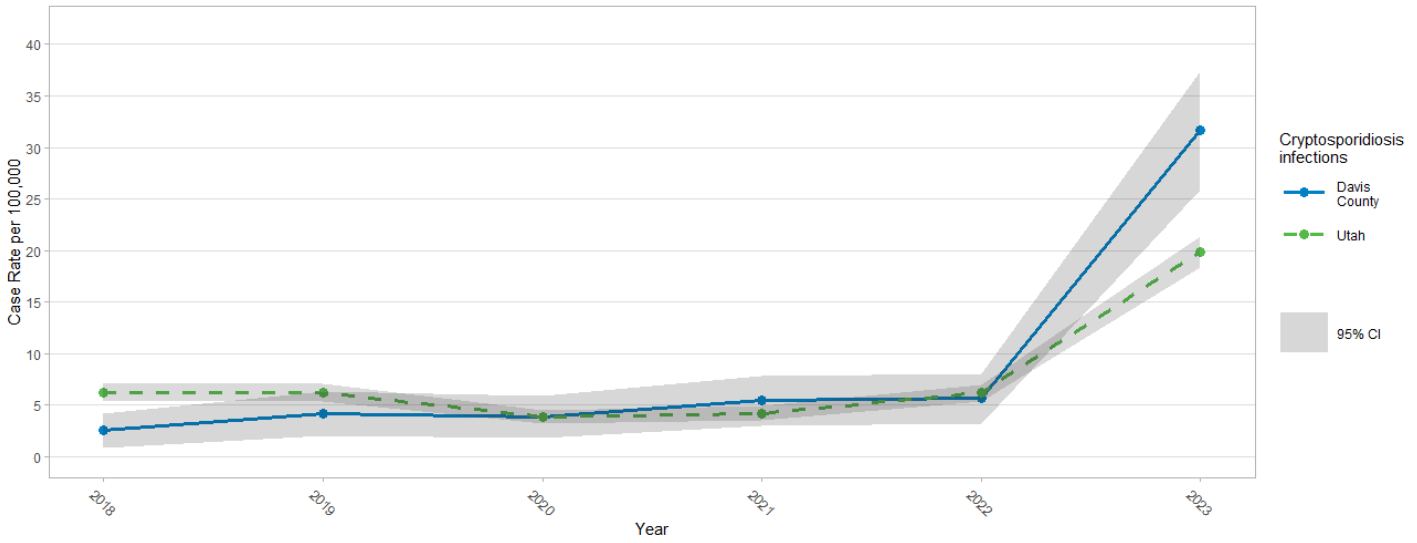
Cryptosporidiosis is an infection caused by the protozoan organism *Cryptosporidium parvum. Cryptosporidia* can infect a wide range of vertebrate hosts, including birds, reptiles, and mammals.[11] Infections mainly occur through ingesting fecally contaminated water or food, or following direct contact with infected animals or people. The parasite may be found in drinking water and recreational water in every region of the US and throughout the world.[11]

Cryptosporidiosis parasites are shed in the host's feces. As many as 10 million to 100 million germs are shed in a single bowel movement. A person may become infected with cryptosporidiosis by swallowing as few as 10 *Crypto* germs.[12] *Cryptosporidium parvum* have high tolerance to chlorine and can therefore survive for long periods of time in chlorinated drinking water or swimming pools.[12] Swallowing contaminated water can make people become ill. While cryptosporidiosis can infect people of all ages, young children, the elderly, those with severely weakened immune systems, and pregnant women are at greater risk for serious illness.[12]

During 2023, there were **117** cases of cryptosporidiosis reported in Davis County. Figure 12 presents the incidence rates per 100,000 people of cryptosporidiosis in Davis County compared to the rest of Utah from 2018 to 2023. When compared to the rest of the state, rates in Davis County have been generally comparable.

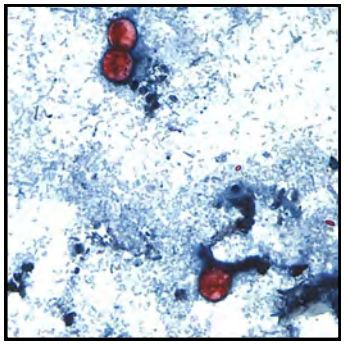
There was an outbreak of cryptosporidiosis in Utah that began during summer 2023. In Davis County, the outbreak began mid-August and peaked during early September. Cases returned to baseline by mid-October. No single point source was identified as the cause of the outbreak. However, the majority of cases were associated with recreational water facilities such as pools, splash pads, and water parks. CD/Epi collaborated with the DCHD Division of Environmental Health when a case had an exposure at a permitted pool facility. The Division of Environmental Health worked closely with each of the pool operators to ensure that the pool was effectively treated before opening back up for public swimming. In total, there were 12 permitted pool facilities in Davis County that were impacted by the outbreak. The last major cryptosporidiosis outbreak was in 2007 with 1,932 cases reported in Utah.

Figure 12. Rate of Cryptosporidiosis Infections, by Year, Davis County and Utah, 2018-2023



Cyclosporiasis

Cyclosporiasis is a parasitic infection caused by the parasite *Cyclospora cayetanensis*. It is primarily associated with contaminated food and water. Cyclosporiasis occurs in many countries, but it seems to be most common in tropical and subtropical regions. In the US, foodborne outbreaks of cyclosporiasis have been linked to various types of imported fresh produce, such as raspberries, basil, snow peas, mesclun lettuce, and cilantro. However, no commercially frozen or canned produce has been implicated to date.[13]



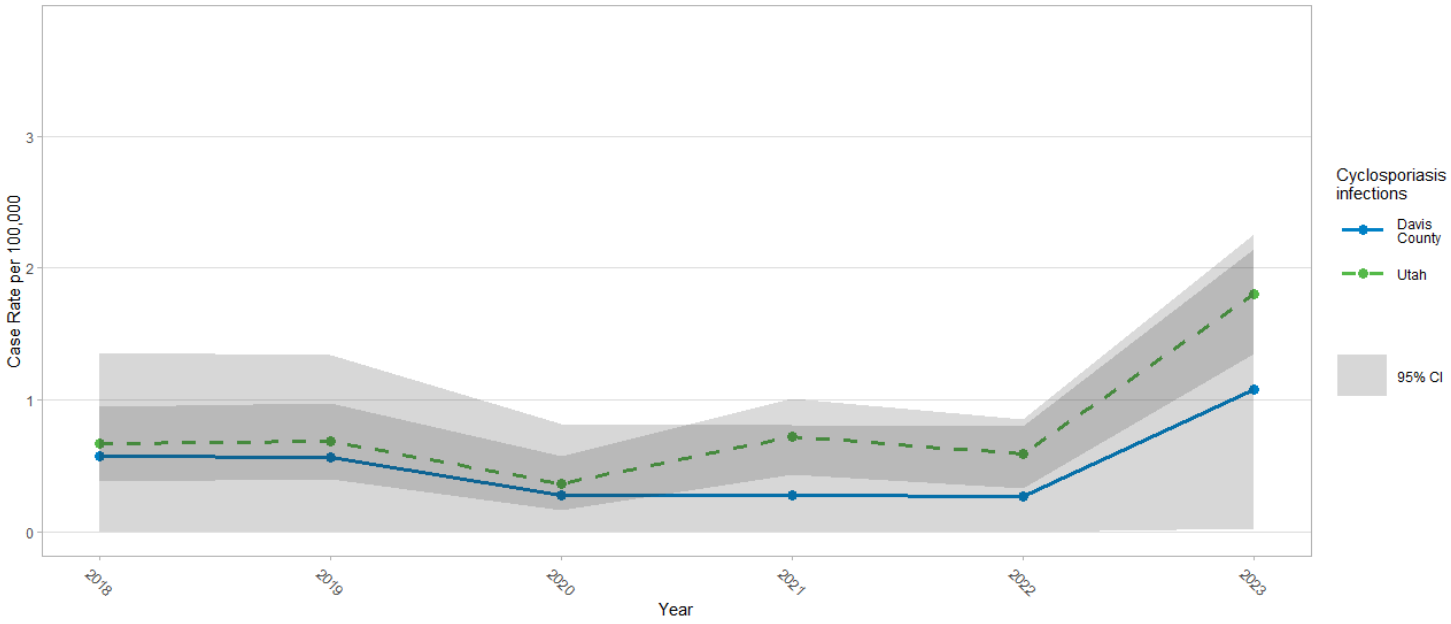
Three uniformly stained Cyclospora cayentanesis *oocysts from a fresh stool sample.*

People become infected with *Cyclospora* by ingesting sporulated oocysts, which are the infective form of the parasite. This most commonly occurs when food or water contaminated with feces is consumed. An infected person sheds unsporulated (immature, non- infective) *Cyclospora* oocysts in the feces. The oocysts are thought to require at least one to two weeks in favorable environmental conditions to sporulate and become infective. Therefore, direct person-to-person transmission is unlikely, as is transmission via ingestion of newly contaminated food or water.[13]

Cyclosporiasis illnesses are reported year-round in the US. However, during the spring and summer months there is often an increase in cyclosporiasis acquired in the US (i.e., "domestically acquired"). The exact timing and duration of these seasonal increases in domestically acquired cyclosporiasis can vary, but reports tend to increase starting in May.[14] From 2000 to 2017, there were 39 reported foodborne outbreaks of cyclosporiasis in the US, totaling 1,730 cases.[15]

During 2023, there were **four** cases of cyclosporiasis reported in Davis County. Figure 13 presents the incidence rates per 100,000 people of cyclosporiasis in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, Davis County rates have been comparable to the rest of the state and followed similar trends.

Figure 13. Rate of Cyclosporiasis Infections, by Year, Davis County and Utah, 2018-2023



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

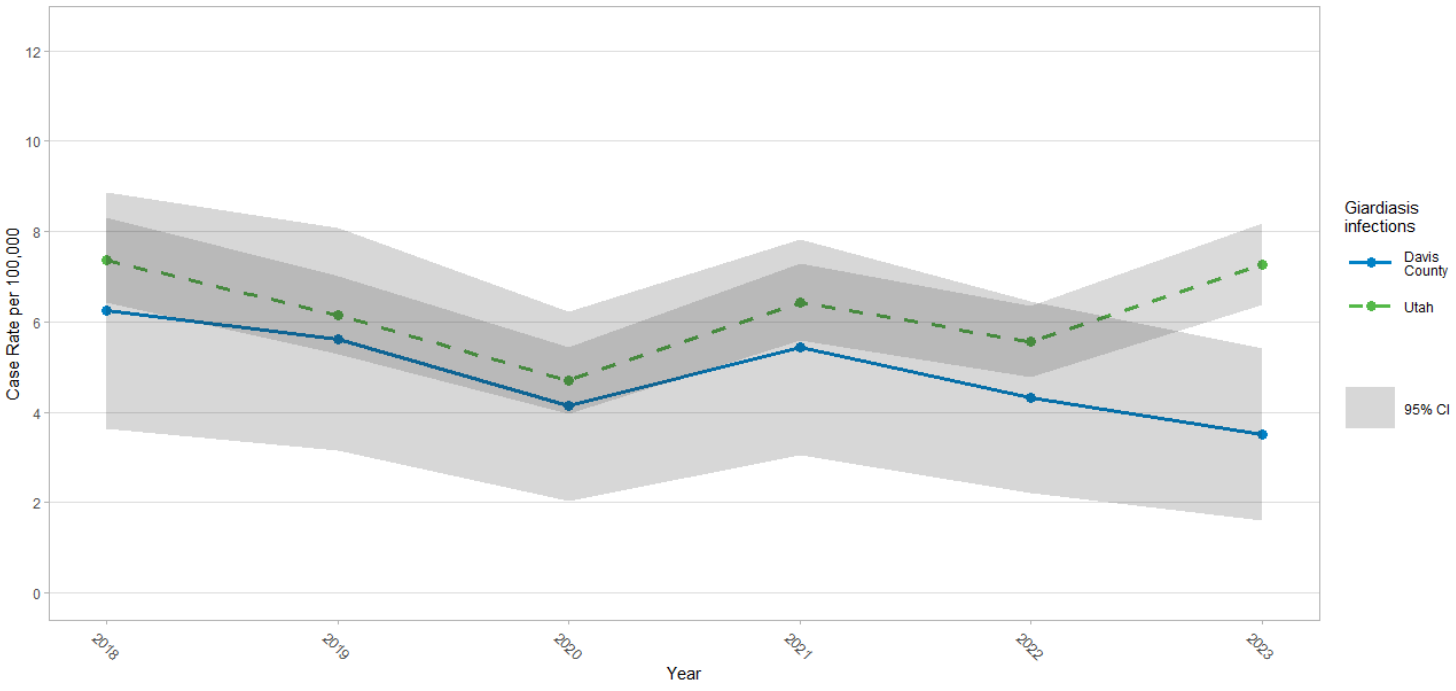
Giardiasis is caused by *Giardia duodenalis,* a microscopic parasite that causes diarrheal illness. *Giardia* is found on surfaces or in soil, food, or water that has been contaminated with fecal matter from infected humans or animals.[16] Humans and other mammals are reservoirs and shed the organism in their stool.[16] Yet, the chances of being infected from a dog or a cat is small since the type of *Giardia* that infects humans is not the same type that infects dogs and cats.[17] Some strains may be shared between humans and exotic pets, such as beavers, monkeys, birds, chinchillas, and opossums.[17]

Giardia is hard to eliminate from the environment and can survive for several months in cold water or soil.[17] While the parasite can be spread in different ways, water (either drinking or recreational) is the most common mode of transmission.

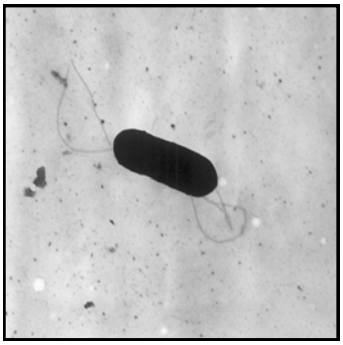
Giardiasis can cause a variety of intestinal symptoms, such as diarrhea, gas, stomach cramps or pain, upset stomach or nausea, and dehydration. Symptoms of giardiasis generally include having two to five loose stools per day and progressively increasing fatigue. Symptoms normally begin one to two weeks after becoming infected, and may last anywhere from two to six weeks.[16]

During 2023, there were **13** cases of giardiasis reported in Davis County. Figure 14 presents the incidence rates per 100,000 people of giardiasis in Davis County compared to the rest of Utah from 2018 to 2023. These data suggest that rates in Davis County are comparable to the rest of the state. However, in 2023, Davis County continued a downward trend that was not seen in the rest of the state.

Figure 14. Rate of Giardiasis Infections, by Year, Davis County and Utah, 2018-2023



Listeriosis



A flagellated Listeria monocytogenes *bacterium, the agent responsible for the foodborne illness listeriosis.*

Listeriosis is a serious infection caused by the bacterium *Listeria monocytogenes*. It typically occurs when people consume food contaminated with this bacterium. Each year in the US, an estimated 1,600 people get listeriosis and about 260 die. *Listeria* bacteria are most likely to sicken people who are pregnant and their newborns, adults age 65 or older, and people with weakened immune systems.[18]

The signs and symptoms of *Listeria* infection vary depending on the person and the part of the body affected. There are two main types of *Listeria* infections: intestinal and invasive. Intestinal illness usually starts within 24 hours of eating food contaminated with *Listeria* and usually lasts one to three days. Symptoms are usually mild and typically include diarrhea and vomiting. Invasive illness happens when the *Listeria* bacteria spread beyond the intestines, and usually starts within two weeks of eating contaminated food. The symptoms and severity of invasive listeriosis can vary.[19] Pregnant women are 10 times more likely than others to get a *Listeria* infection.[18]

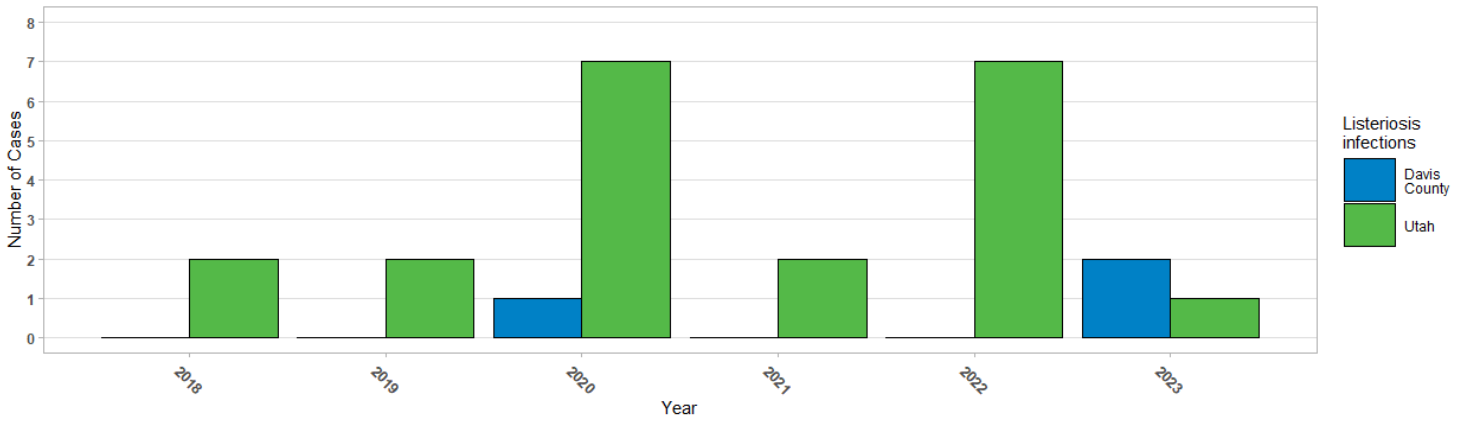
For pregnant women, symptoms typically include fever and other flu-like symptoms. While symptoms are usually mild for pregnant people, infection during pregnancy usually leads to miscarriage, stillbirth, premature delivery, or life-threatening infection of the newborn. On the other hand, for those who are not pregnant, symptoms include, fever, flu -like symptoms, headache, stiff neck, confusion, seizures, and loss of balance. Symptoms in non-pregnant individuals can be severe, and almost one in 20 die.[19]

Listeria can hide in various foods, so it is essential to be cautious when buying, preparing, and consuming specific items. These include raw (unpasteurized) milk, yogurt, and ice cream, unpasteurized soft cheeses (e.g. queso fresco, brief), unheated deli meats, cold cuts, hot dogs, fermented or dry sausages, refrigerated pâté and meat spreads.[20]

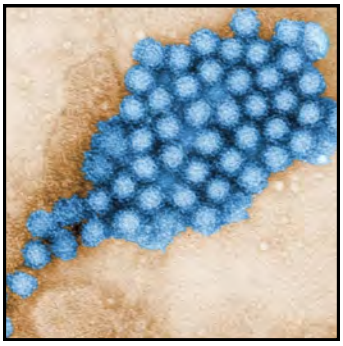
Listeria is a hardy germ that can be difficult to fully remove from food processing facilities. If a facility has *Listeria* germs, the germs can spread to food that touches contaminated equipment or surfaces. *Listeria* can also spread from contaminated food to surfaces. It can even grow on foods kept in the refrigerator. Fortunately, *Listeria* is easily killed by heating food to a high enough temperature.[20]

During 2023, there were **two** cases of listeriosis reported in Davis County. Figure 15 presents counts of listeriosis in Davis County compared to the rest of Utah from 2018 to 2023. The last time a listeriosis case was reported in Davis County was in 2020.

Figure 15. Number of Listeriosis Infections, by Year, Davis County and Utah, 2018-2023



Noroviruses are named after the original strain "Norwalk virus," which caused an outbreak of gastroenteritis in a school in Norwalk, Ohio, in 1968.[21, 22] Noroviruses are classified into ten genogroups and 48 genotypes.[22]



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

People can get infected by having direct contact with someone with norovirus, such as by caring for them, sharing food or eating utensils with them, or eating food handled by them. Other modes of transmission include eating food or drinking liquids that are contaminated with norovirus and touching surfaces or objects contaminated with norovirus and then putting your unwashed fingers in your mouth.[23] CDC estimates that 19-21 million cases of acute gastroenteritis due to norovirus infection occur each year. Norovirus is the leading cause of foodborne illness in the US, accounting for 58% of foodborne illness.[24]

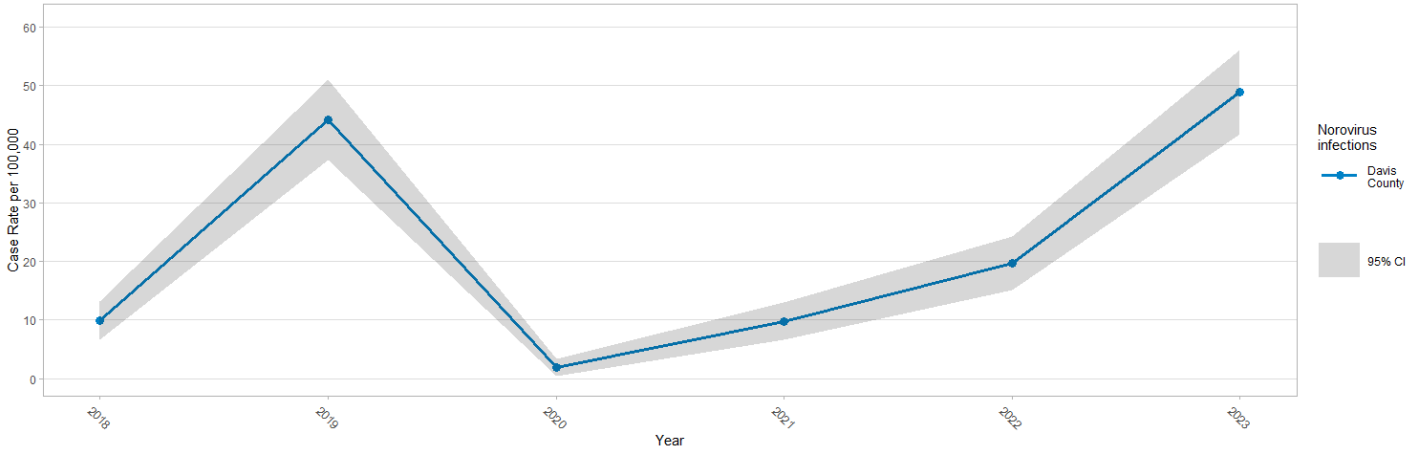
Norovirus is often confused for influenza, which is caused by a different virus. Due to the short duration of illness (typically 24 hours) and the self-limited, mild-to-moderate manifestation, people infected with norovirus often do not seek medical care. Those who do are rarely tested because testing is not widely available. As a result, many outbreaks are not identified. In addition, state, local, and territorial health departments are not required to report individual cases of norovirus illness to CDC.[25] In Utah, only norovirus outbreaks are required to be reported; individual cases are no longer reportable. When suspect cases are reported to the health department, they are often received after the patient has recovered or late into the illness, making it difficult to confirm a diagnosis.

Occasionally, some individuals encounter symptoms of extreme illness with diarrhea, vomiting, stomach pain and nausea. Dehydration is a common secondary condition, especially among children.[26]

During 2023, there were **181** cases of norovirus reported in Davis County residents. Figure 16 presents the incidence rates per 100,000 people of norovirus in Davis County from 2018 to 2023. During this timeframe, rates greatly decreased in 2020 (most likely due to the COVID-19 pandemic). Since then, rates have increased every year.

CD/Epi responded to 2 norovirus outbreaks in 2023, each in a different healthcare facility. The first outbreak had a total of 54 cases and the second outbreak had 12 cases. CD/Epi provided guidance on infection control and prevention to the facility staff. In addition, CD/Epi conducted site visits at both locations in partnership with the Environmental Health Division. The facilities' kitchen, dining, and laundry areas were evaluated, along with advising on best practices for cleaning.

Figure 16. Rate of Norovirus Infections, by Year, Davis County, 2018-2023



Salmonellosis

Infections caused by Salmonella *result in more hospitalizations and deaths than any other foodborne illness in the US.*

Salmonellosis is an infection caused by the bacteria *Salmonella*, which lives in the intestines of people and animals. People can get salmonellosis from a variety of sources, including eating contaminated food or drinking contaminated water, and touched infected animals, their feces, or their environment.[27] Most people with salmonellosis have diarrhea, fever, and stomach cramps. Symptoms usually begin six hours to six days after infection and last four to seven days. However, some people do not develop symptoms for several weeks after infection and others experience symptoms for several weeks. Salmonella strains sometimes cause infection in urine, blood, bones, joints, or the nervous system (spinal fluid and brain), and can cause severe disease.[27]

CDC estimates that approximately 1.35 million cases of *Salmonella* infections occur in the US each year, causing 26,500 hospitalizations, and 420 deaths.[28] *Salmonella* cause far more illnesses than one might suspect. For every one confirmed *Salmonella* infection test, CDC estimates that there are as many as 30 cases that are not treated or tested because those individuals do not seek medical attention.[29]

When a *Salmonella* case is identified, it is critical to determine its serotype and whole genome sequencing (WGS) pattern to identify sources and epidemiological links among cases. Serotypes are conventionally named after the city where they were discovered (see Table 3). Private laboratories are required to submit *Salmonella* isolates to the Utah Public Health Laboratory (UPHL) for serotyping and WGS analysis. WGS patterns are then compared with Utah and US *Salmonella* isolates to identify possible clusters and suspect sources.

During 2023, there were **44** cases of salmonellosis reported in Davis County. Figure 17 presents the incidence rates per 100,000 people of salmonellosis in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, the rate of salmonellosis in Davis County was comparable with the rest of the state.

Figure 17. Rate of Salmonellosis Infections, by Year, Davis County and Utah, 2018-2023

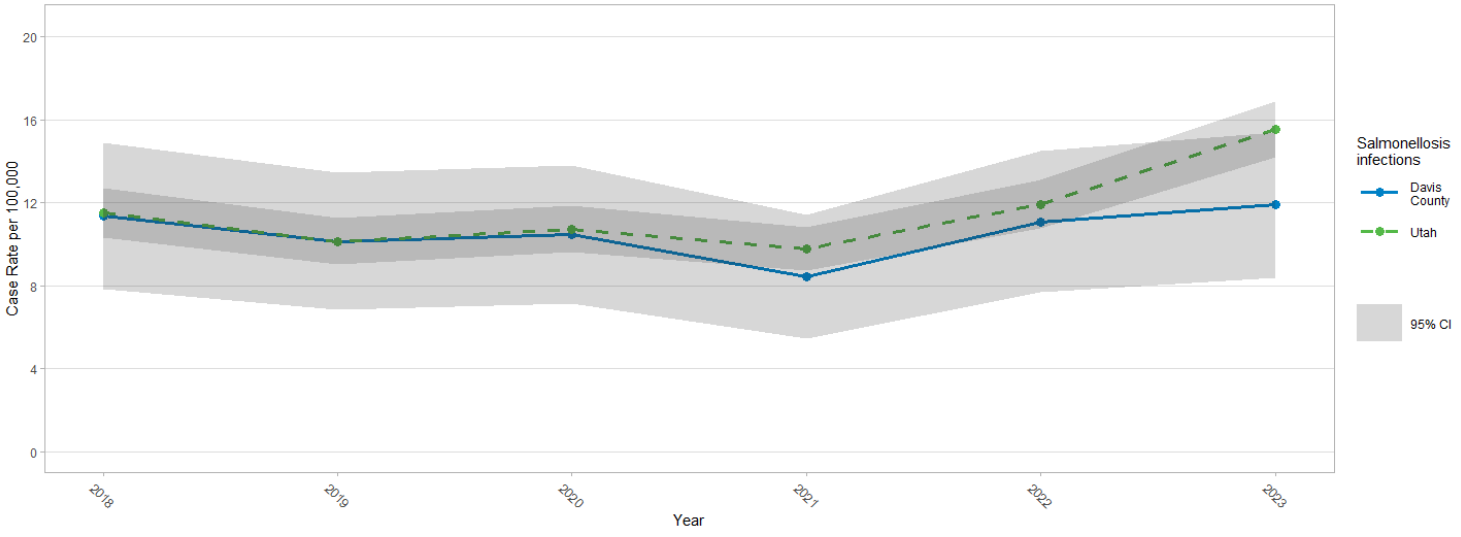
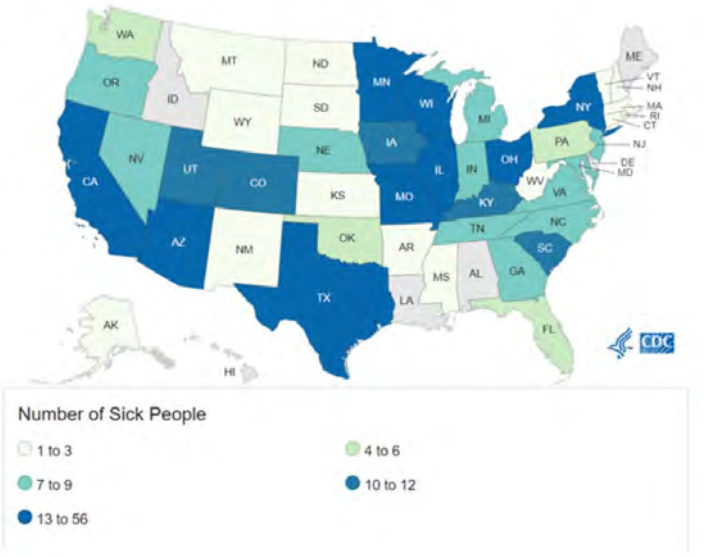


Table 3. *Salmonella* Serotypes Identified, Davis County, 2023

Serotype	Number of Cases (%)
Anatum	1 (2.3%)
Bonairensis 6,8i:e,n,x	1 (2.3%)
Braenderup	2 (4.5%)
Enteritidis	12 (27.3%)
IIIb 60r:z	1 (2.3%)
Infantis	1 (2.3%)
Muenchen	3 (6.8%)
Newport	5 (11.4%)
Oranienburg	1 (2.3%)
Paratyphi A	5 (11.4%)
Paratyphi B	1 (2.3%)
Serovar I 4, [5], 12:i-	1 (2.3%)
Stanley	1 (2.3%)
Sundsvall [1],6,14,[25]:z:e,n,x	1 (2.3%)
Thompson	1 (2.3%)
Typhimurium	3 (6.8%)
Unknown	4 (9.1%)
Total	**44 (100%)**

Figure 18. *Salmonella* Cases Linked to Cantaloupe, United States, 2023



Outbreaks

When two or more people get the same illness from the same contaminated food or drink, the event is called a foodborne disease outbreak. Outbreaks can also occur when individuals have contact with animal or its environment. When this occurs, it is known as a zoonotic outbreak. Multiple nationwide *Salmonella* outbreaks occurred in 2023, some of which involved Davis County residents.

Salmonella outbreak linked to cantaloupes

This was the largest food-related outbreak in the US in 2023 with 407 illnesses, 158 hospitalizations, and 6 deaths across 44 states.[30] Whole and pre-cut cantaloupes that were sold or distributed from September to early December 2023 were the source of the outbreak.[31] Figure 18 displays a map of case counts linked to the cantaloupes.[31] One Davis County case was linked to this outbreak.

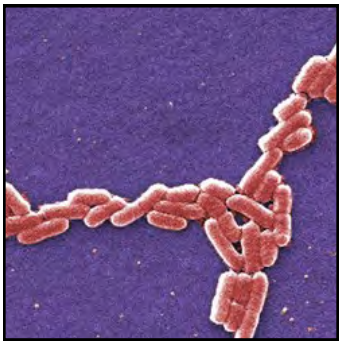
Salmonella outbreak linked to fresh diced onions

This outbreak resulted in 80 illnesses, 18 hospitalizations, and 1 death across 23 states. Products included some lots of diced yellow onions, diced celery and onions, diced mirepoix, and diced red onions.[32] The recalled onions had use-by dates from August 8-28, 2023 and were sold in select stores and also sent to restaurants and institutions nationwide and in Canada.[32] One Davis County case was linked to this outbreak.

Salmonella infections linked with backyard poultry

This outbreak resulted in 1,072 illnesses, 247 hospitalizations, and no deaths across 48 states and Puerto Rico.[33] Backyard poultry, like chickens and ducks, can carry *Salmonella* germs even if they look healthy and clean. These germs can easily spread to anything in the areas where the poultry live and roam. You can get sick from touching your backyard poultry or anything in their environment and then touching your mouth or food and swallowing *Salmonella* germs.[33] One Davis County case was linked to this outbreak.

Shiga Toxin-Producing *Escherichia coli* Infection



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

Escherichia coli (*E. coli*) bacteria normally live in the intestines of people and animals. Most *E. coli* are harmless and actually are an important part of a healthy human intestinal tract. However, some *E. coli* are pathogenic, meaning they can cause illness, either diarrhea or illness outside of the intestinal tract. The types of *E. coli* that can cause diarrhea can be transmitted through contaminated water or food, or through contact with animals or persons.[34]

Some kinds of *E. coli* cause disease by making a toxin called Shiga toxin. The bacteria that make these toxins are called "Shiga toxin-producing" *E. coli*, or STEC for short. A serious complication of a STEC infection is called hemolytic uremic syndrome (HUS), which is a type of kidney failure.[34]

About five to 10% of people who are diagnosed with STEC infection developed HUS. It occurs about 7 days after symptoms first appear, when diarrhea is improving. People with HUS should be hospitalized because their kidneys may stop working, among other serious problems. Most people with HUS recover within a few weeks, but some suffer permanent damage or die.[35]

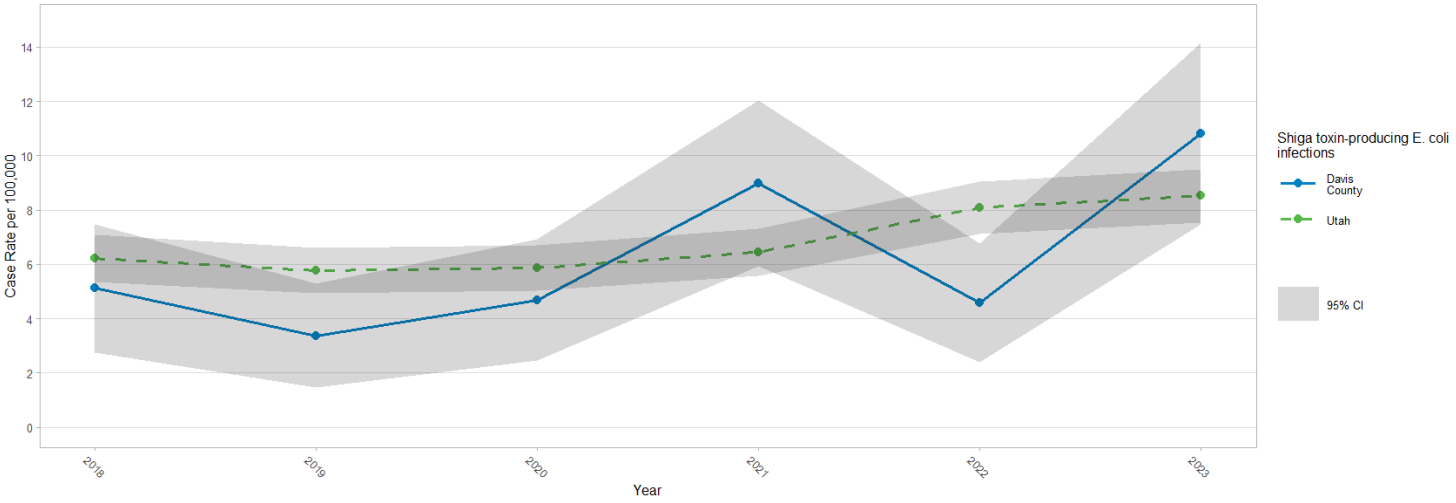
During 2023, there were **40** cases of STEC infection reported in Davis County. Two of these cases progressed to HUS. Figure 19 presents the incidence rates of STEC infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. These data suggest that with the exception of 2022, STEC rates in Davis County have been consistently rising since 2019.

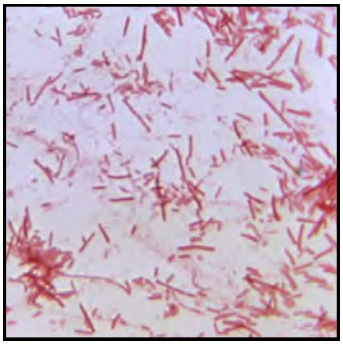
Table 4. Shiga Toxin-Producing *E. coli* Serotypes Identified, Davis County, 2023

Serotype	Number of Cases (%)
O103:H11	1 (2.5%)
O118/O151:H2	1 (2.5%)
O121:H19	1 (2.5%)
O123/O186:H2	1 (2.5%)
O123:H2	1 (2.5%)
O151:H2	1 (2.5%)
O157	1 (2.5%)
O157:H7	16 (40.0%)
O26:H11	6 (15.0%)
O45	1 (2.5%)
O71:H11	1 (2.5%)
Unknown	9 (22.5)
Total	**40 (100%)**

Table 4 shows which serotype was identified in the Davis County cases. The most commonly identified STEC in North America is *E. coli* O157:H7 (often shortened to *E. coli* O157 or even just "O157"). Many other kinds of serogroups of STEC can cause disease too. However, there are limited public health surveillance data on the occurrence of other non-O157 STECs. Though as a whole, the non-O157 serogroups are less likely to cause severe illness.[34]

Figure 19. Rate of STEC Infections, by Year, Davis County and Utah, 2018-2023





Antibiotic-resistant Shigella *is a growing concern.*

Shigella bacteria cause an infection called shigellosis. It can spread easily from one person to another—and it only takes a small amount of *Shigella* to cause illness. People get *Shigella* by swallowing it. People can get sick by getting *Shigella* germs on their hands, which may happen after changing diapers of children who are infected with the germ, touching people who are sick who might have the germ on their hands or bodies, eating food that was prepared by someone who is sick with the germ, swallowing recreational water (for example, lake or river water) while swimming or drinking water that was contaminated with stool (poop) containing *Shigella*, or having exposure to stool during sexual contact with someone who is sick.[36]

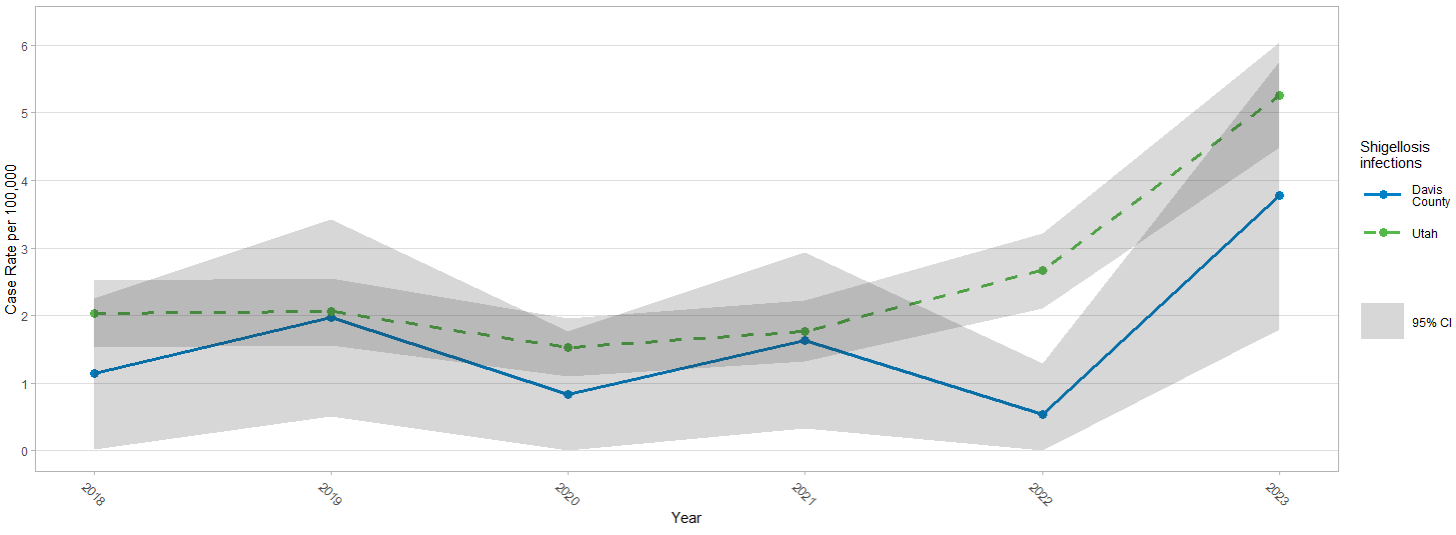
Shigellosis symptoms usually start one to two days after infection and last seven days. Symptoms include diarrhea that can be bloody or prolonged (lasting more than three days), fever, and stomach pain. In some cases, bowel habits do not return to normal for several months.[36]

Shigella infections are best prevented by washing your hands carefully and frequently with soap and water, especially after using the bathroom. Other ways include not preparing food for other while sick, avoiding swimming with sick, staying home from childcare, school, and food service facilities while sick, and waiting to have sex for several weeks, even after recovery. This is because *Shigella* bacteria may be in stool for several weeks.[36]

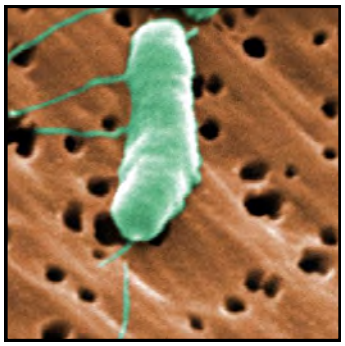
Antimicrobial-resistant *Shigella* infections have been rising since 2016. Anyone can get an antimicrobial-resistant *Shigella* infection, but some people have a greater chance of infection, such as international travelers, men who have sex with men (MSM), and people with weakened immune systems.[37] If *Shigella* bacteria are resistant, first-choice antibiotics recommended to treat these infections may not work. Healthcare providers might need to prescribe second- or third-choice drugs for treatment. However, these drugs might be less effective, may need to be taken through a vein (IV) instead of by mouth, may be more toxic, and may be more expensive.[36]

During 2023, there were **14** cases of shigellosis reported in Davis County. Figure 20 presents the incidence rates per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, the rate of shigellosis in Davis County was comparable with the rest of the state, including increases observed during 2023.

Figure 20. Rate of Shigellosis Infections, by Year, Davis County and Utah, 2018-2023



Vibriosis (non-cholera)



About a dozen Vibrio *species can cause human illness, known as vibriosis. The most common species that cause human illness in the US are* Vibrio parahaemolyticus*,* Vibrio vulnificus *(pictured), and* Vibrio alginolyticus.

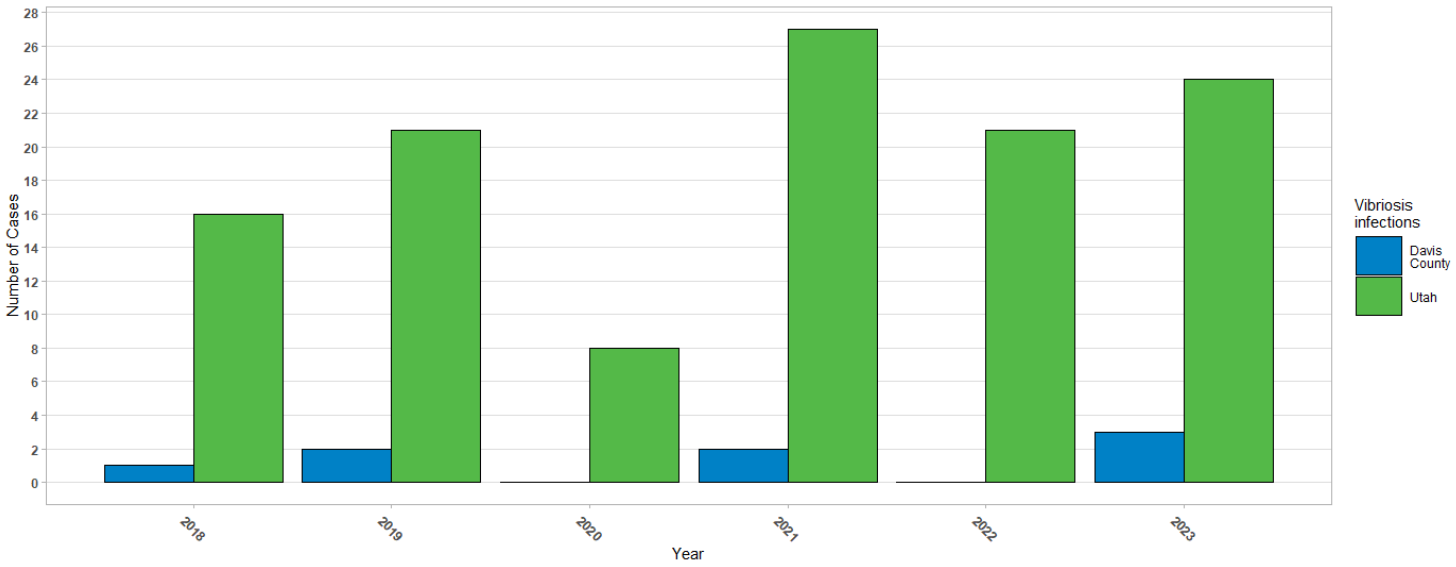
Vibrio bacteria naturally live in certain coastal waters and are present in higher concentrations between May and October when water temperatures are warmer. About a dozen *Vibrio* species can cause human illness, known as vibriosis.[38] Symptoms include watery diarrhea, abdominal cramping, nausea, vomiting, fever, and chills. Some types of *Vibrio* can also cause a skin infection.[39] This section does not discuss cholera, which is caused by the species *Vibrio cholerae.* Cholera is rare in the US and other industrialized nations.[40]

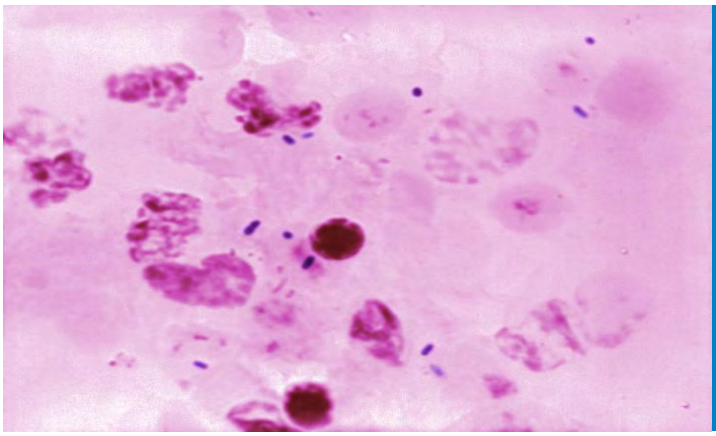
Most people become infected with *Vibrio* by eating raw or undercooked shellfish, particularly oysters. Certain *Vibrio* species, such as *Vibrio vulnificus*, are primarily transmitted through open-wound contact with salt water or brackish water. It is often found where rivers meet the sea. In the US, *V. vulnificus* infections have been most commonly reported by Gulf Coast states. However, *V. vulnificus* infections in the Eastern US has increased eightfold from 1988 to 2018, and the northern geographic range of infections has increased approximately 30 miles per year.[38,41]

CDC estimates that vibriosis causes 80,000 illnesses each year in the US About 52,000 of these illnesses are estimated to be the result of eating contaminated food. The most commonly reported species, *Vibrio parahaemolyticus*, is estimated to cause 45,000 of these illnesses each year. Most people with a mild case of vibriosis recover after about three days with no lasting effects. However, people with a *V. vulnificus* infection can get seriously ill and need intensive care or limb amputation. About one in five people with this type of infection die, sometimes within a day or two of becoming ill.[38]

During 2023, there were **three** cases of vibriosis reported in Davis County. Figure 21 presents counts of vibriosis in Davis County compared to the rest of Utah from 2018 to 2023. Vibriosis cases have been relatively rare in Davis County.

Figure 21. Number of Vibriosis Infections, by Year, Davis County and Utah, 2018-2023





Invasive Diseases

An invasive disease includes infections of the bloodstream, as well as meningitis and encephalitis.

Figure 22. Percent of Invasive Diseases Reported, by Category, Davis County, 2023

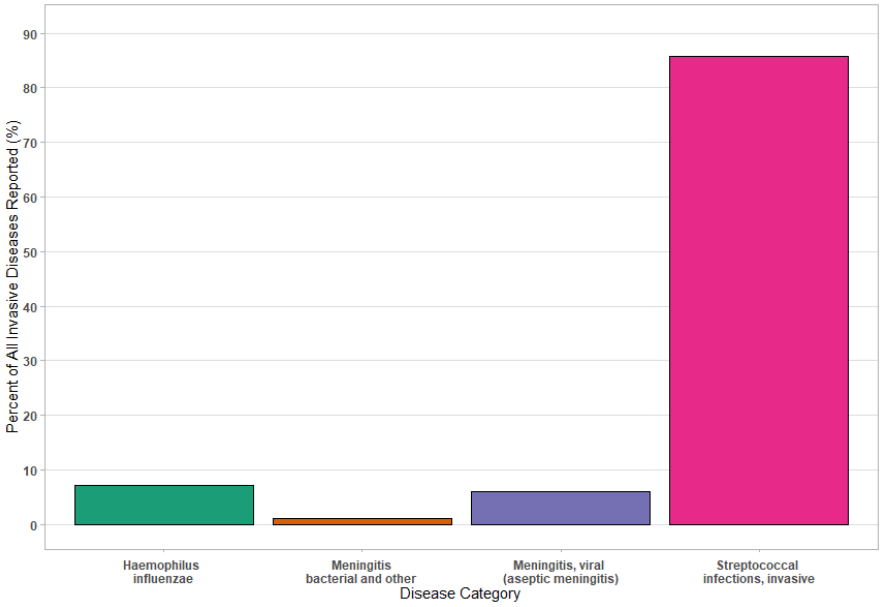
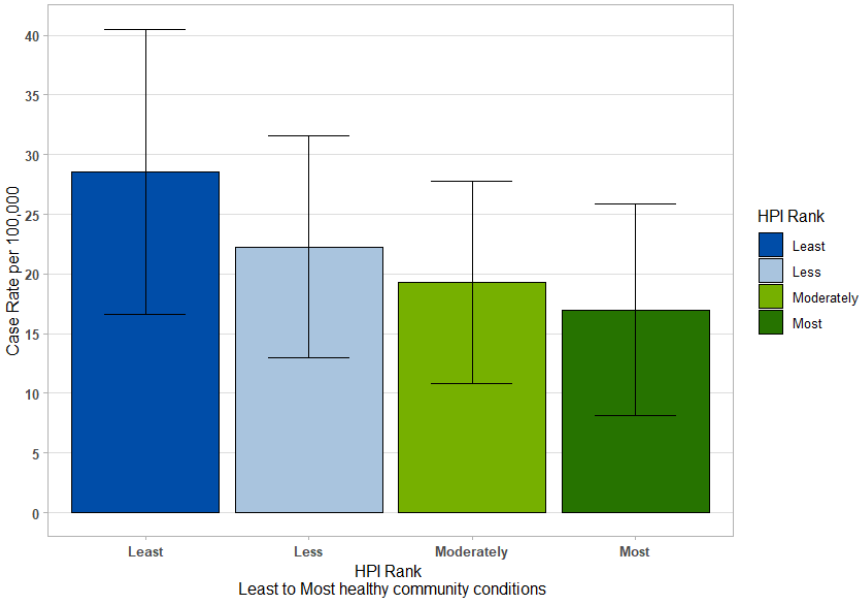


Figure 23. Rate of Invasive Diseases, by HPI Area, Davis County, 2023



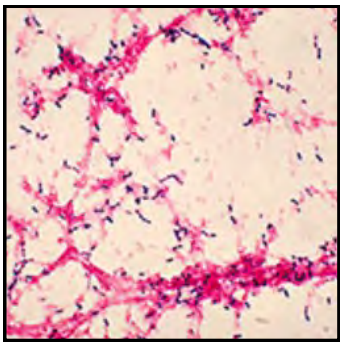
Invasive diseases include infections of the bloodstream, as well as meningitis and encephalitis. All cases of meningitis, encephalitis, and toxic shock syndrome are reportable to the health department, regardless of the causative organism. In addition, all cases of invasive streptococcal disease (isolation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

There were **84** invasive disease cases reported during 2023. Figure 22 presents the percentage of all invasive disease reports attributed to each specific disease. The most common invasive disease reported were invasive streptococcal infections (including streptococcal toxic shock syndrome [STSS]) with **72** (85.7%).

Others reported include *Haemophilus influenzae* with **six** cases (7.1%), aseptic/ viral meningitis with **five** cases (6.0%), and **one** case (1.2%) of bacterial/other meningitis.

Figure 23 displays the rates of invasive disease stratified by HPI rank area, which shows a decrease in invasive disease rates as health community conditions improve. In the least healthy area, the rates of invasive diseases was 28.6 cases per 100,000 people. Conversely, rates in the most healthy area were 17.0 cases per 100,000 people.

Invasive Streptococcal Infections



There are 100 known serotypes of Streptococcus pneumoniae*, the bacteria that cause pneumococcal disease.*

The primary invasive streptococcal diseases of public health concern are Group A, Group B, and *Streptococcus pneumoniae.* Each subheading in this section provides a brief overview of the major types of invasive streptococcal diseases that are tracked and investigated. Table 5 shows the types of streptococcal disease identified in Davis County.

Group A *Streptococcus* invasive disease manifests as necrotizing fasciitis, STSS, bacteremia, and pneumonia.[42] 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 between the age of five and 15 years.[43]

Group B *Streptococcus* invasive disease in neonates manifests as sepsis, pneumonia, and meningitis. Infection in the first week of life is called early-onset. 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 colonization occurs. The mode of transmission in nonpregnant adults and older infants (greater than one week old) is unknown.[44]

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 these organisms as Group A *Streptococcus*. They can also be found as part of normal human flora. Many people with Group C infections have underlying health problems, but more recent studies have implicated this disease as an emerging human pathogen.[45]

Group G *Streptococcus* is a normal human flora and individuals infected with this organism usually have underlying health problems, especially cancer.[45]

Streptococcus pneumoniae is a bacteria that can cause pneumococcal disease, an invasive disease that ranges from ear and sinus infections to pneumonia and bloodstream infections.[46] Within the *Streptococcus pneumoniae* family, there are 100 known serotypes that cause disease. However, only a minority of serotypes produce the majority of pneumococcal infections.[47] Not all *Streptococcus pneumoniae* serotypes are considered invasive.

There are vaccines that can help prevent pneumococcal disease. In the US, there are two types. The first are pneumococcal conjugate vaccines (PCV15 or PCV20). The second are pneumococcal polysaccharide vaccines (PPSV23). These vaccines protect against many, but not all common types of pneumococcal bacteria. The protection from these vaccines is good, but not perfect.[48]

Figure 24 shows rates of invasive pneumococcal disease among children under five years old. Of note are the dramatic decrease in rates following the introduction of previous versions of the vaccine, PCV7 and PCV13, respectively.

Table 5. Types of Invasive *Streptococcus* Infections, Davis County, 2023

Type	Number of Cases (%)
Group A *Streptococcus*	25 (34.7%)
Group B *Streptococcus*	21 (29.2%)
Groups C & G *Streptococcus*	2 (2.8%)
Other *Streptococcus* (*anginosus, bovis, dysgalactiae, mitis*, etc.)	7 (9.7%)
Streptococcus pneumoniae	13 (18.1%)
Toxic-shock syndrome, Streptococcal	2 (2.8%)
Unknown	2 (2.8%)
Total	**72 (100%)**

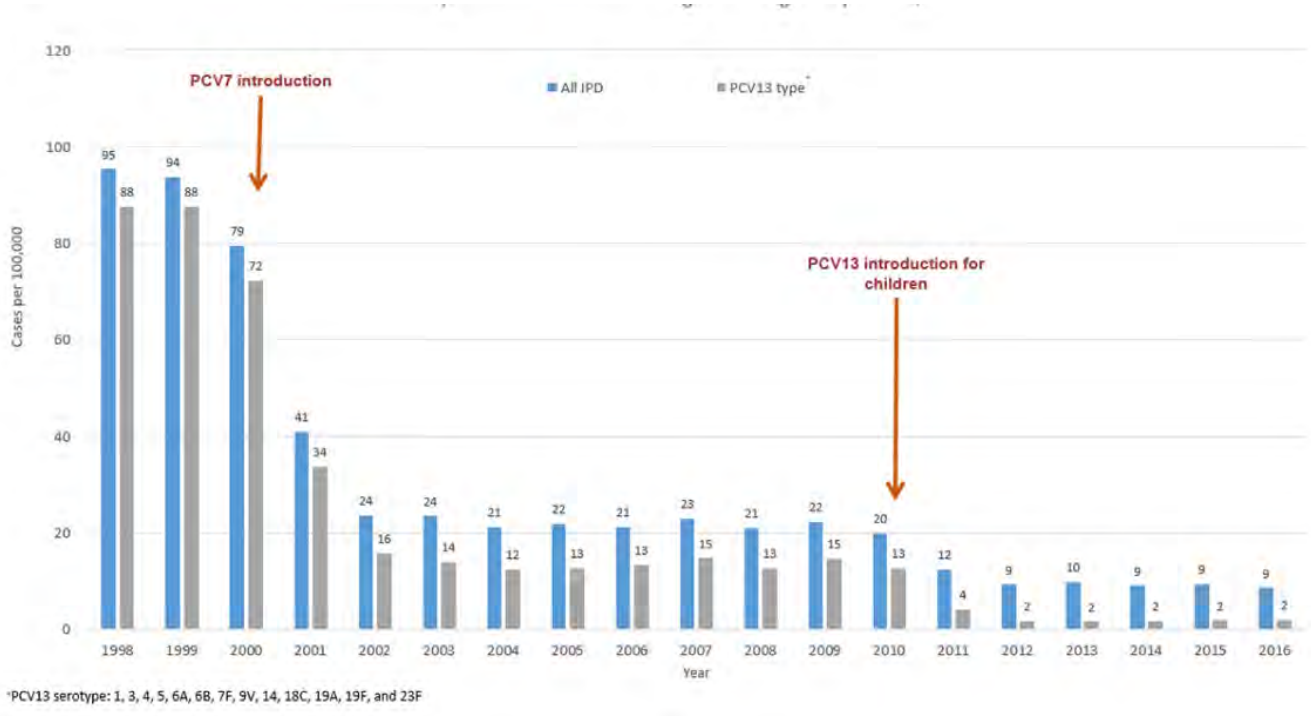
Streptococcal Toxic Shock Syndrome

STSS is a serious and life threatening bacterial infection caused by the Group A *Streptococcus* bacteria.[49] STSS is rare and not commonly spread from person to person. However, Group A strep is very contagious and can easily develop into STSS if the bacteria spreads into the bloodstream. Other common sources of STSS infection occur when the bacteria enter the body through open sores, surgical wounds, or the mucous membranes, such as the mouth and nose.[49]

Indications of STSS include muscle aches and pain, fever and chills, and nausea and vomiting.[49] Within 24 to 48 hours, the illness becomes much more severe as symptoms progress to low blood pressure, rapid breathing, and a fast heart beat. Other critical outward signs demonstrate organ failures, such as a lack of urine production, yellow skin or eyes, and easily bruising.[49] Any person showing signs of STSS should seek immediate medical attention. Treatment includes strong antibiotics, intravenous fluid, and possible surgery to remove the infection from the tissue. The complications of STSS are serious; as many as three out of 10 people die, even with medical treatment.[49]

While anyone can get STSS, people with increased risk include individuals who are 65 years and older, experience alcohol use disorder, are recovering from an infection with open sores, or who recently underwent surgery.[49] It is important for these individuals to adhere to preventative guidelines, such as washing hands often with soap and water; cleaning wounds with soap and water and wrapping them in fresh, dry bandages regularly; and avoid swimming in lakes, pools, or hot tubs with skin infections or open wounds or sores.[49]

Figure 24. Trends in Invasive Pneumococcal Disease Among Children Aged <5, United States, 1998-2016



Respiratory Diseases

Diseases that are primarily spread from person to person by respiratory secretions.

Respiratory viruses commonly cause illnesses such as influenza, COVID-19, and respiratory syncytial virus (RSV). These are primarily spread from person to person, especially in the fall and winter seasons. When people with the illness cough, sneeze, or talk, they expel particles that contain the virus.[50,51] These particles can then land in the mouths or noses of people who are nearby and possibly be inhaled into the respiratory tract. It is also possible that a person can get infected by touching another person, object, or surface that has the virus, and then touching their own mouth, nose, or eyes.[51]

Similarities and Differences

These diseases often have similar symptoms, such as fever, cough, sneezing, shortness of breath, runny nose, and sore throat. They can also lead to complications, such as pneumonia, respiratory failure, sepsis, and cardiac injury, among others.[51,52]

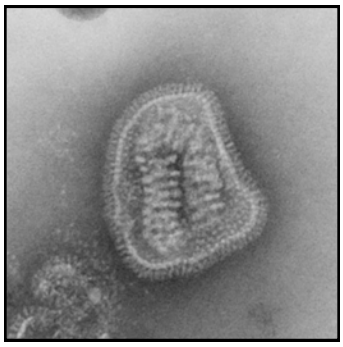
Despite these similarities, there are some important differences. A basic difference is that influenza, COVID-19, and RSV are caused by different viruses. Testing is needed to confirm the illness so that proper treatment can be received. It is not possible to determine which illness someone has based on symptoms alone.

It may be tempting to consider COVID-19 and influenza as one and the same. Table 6 presents an outline of these differences.[51] In general, when compared to influenza, COVID-19 spreads more easily, can cause more severe illness, and people may be contagious for a longer period of time.

Table 6. Comparison of Select Characteristics of Influenza and COVID-19

How long does it take for symptoms to appear after being infected?	
Influenza	COVID-19
1 to 4 days after infection	2 to 5 days, and up to 14 days after infection
How long can someone spread the virus?	
Influenza	COVID-19
People are contagious for about 1 day before symptoms begin After symptoms begin, older children and adults appear to be most contagious during the first 3 to 4 days of illness. This may be longer for infants and people with weakened immune systems.	People are contagious for about 2 to 3 days before symptoms begin After symptoms begin, people are generally considered to be contagious for about 8 days.
How is the virus spread?	
Influenza	COVID-19
It is believed that influenza is spread mainly by people who are symptomatic (people who show influenza symptoms).	Can be spread before people begin showing symptoms, those with very mild symptoms, and those who never experience symptoms (asymptomatic people). In addition, COVID-19 has been observed to have more superspreading events than influenza.
How severe can it get?	
Influenza	COVID-19
Both COVID-19 and flu illness can result in severe illness and complications.	Both COVID-19 and flu illness can result in severe illness and complications. Overall, COVID-19 seems to cause more severe illness in some people. Severe COVID-19 illness resulting in hospitalization and death can occur even in healthy people. Some people that had COVID-19 can go on to develop post-COVID conditions or multisystem inflammatory syndrome.

The way each disease manifests and who is at risk for severe disease may also vary. For example, infants and older adults are more likely to develop severe RSV and need hospitalization.[53] Also, RSV is the leading cause of infant hospitalization in the US[54] On the other hand, older adults, infants, children, pregnant people, and people with certain underlying medical conditions all have a increased risk of complications from COVID-19 and influenza.[51]

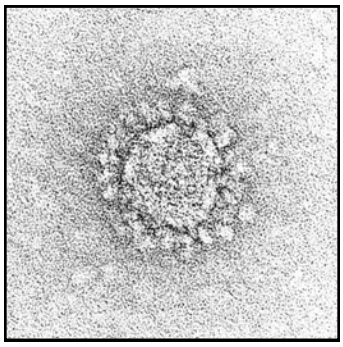


There are two main types of human influenza viruses: types A and B. These two types are routinely spread in people and are responsible for seasonal influenza epidemics each year.

Respiratory Disease Surveillance

Respiratory diseases are very common, and the number of people infected each season can only be estimated because not everyone will seek medical care or get tested.[55] Instead, these diseases are monitored using a variety of methods. These methods approximate the burden of disease and provide insight on trends and severity.

One method is syndromic surveillance. When people seek treatment in a medical facility, the facility sends de-identified data about the visit, including chief complaint, diagnosis codes, and patient characteristics, to state and local health departments. These data are called "syndromic surveillance" because it tracks the symptoms and diseases people are experiencing. CD/Epi currently uses syndromic surveillance data to track outpatient visits due to influenza-like illness and emergency department visits associated with common respiratory diseases.



COVID-19 most often causes respiratory symptoms that can feel much like a cold, the flu, or pneumonia. While COVID-19 primarily attacks the lungs and respiratory system, other parts of the body may be affected by the disease too.

Another method is to monitor hospitalizations and deaths that are associated with respiratory diseases. Medical providers, hospitals, and laboratories report hospitalized cases and deaths to the local health departments. These are important measures to help CD/Epi assess the severity of the current respiratory disease season.

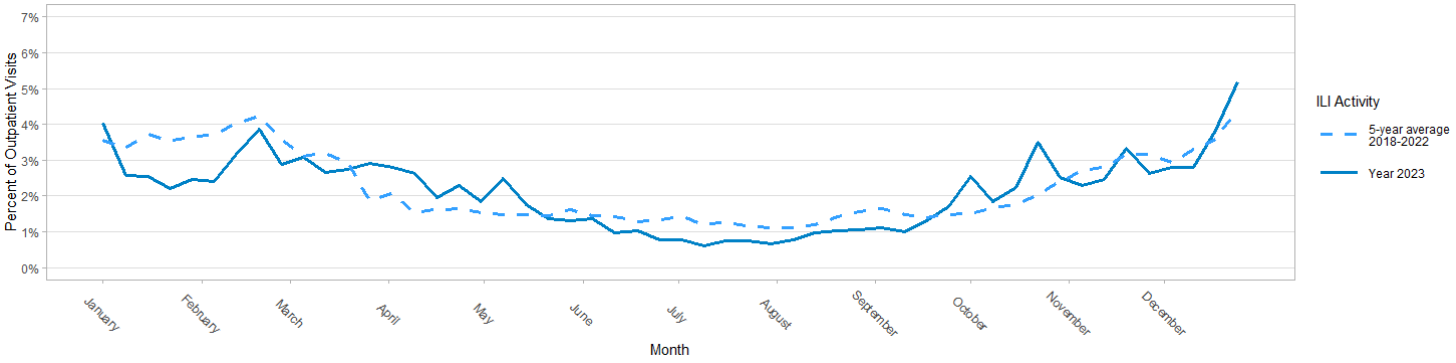
Finally, hospitals and other clinics submit viral specimens for testing and typing to the UPHL so that circulating strains can be identified. These methods of respiratory disease surveillance should all be evaluated in the context of other data to obtain a complete and accurate picture of respiratory disease.

RSV is a common respiratory virus that usually causes mild, cold-like symptoms. While most people recover in a week or two, RSV can be serious.

Influenza-like Illness (ILI)

As previously mentioned, ILI is a syndromic surveillance measure that helps track the number of outpatient visits due to certain symptoms. If someone presents to the doctor and has a fever and a cough and/or a sore throat, it is considered an ILI visit.[56] Figure 25 displays the weekly percentage of all outpatient visits that were due to ILI. For comparison, the dashed line shows the previous five-year average from 2018 to 2022. The 2023 trend of ILI visits were generally comparable to the five-year average. The percent of ILI outpatient visits peaked at 5.2% during the final week of 2023.

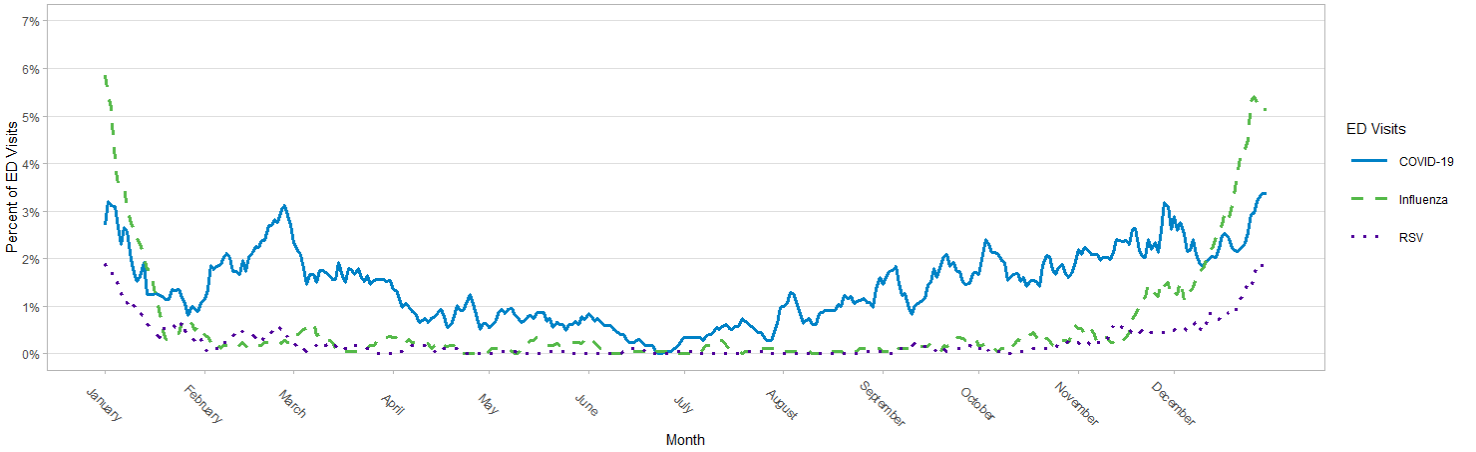
Figure 25. Percent of Outpatient Visits due to ILI, Davis County, 2023 and 5-Year Average



Emergency Department Visits

In a similar manner, CD/Epi uses syndromic surveillance to track the emergency department (ED) visits due to respiratory diseases. These are based on the discharge diagnosis code. Figure 26 presents the rolling seven-day average of the percentage of all ED visits due to influenza, COVID-19, and RSV. During the first week of 2023, the percentage of influenza and RSV ED visits peaked at 5.9% and 1.9%, respectively. During the last week of 2023, COVID-19 ED visits peaked at 3.4%. During peak respiratory disease season, one in 10 ED visits is due to either influenza, COVID-19, or RSV.

Figure 26. Percent of Emergency Department Visits due to COVID-19, Influenza, and RSV, Davis County, 2023



Hospitalizations

Finally, CD/Epi monitors hospitalizations that are associated with respiratory disease. During 2023, there were **92** influenza-associated and **278** COVID-19-associated hospitalizations. At this time RSV-associated hospitalizations are not tracked. Figure 27 shows the rate per 100,000 people of influenza- and COVID-19-associated hospitalizations by age group. The highest rates for influenza and COVID-19 are seen in people age 85 and over, at 159.8 per 100,000 people and 1,091.9 per 100,00, respectively. The lowest rates for influenza and COVID-19 are seen in people age 15-24 at 6.9 per 100,000 people and 8.7 per 100,000 people, respectively.

Figure 27. Rate of Influenza- and COVID-19-Associated Hospitalizations, by Age Group, Davis County, 2023

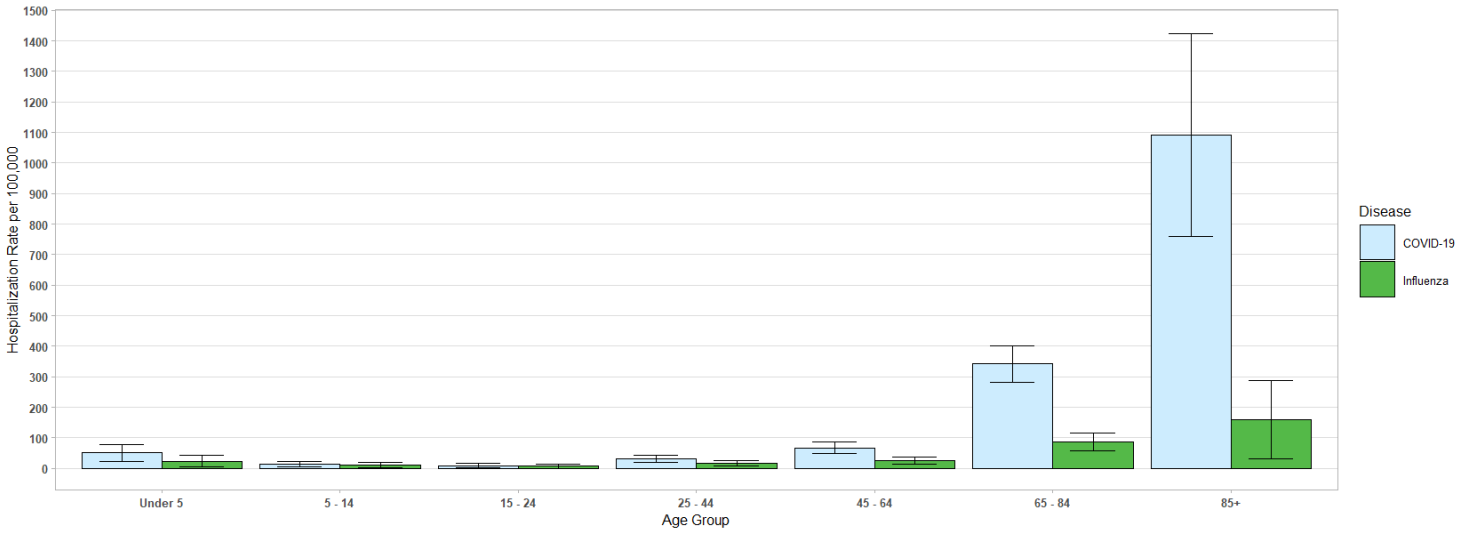
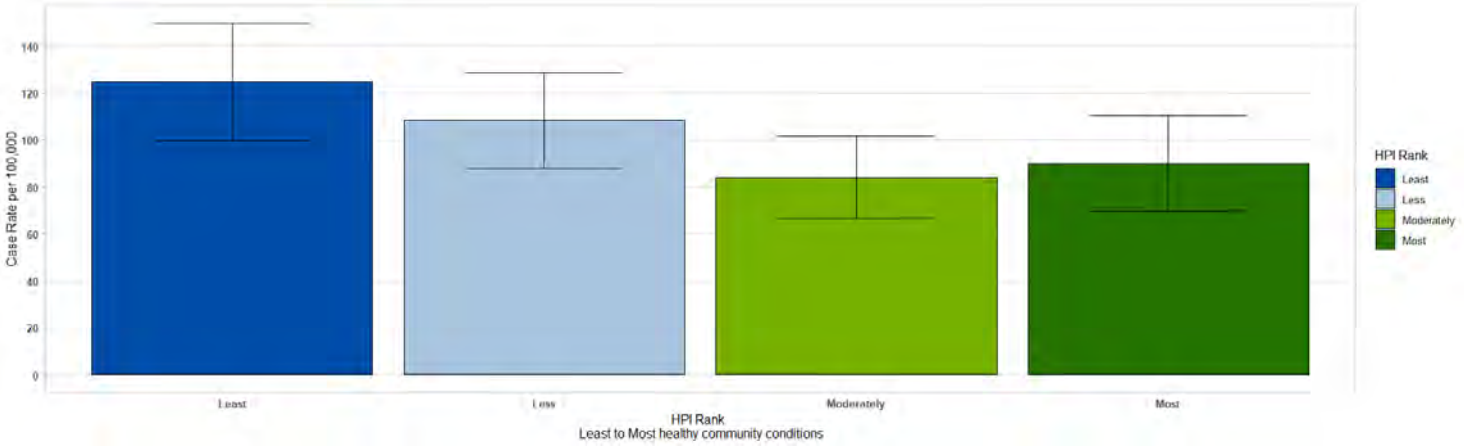


Figure 28 displays the rates of influenza- and COVID-19-associated hospitalizations stratified by HPI rank area. As healthy community conditions improve, hospitalization rates generally decrease. In the least healthy area, the rate of hospitalizations was 124.7 per 100,000 people, which is 32.6% higher compared to the rest of the county. Conversely, the moderately healthy area had a rate of 84.0 per 100,000 people, which is 21.6% lower compared to the rest of the county.

Figure 28. Rate of Influenza- and COVID-19-Associated Hospitalizations, by HPI, Davis County, 2023



Reporting

During the respiratory disease season, CD/Epi releases a report called the Respiratory Illness Report (RIR). The RIR is a weekly publication that aims to provide the most up-to-date information on these diseases in Davis County. The report follows trends of ED visits, hospitalizations, school absenteeism, and ILI visits. Each report also includes brief summaries of important updates or information pertinent to respiratory diseases. The report can be found in the Newsletter section of the DCHD website at https://www.daviscountyutah.gov/health.

Sexually-Transmitted Infections

Diseases that are caused by bacteria, viruses, and other organisms transmitted from one person to another through sexual activity.

Sexually-transmitted infections (STIs) are caused by bacteria, viruses, and other organisms transmitted from one person to another through sexual activity. Bacterial STIs, such as chlamydia, gonorrhea, and syphilis, are curable by using appropriate antibiotic therapy. However, permanent damage may occur (e.g. pelvic inflammatory disease, sterility, organ damage, meningitis) especially if treatment is delayed. Viral STIs such as herpes simplex virus (HSV) and HIV are not curable, but treatment can slow disease progression by reducing viral load (contagiousness) and improving quality of life. Complications from STIs range from mild/moderate illness to infertility, chronic pain, cancer, and even death. Less invasive testing techniques (e.g. urine testing, self-collected oral/rectal testing) have made chlamydia and gonorrhea testing more practical and convenient.

There were **1,180** STIs reported in 2023. Figure 29 presents the percentage of all STI reports attributed to each specific disease. Chlamydia was the most commonly reported STI with **973** (82.5%) cases, followed by gonorrhea with **158** (13.4%) cases, all stages of syphilis with **40** (3.4%) cases, and HIV with **9** (0.8%) cases.

Figure 29. Percent of STIs Reported, by Category, Davis County, 2023

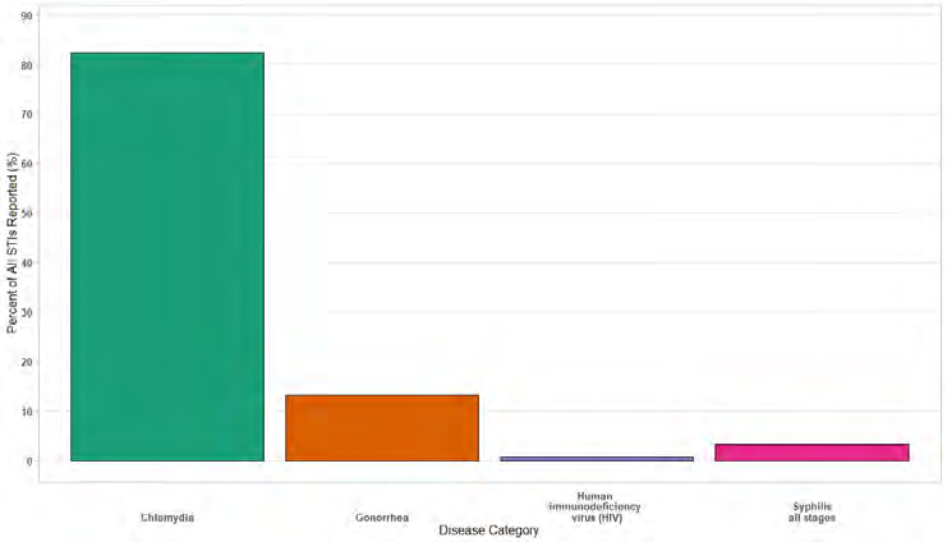
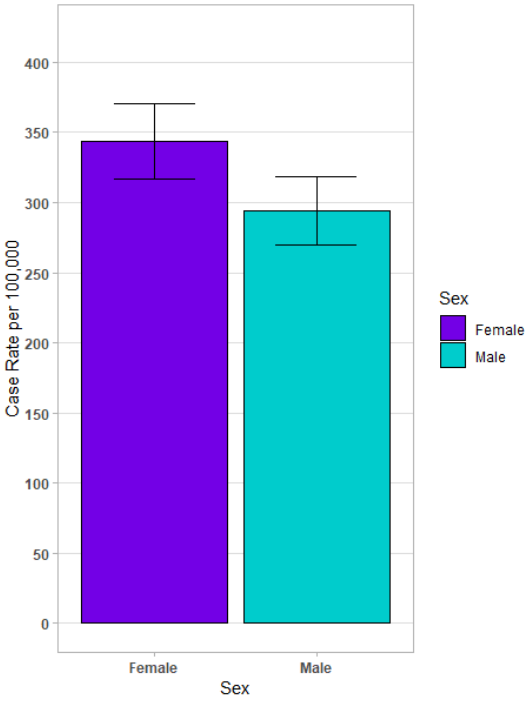
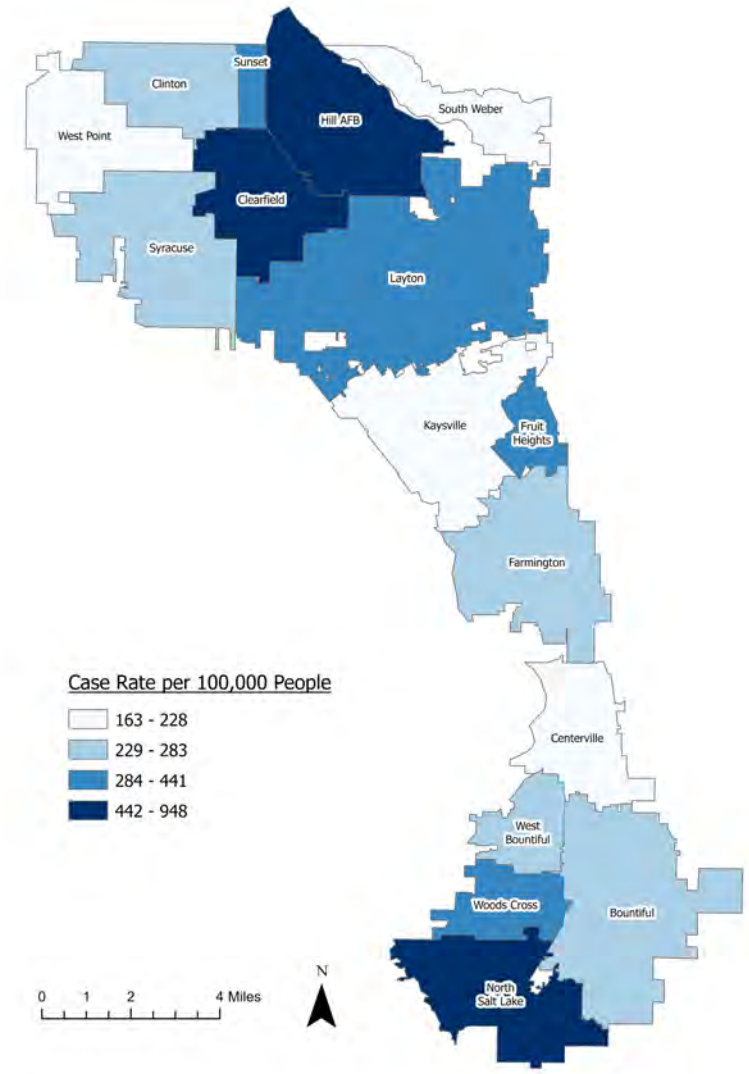


Figure 30. Rates of STIs, by Sex, Davis County, 2023



STIs are reported more frequently in females than in males. Figure 30 shows the rate of STI reporting among males and females. As previously discussed, females are often diagnosed during routine medical visits; males are typically diagnosed following contact investigations or if they become symptomatic. It is DCHD's goal to locate all partners, offer low-cost testing and treatment, provide disease education, and assist in developing a risk reduction plan. Contact investigations not only limit the

Figure 31. Rate of STIs, by City, Davis County, 2023



spread of infection to other individuals, but also decrease the likelihood of reinfection. Reinfections can occur when appropriately-treated individuals engage in sexual activity with their untreated partners or resume sexual activity before the infection is cleared.

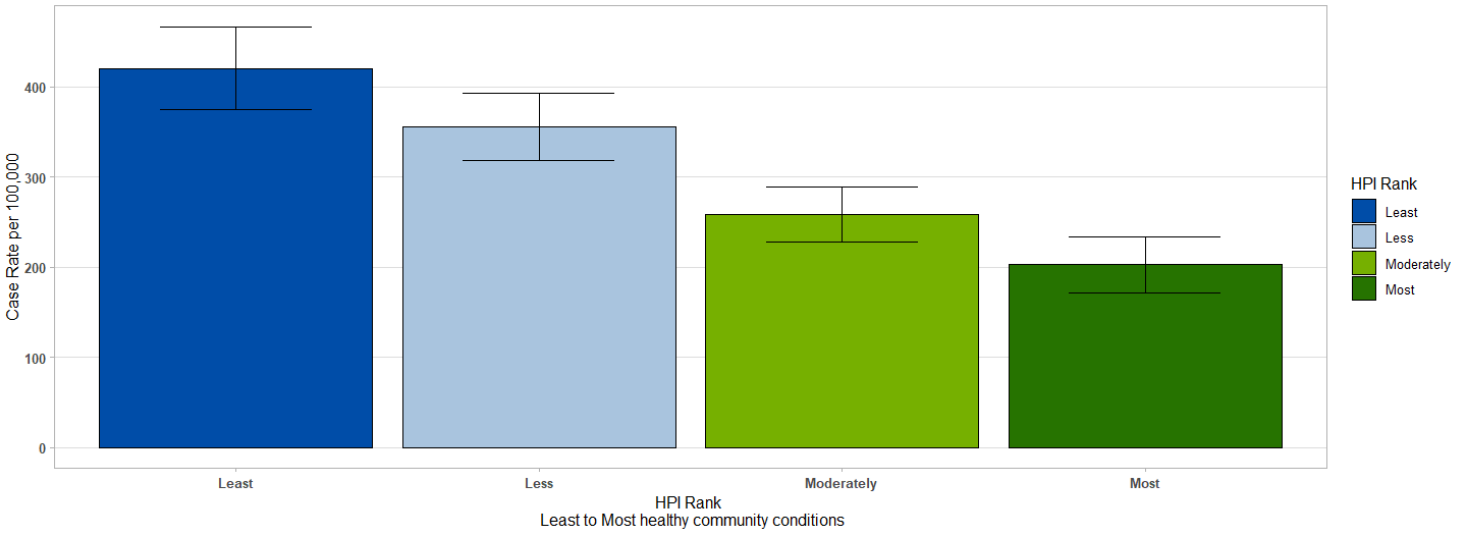
In 2023, STIs were reported within every locality in Davis County. Figure 31 presents the incidence rate of STIs reported by city per 100,000 people.

Clearfield, Hill AFB, and North Salt Lake had the highest rates of STIs, while Centerville, Kaysville, South Weber, and West Point had the lowest rates.

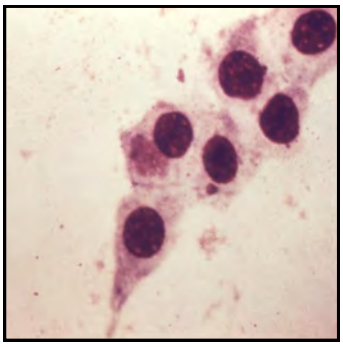
Figure 32 displays the rates of STIs stratified by HPI rank area. The familiar trend of rates decreasing as healthy community conditions improve is seen.

In the least healthy area, the rate of STIs was 420.7 cases per 100,000 people. This is 52.3% higher compared to the rest of the county. Conversely, the most healthy area had a rate of 202.8 cases per 100,000 people, which is 40.0% lower compared to the rest of the county.

Figure 32. Rate of STIs, by HPI Area, Davis County, 2023



Chlamydia

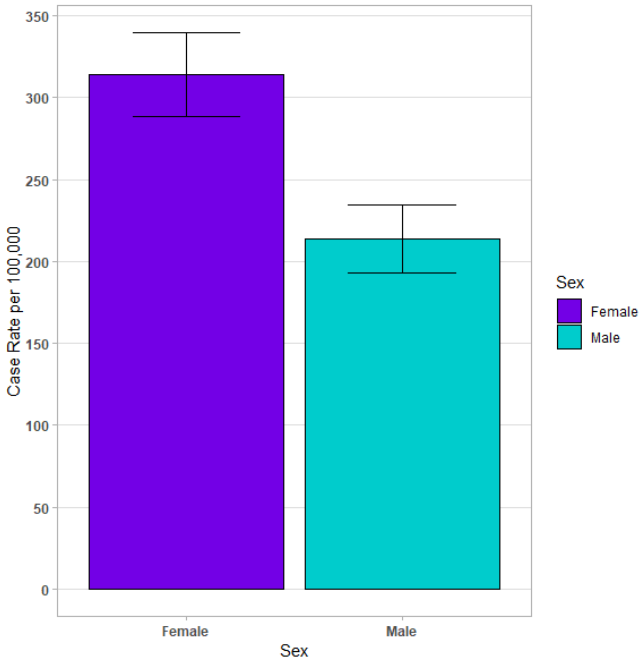


Chlamydia is the most commonly reported STI in the US.

Chlamydia is an STI caused by the bacteria *Chlamydia trachomatis.* It is the most commonly reported STI in the US. People infected with chlamydia often do not have obvious symptoms, but serious complications can include cervicitis, urethritis, infertility, ectopic pregnancies, epididymitis, and arthritis.[57]

Chlamydia infections continue to account for the single largest disease-specific burden in Davis County at 39.3% . Figure 33 shows the rate per 100,000 people of chlamydia among men and women for Davis County in 2023. The rate among women is 46.9% higher when compared to men (313.7 and 213.5 cases per 100,000 people, respectively). Reasons for differences in STI reporting are discussed on page 33.

Figure 33. Chlamydia by Sex, Davis County, 2023

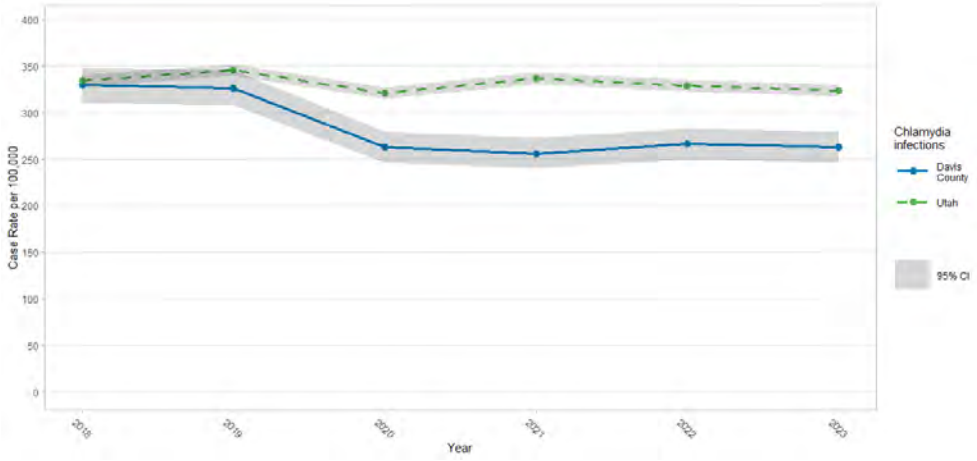


In addition, the female reproductive system is more susceptible to bacteria growth. Women are less likely to have symptoms than men. If the symptoms do occur, they may go away, but the infection can remain. If left untreated, chlamydia may cause permanent damage to the reproductive system.[57]

During 2023, there were **973** cases of chlamydia reported in Davis County. Figure 34 presents the incidence rates of chlamydia infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. In 2018 through 2019, Davis County's rate was comparable to the rest of the state. However, a decrease in Davis County occurred in 2020 and up to this point in time, has been consistently lower than the rest of the state.

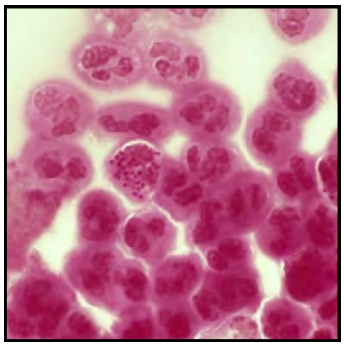
Utah public health procedures do not require local health departments to investigate all cases of chlamydia. Instead, each jurisdiction individually determines local investigation procedures. CD/Epi has an adaptable approach to chlamydia case investigations. This approach is based on established risk groups and CD/Epi disease investigation staff capacity.

Figure 34. Rate of Chlamydia Infections, by Year, Davis County and Utah, 2018-2023



Regardless of staff capacity, a chlamydia case is investigated if it falls into a high-risk population: individuals who are 21 years old or younger, MSM, or pregnant women. As staff capacity allows, all chlamydia cases are investigated. Since 2022, DCHD has received funding to hire additional staff as DIS. This allows DCHD to investigate the full disease burden of chlamydia in addition to other diseases.

Gonorrhea is an STI caused by the bacteria *Neisseria gonorrhoeae* and is the second most common notifiable STI in the US.[58] Gonorrhea infections are often asymptomatic in women and are becoming increasingly so in men. If left untreated, gonorrhea may result in serious complications. For women, this includes pelvic inflammatory disease (PID), which can lead to internal abscesses, chronic pain, infertility, and an increased risk of ectopic pregnancy.[58] In men, it may lead to epididymitis and infertility.[58]



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

A urine sample can be used to screen for both gonorrhea and chlamydia.[59] This testing process is less invasive, more appealing to patients, and may encourage sexually-active individuals to seek testing. When patients are participating in rectal or oral intercourse, however, some STIs may be missed if exclusively using the conventional urine test.

Gonorrhea has progressively developed resistance to the antibiotic drugs prescribed to treat it. Following the spread of gonococcal fluoroquinolone resistance, the cephalosporin antibiotics have been the foundation of recommended treatment for gonorrhea. The emergence of cephalosporin-resistant gonorrhea would significantly complicate the ability of providers to treat gonorrhea successfully, since we have few antibiotic options left that are simple, well-studied, well-tolerated and highly effective. It is critical to continuously monitor resistance and encourage research and development of new treatment regimens.[60]

Figure 35 shows the rate of gonorrhea infections among males and females. Unlike chlamydia, gonorrhea infections in Davis County were more frequent in males. The rate among men is 207.7% higher when compared to women (64.0 and 20.8 cases per 100,000 people, respectively).

During 2023, there were **158** cases of gonorrhea reported in Davis County. Figure 36 presents the incidence rates of gonorrhea infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, Davis County rates of gonorrhea have consistently been lower than the rest of the state.

Figure 35. Gonorrhea by Sex, Davis County, 2023

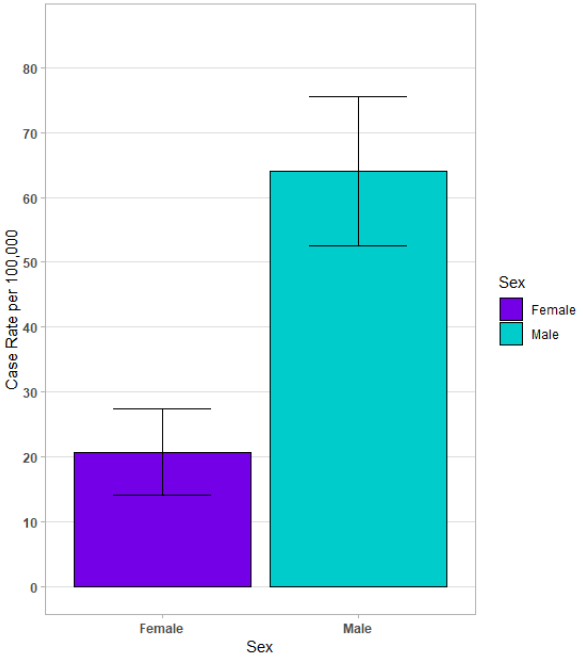
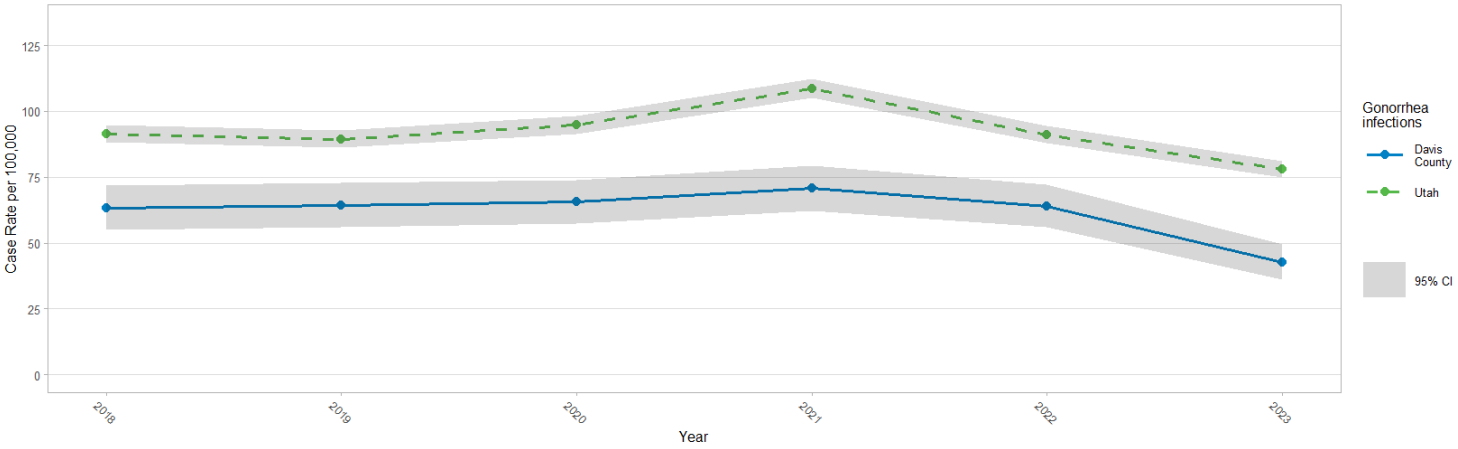
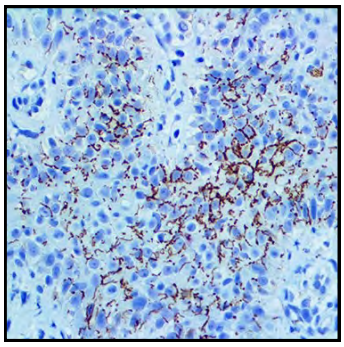


Figure 36. Rate of Gonorrhea Infections, by Year, Davis County and Utah, 2018-2023



Syphilis



Syphilis can cause long-term complications if not treated correctly.

Syphilis is an STI caused by the bacterial spirochete *Treponema pallidum*.[61] There are four stages of syphilis, each with different signs and symptoms.[62] The staging of syphilis requires obtaining a thorough history (including past test results), risk factors, previous treatment regimens, and evaluation of symptoms. Partners' disease status also helps in the staging process.

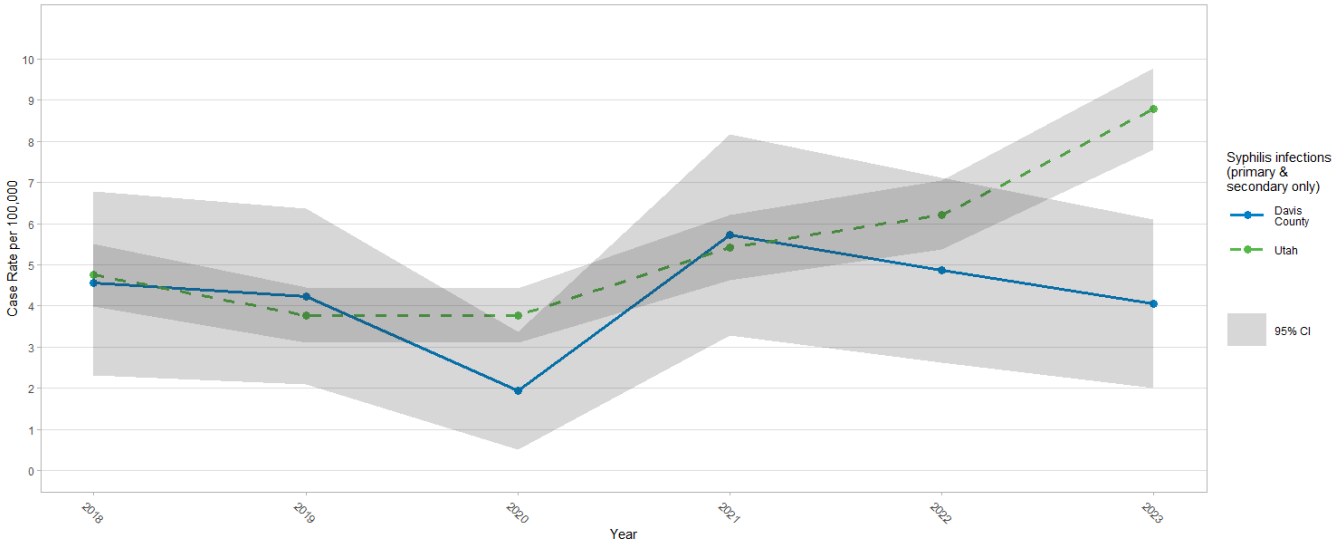
Syphilis is usually transmitted from person-to-person by direct contact with a syphilitic sore, known as a chancre, during sexual contact. Syphilis is not transmitted by casual contact with objects, such as doorknobs or toilet seats.[62] The painless sore that appears initially when a person is first infected can be confused as a pimple or other seemingly harmless lesion. However, many of these syphilitic sores develop in the rectum or vagina and are difficult to notice.[61] Thus, most transmission is from people who are unaware of their infection. Regular testing for syphilis is recommended for people who have HIV, are taking pre-exposure prophylaxis (PrEP) for HIV prevention, have partner(s) who have tested positive for syphilis, or are MSM.[61]

During 2023, there were **40** cases of syphilis across all stages reported in Davis County. Table 7 shows the distribution of syphilis stage categories that were reported. Figure 37 presents the incidence rates of primary and secondary syphilis infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, the data suggest that Davis County has rates comparable to the rest of the state.

Table 7. Stage of Reported Syphilis Cases, Davis County, 2023

Syphilis Stage Category	Number of Cases (%)
Congenital	2 (5.0%)
Early non-primary, non-secondary	8 (20.0%)
Primary	8 (20.0%)
Secondary	7 (17.5%)
Late or unknown duration	15 (37.5%)
Total	**40 (100%)**

Figure 37. Rate of Primary and Secondary Syphilis Infections, by Year, Davis County and Utah, 2018-2023



Syphilis can cause long-term complications if not treated correctly.

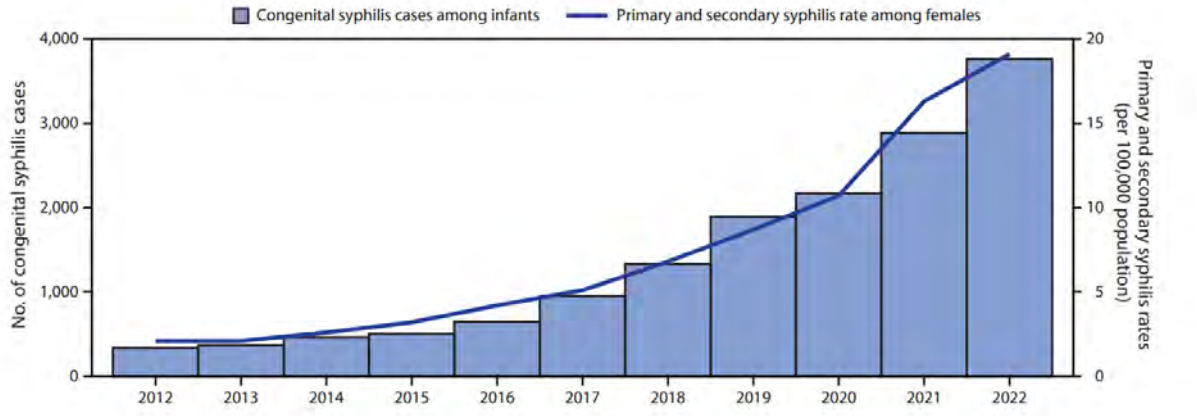
Pregnant women with syphilis can transmit it to their child. This is called congenital syphilis. Congenital syphilis can lead to stillbirth, miscarriage, or neonatal death, and surviving infants who are not adequately treated might develop blindness, deafness, developmental delay, or skeletal abnormalities. At birth, a baby with a syphilis infection may not immediately have signs or symptoms. However, if the baby does not receive treatment right away, the baby may develop serious problems within a few weeks.[63]

The number of babies born with syphilis in the US is increasing at an alarming rate. There were more than 3,700 babies born with syphilis in 2022 in the US, over 10 times the number reported in 2012. These increases reflect overall increases in syphilis among women of reproductive age.[64] This, combined with social and economic factors, create barriers to high-quality prenatal care and ongoing declines in the prevention infrastructure and resources.[65] Figure 38 presents the number of cases of congenital syphilis and rates of syphilis among females in the US from 2012 to 2022.[63]

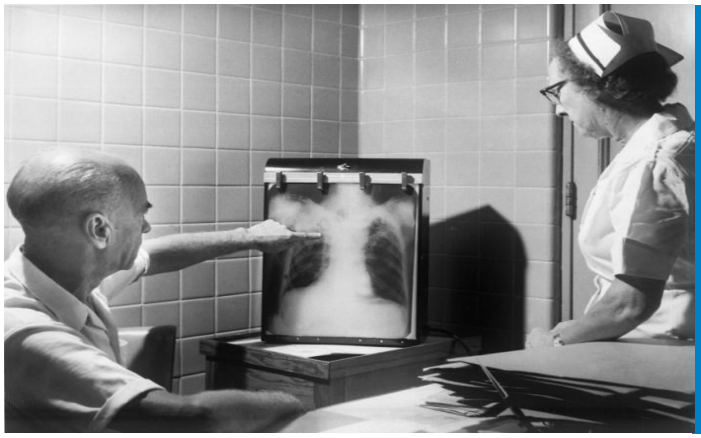
Maternal risk factors for syphilis during pregnancy include sex with multiple partners, sex in conjunction with drug use or transactional sex, late entry to prenatal care (i.e., first visit during the second trimester or later) or no prenatal care, methamphetamine or heroin use, incarceration of the woman or her partner, and unstable housing or homelessness. Moreover, as part of the management of pregnant women who have syphilis, providers should obtain information concerning ongoing risk behaviors and treatment of sex partners to assess the risk for reinfection.[66]

Davis County has not seen such a rise in cases of congenital syphilis. However, there has been an increase in syphilis cases among pregnant women. From 2012 to 2022, Davis County averaged 1 to 2 cases of syphilis among pregnant women per year. In 2023, this increased to 8 cases. While there thankfully has not been a commensurate increase of congenital syphilis cases, this is certainly a concerning trend. When CD/Epi nurses investigate a case of syphilis in pregnant women, they make sure that the mother can be properly treated prior to giving birth.

Figure 38. Reported Number of Cases of Congenital Syphilis among Infants, by Year of Birth, and Rates* of Reported Cases of Primary and Secondary Syphilis† among Females Aged 15-44, by Year, United States, 2012-2022



* Cases per 100,000 population.
† Primary and secondary syphilis case data for all U.S. territories and freely associated states and outlying areas were not available for all years; therefore, rates presented include only the 50 states and the District of Columbia.



Tuberculosis

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

TB is caused by a type of bacteria called *Mycobacterium tuberculosis.* The bacteria usually attacks the lungs, but may attack any part of the body. It is spread through the air when a person with TB coughs, speaks, or sings. People nearby may breathe in these particles and become infected.[67] Not everyone infected with TB bacteria becomes sick.

As a result, two TB conditions exist: active TB disease (ATBD) and LTBI. It is estimated that up to 13 million people in the US live with LTBI. Without treatment, 10% of people with LTBI will get sick with ATBD, which can spread to others and be deadly.[68]

Tuberculosis is a serious health threat, especially for people living with HIV. People living with HIV are more likely than others to become sick with TB. Worldwide, TB is one of the leading causes of death among people living with HIV.[69]

In most cases, TB is treatable and curable. However, people with TB can die if they do not get proper treatment. Sometimes drug-resistant TB occurs when bacteria become resistant to the drugs used to treat TB. This means that the drug can no longer kill the TB bacteria.[70]

In 2023, there was **one** ATBD case, **127** newly identified LTBI cases, and **one** case of Hansen's disease (leprosy) reported in Davis County. Figure 39 presents the number of ATBD cases in Davis County and Utah. Figure 40 shows the incidence rate per 100,000 people for identified LTBI in Davis County from 2018 to 2023.

Figure 39. Number of Active TB Cases, by Year, Davis County and Utah, 2018-2023

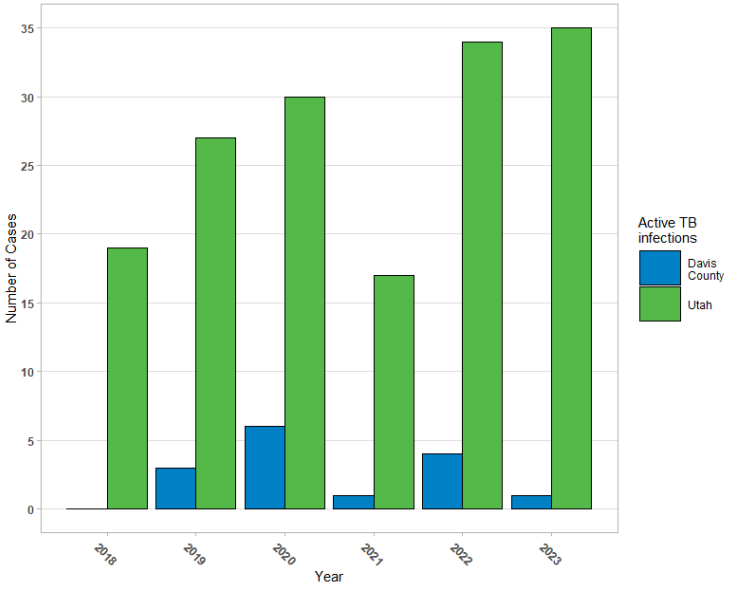
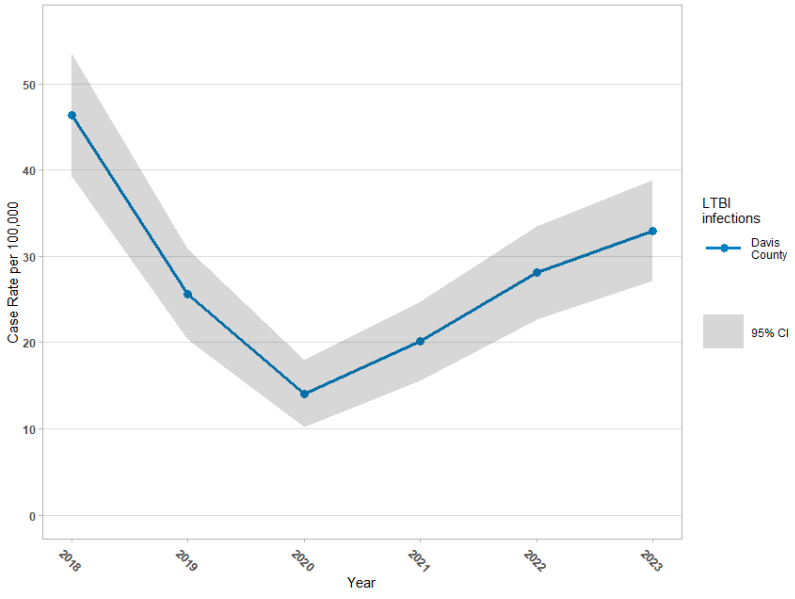
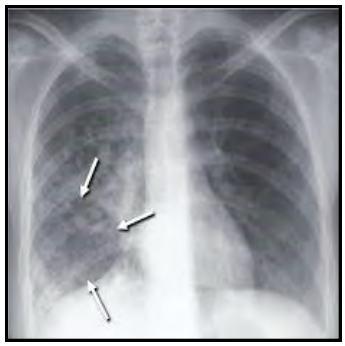


Figure 40. Rate of LTBI, by Year, Davis County, 2018-2023



TB bacteria become active if the immune system cannot stop the bacteria from growing. When TB bacteria begin to multiply in the body, ATBD is the result.[71] When ATBD manifests in the lungs, it is known as pulmonary TB. Whereas when it manifests in other parts of the body, it is classified as extrapulmonary TB.[71]



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

In 2022, the United States reported 8,331 TB cases, representing a 5.9% increase in case count compared with 2021. The incidence rate was 2.5 cases per 100,000 persons, a 5.5% increase in incidence rate compared with 2021.[72]

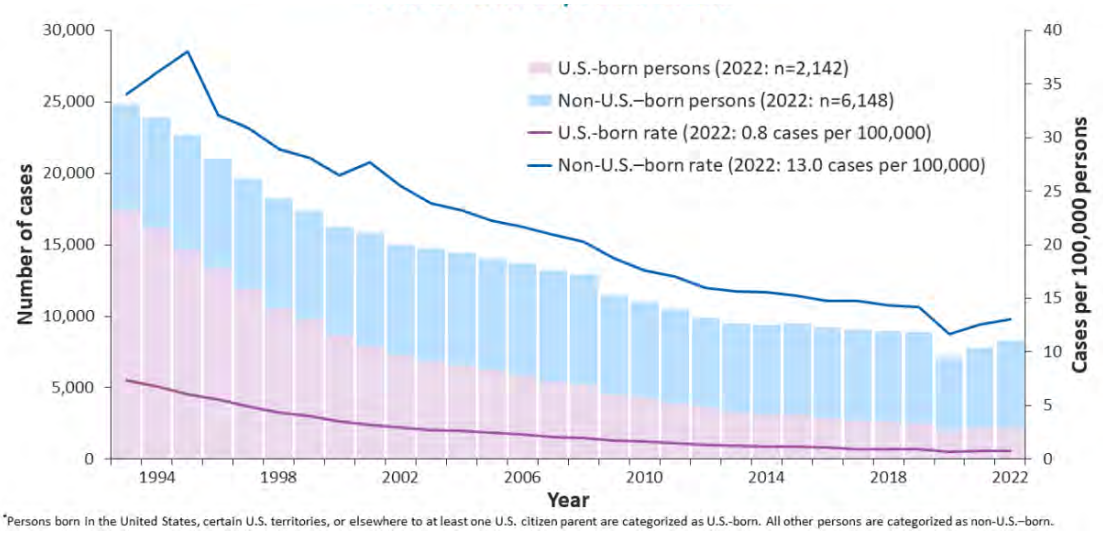
After declining substantially in 2020, TB cases rose in 2021 and 2022, but remain lower compared with 2019. TB cases appear to be gradually returning to pre-pandemic levels, but concerns about pandemic-related disruptions to public health persist, including more identified ATBD cases.[72]

Origin of birth is a prominent risk factor for TB in the United States because of the substantially greater risk of exposure to TB outside of the United States. In 2022, 6,148 (73.8%) cases of TB were reported among non-US-born persons, and 2,142 (25.7%) cases were reported among US-born persons; the incidence rate per 100,000 persons was 17.1 times higher among non-US-born persons (13.0) than US-born persons (0.8).[72] Figure 41 compares the case counts and incidence rates of TB in the US by origin of birth.[74]

In 2023, Utah had 35 cases of ATBD, only **one** of which was in Davis County. Management of ATBD cases requires close collaboration between several agencies including DCHD, medical providers, DHHS, UPHL, and commitment from the infected individual. Both pulmonary and extra-pulmonary TB typically require six months of treatment. Complicated cases of TB can require treatment to be extended up to two years (e.g. meningeal infections, multidrug resistant/ extensively-drug resistant infections [MDR/XDR]).

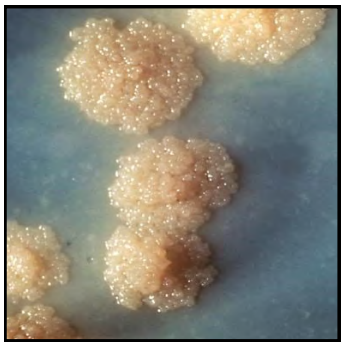
Patients with infectious pulmonary TB is of most concern for public health. These individuals are isolated until sputum sample tests indicate the individual is no longer infectious. To ensure compliance to treatment, medication is administered under directly observed therapy (DOT).[74] Because DOT can seem personally invasive to the patient, CD/Epi seeks to implement multiple strategies to promote a less intrusive and more flexible schedule, where possible. This includes bi-/tri-weekly treatments, home visits, and video conferencing.

Figure 41. TB Cases and Incidence Rates by Origin of Birth,* United States, 1993-2022



*Persons born in the United States, certain U.S. territories, or elsewhere to at least one U.S. citizen parent are categorized as U.S.-born. All other persons are categorized as non-U.S.–born.

Latent Tuberculosis Infection



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

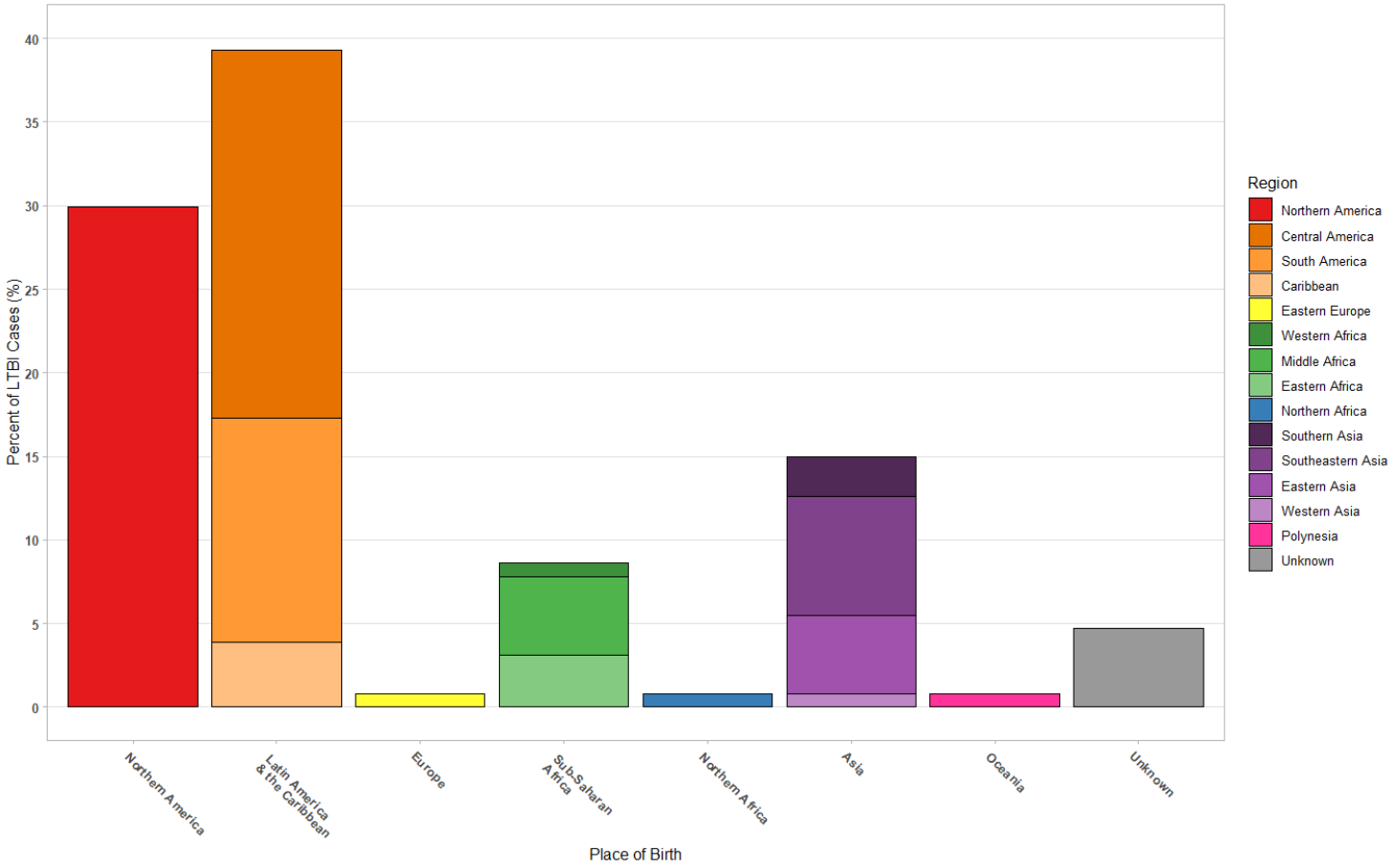
LTBI is a condition in which TB bacteria are alive, but inactive in the body. People with LTBI have no symptoms, cannot spread TB to others, and usually have a positive skin test reaction or interferon gamma-release assay (IGRA) blood test. Development into active disease occurs in about 10% of those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

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

With the low incidence of ATBD in Davis County and Utah as a whole, the largest disease burden for tuberculosis falls under LTBI. During 2023, DCHD managed **127** clients with LTBI. Treatment reduces the risk that LTBI will progress to ATBD and is essential to the control and elimination of TB disease. Case management of LTBI includes initial testing to rule out ATBD and ensuring appropriate treatment.

Because of the substantially greater risk of exposure to TB outside of the US, origin of birth is a prominent risk factor for TB in the US.[72] As such, the majority of individuals who receive LTBI treatment in Davis County are born outside of the US. Figure 42 presents the place of birth for the LTBI cases identified during 2023 in Davis County.

Figure 42. Percent of LTBI, by Place of Birth and Region, Davis County, 2023



Typically, treatment for LTBI consists of daily antibiotic therapy for three to nine months.[75] Individuals are monitored throughout therapy, but DOT is not necessary. In October 2012, the 3HP treatment regimen was implemented in Utah, as recommended by CDC . It is a combination of two drugs, taken once weekly for 12 doses.[75] It is recommended for people age two years or older who are otherwise healthy, but also meet a certain set of criteria.

Referrals are sent to DCHD for suspect ATBD and LTBI follow-up from various medical facilities and providers not only in Davis County, but throughout the state. Screening tests for TB consist of a tuberculin skin test (TST) or blood test (e.g. QuantiFERON Gold). People who receive positive test results are often referred to DCHD for evaluation and treatment. There are many reasons why someone receives a TB screening test.

Since people with LTBI do not have symptoms, they may be unaware that they are infected with TB. Sometimes these people learn that they have LTBI due to being screened for some other reason. The most frequent screening reasons that resulted in CD/Epi identifying an LTBI case were incoming immigrants or refugees and job or school requirements. Table 8 shows the reasons why each of the 127 LTBI cases in 2023 were initially screened.

While LTBI is not a reportable condition, DCHD provides free or low-cost services for the community. DCHD provided 948 TSTs to the public in 2023. Table 9 presents the reasons for which a TST was sought at DCHD. However, this number only accounts for a small portion of all TB tests performed in Davis County.

Table 8. Reasons Why Identified LTBI Cases Were Initially Screened for TB, Davis County, 2023

Reason for TB Screening	Number of Cases (%)
Immunocompromised	2 (1.6%)
Incoming immigrant or refugee	59 (46.5%)
Job or school requirement	34 (26.8%)
Other	17 (13.4%)
Pre- or post- mission requirement	6 (4.7%)
Unknown	9 (7.1%)
Total	**127 (100%)**

Table 9. Reasons People Requested Tuberculin Skin Tests at DCHD, 2023

Reason for TB Screening	Number of Tests (%)
Contact with ATBD case	6 (0.6%)
Immunocompromised	1 (0.1%)
Incoming immigrant or refugee	11 (1.2%)
Job requirement	548 (57.8%)
Other	27 (2.8%)
Personal choice	2 (0.2%)
Pre– or post-mission requirement	55 (5.8%)
Student	261 (27.5%)
Volunteer	19 (2.0%)
Unknown	18 (1.9%)
Total	**948 (100%)**

Vaccine-Preventable Diseases

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

Figure 43. Percent of VPDs Reported, by Category, Davis County, 2023

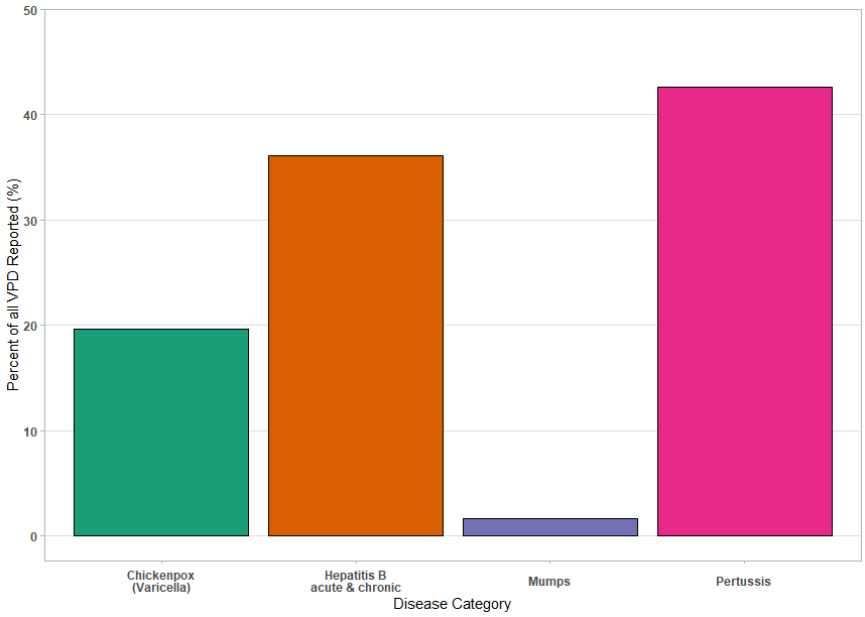
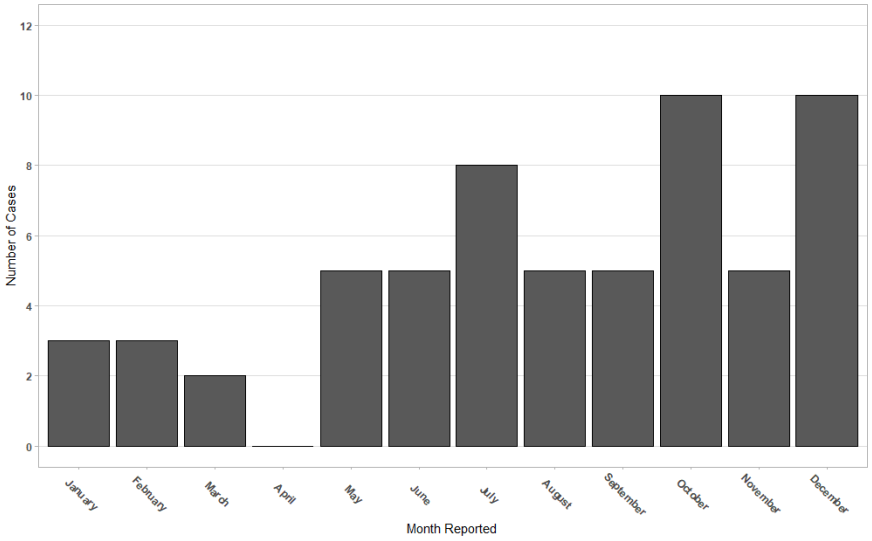


Figure 44. Number of VPDs Reported, by Month, Davis County, 2023



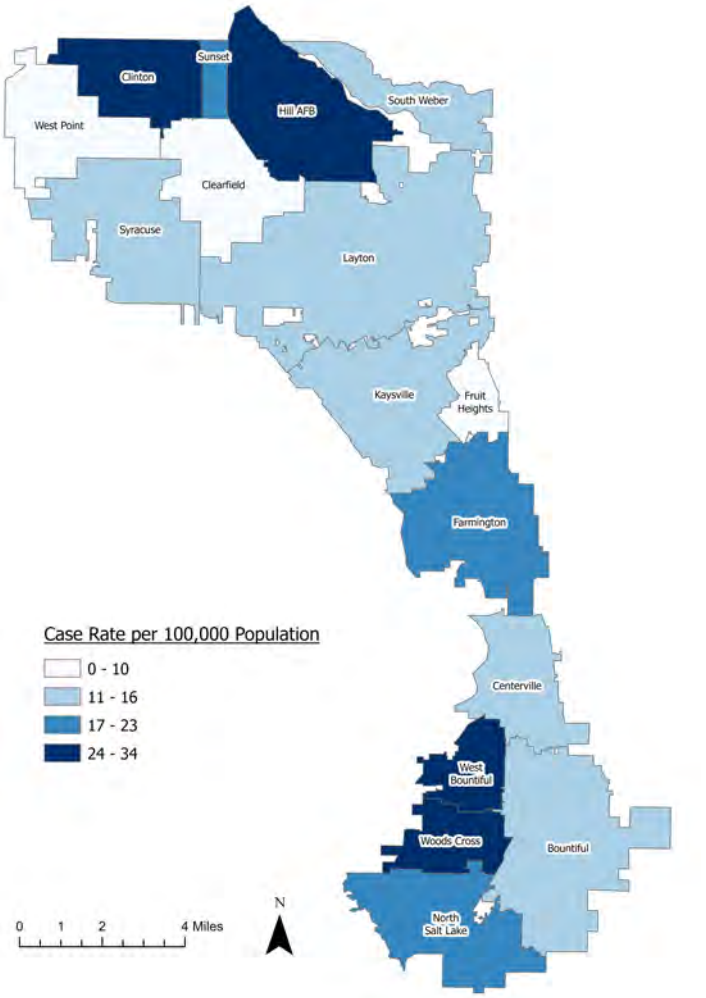
Vaccine-preventable diseases (VPDs) are diseases that are preventable through the use of immunizations. Historically, children had high rates of morbidity and mortality from VPDs. Rates of VPDs have dramatically declined in large part because of immunizations. However, these diseases can still occur due to importation, vaccine failure, disease breakthrough, and inadequate or no vaccine coverage.

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

There were **61** VPDs reported in 2023. Figure 43 presents the percentage of all VPD reports attributed to each specific disease. Pertussis was the most commonly reported with **26** (42.6%) cases. Others include hepatitis B (acute and chronic) with **22** cases (36.1%), chickenpox (varicella) with **12** cases (19.7%), and mumps with **one** case (1.6%).

Figure 44 presents the count of VPDs by month. The highest counts in October and December are primarily due to pertussis cases that exposed multiple people and resulted in multiple new cases.

Figure 45. Rate of VPDs, by City, Davis County, 2023



In 2023, VPDs were reported within every locality in Davis County. Figure 45 presents the incidence rate of VPDs reported by city per 100,000 population.

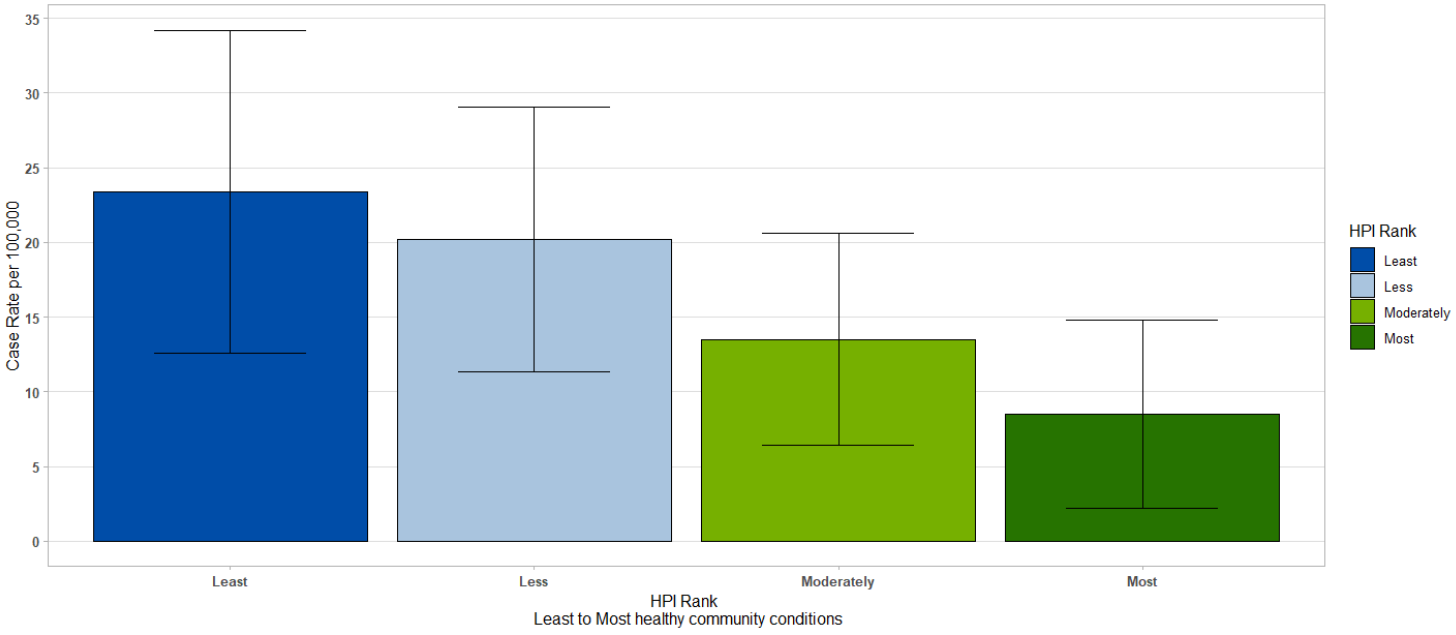
Clinton, Hill AFB, West Bountiful, and Woods Cross had the highest VPD rates, while Clearfield, Fruit Heights, and West Point had the lowest.

Figure 46 shows the rates of VPDs stratified by HPI rank area. As healthy community conditions improve, rates of VPDs decrease.

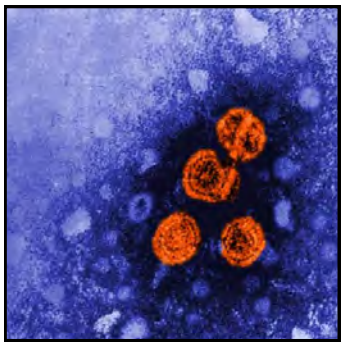
In the least healthy area, there were 23.4 cases of VPDs per 100,000 people, which is 63.2% higher compares to the rest of the county.

Conversely, the most healthy area there were 8.5 cases of VPDs per 100,000 people, which is 53.4% lower compared to the rest of the county.

Figure 46. Rate of VPDs, by HPI, Davis County, 2023



Hepatitis B

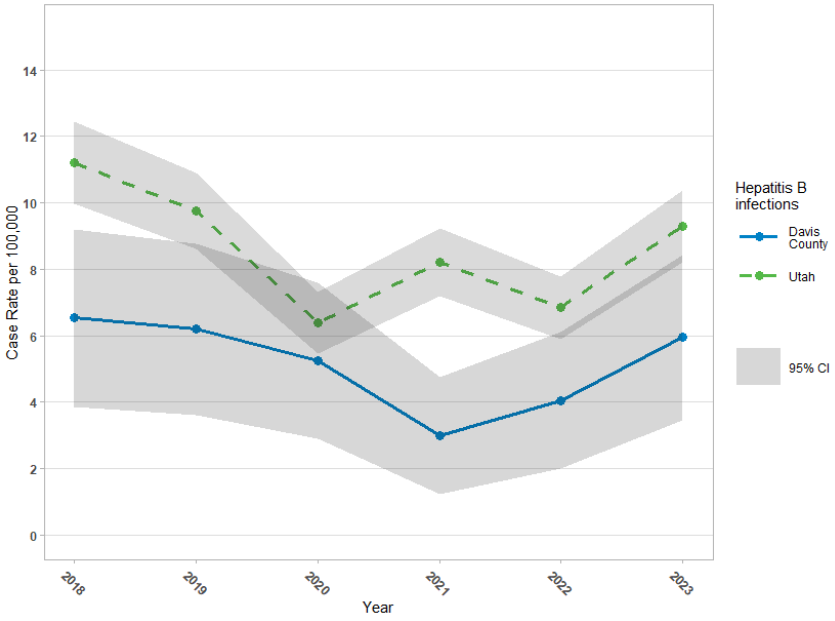


The mission of the Perinatal Hepatitis B Prevention Program is to increase identification and treatment of women, their infants, and household contacts that are positive for the hepatitis B virus.

Hepatitis B is caused by the hepatitis B virus (HBV). It is transmitted through blood or body fluids, and is more infectious than any other blood-borne pathogen (such as hepatitis C or HIV), and is more durable in the environment.[76] 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 from an infected mother. In the US, about 880,000 people are estimated to be living with chronic, long-term hepatitis B.[77]

Hepatitis B virus infection in a pregnant woman poses a serious risk to her infant at birth. Without post-exposure prophylaxis, as many as 90% of infants born to HBV-infected mothers in the US will become infected with HBV. Subsequently, 90% of those infants develop chronic HBV infection and approximately one-fourth of these infants eventually will die from liver-related complications. A vaccine for hepatitis B is available, and, during the last 30 years, vaccination has prevented more than half a million US children from acquiring the disease. Although the hepatitis B vaccine successfully prevents infection, women who have had the vaccine for hepatitis B should still get screened during every pregnancy.[78]

Figure 47. Rate of Acute and Chronic Hepatitis B Infections, by Year, Davis County and Utah, 2018-2023



During 2023, there were **22** cases of hepatitis B reported in Davis County. Of these 22 cases, **21** were chronic infections and **one** was determined to be a new acute infection. Figure 47 presents the incidence rates of hepatitis B infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, the data suggest that rates in Davis County are lower than the state.

Perinatal Hepatitis B Prevention Program

The Perinatal Hepatitis B Prevention Program is responsible for evaluating, monitoring, testing, and treating all reported cases of hepatitis B among pregnant women 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 of delivery. This is done to help prevent the newborn from acquiring the virus. The newborn is monitored until all three doses of vaccine have been administered. After vaccination, serology testing is conducted to ensure antibody protection. If the infant is a non-responder to the vaccine, a second series is given. Testing is repeated at completion of the second series. Women who are prenatally tested and determined to be chronic hepatitis B carriers are interviewed to identify close contacts. Identified contacts (sexual partners, household contacts, and children) are recommended to have testing to determine their infection status. If serology testing is negative, the hepatitis B vaccination series is encouraged. The case management of women in this program can range from eight to 18 months. In 2023, **six** women were referred to the DCHD Perinatal Hepatitis B Prevention Program.

Pertussis (also known as whooping cough) is a very contagious respiratory illness caused by the bacteria *Bordetella pertussis.*[79] This disease is of particular concern in infants because of higher rates of hospitalization, pneumonia, and death, when compared with older children and adults.[80]

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

Bordetella pertussis spreads easily from person to person through the air. When a person who has whooping cough sneezes or coughs, they can release small particles with the bacteria in them. Other people then breathe in the bacteria. It also spreads when people spend a lot of time together or share breathing space, like when you hold a newborn on your chest.[79]

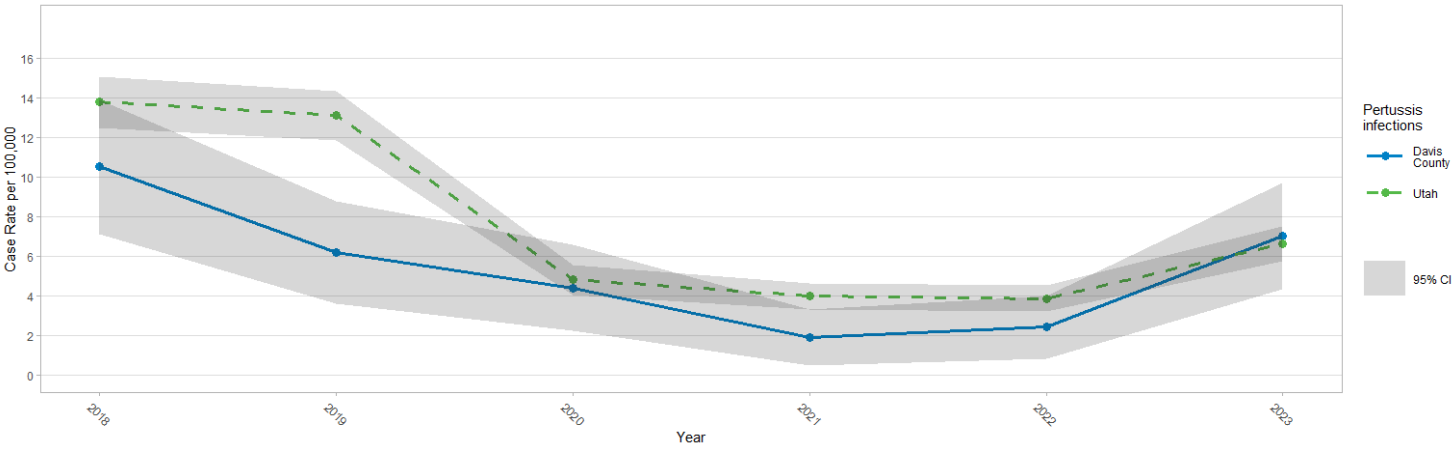
People can spread the bacteria from the start of the very first symptoms and for at least 2 weeks after coughing begins. Some people have mild symptoms and do not know they have whooping cough, but they can still spread the bacteria to others.[79]

Vaccination is a key tool in preventing pertussis infections. Babies need 3 shots of the DTaP vaccine to build up high levels of protection against diphtheria, tetanus, and whooping cough. Then, young children need 2 booster shots to maintain that protection through early childhood. Preteens should get one shot of Tdap between the ages of 11 and 12 years to boost their immunity. Teens who didn't get Tdap as a preteen should get one shot the next time they visit their doctor. All adults who have never received one should get a Tdap shot. This can be given at any time, regardless of when they last got Td. This should be followed by either a Td or Tdap shot every 10 years. Women should get Tdap during the early part of the 3rd trimester of every pregnancy. By doing so, she helps protect her baby from whooping cough in the first few months of life.[81]

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

During 2023, there were **26** cases of pertussis reported in Davis County. Figure 48 presents the incidence rates of pertussis infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, pertussis rates decreased both within Davis County and in the rest of Utah. Since 2020, pertussis rates in Davis County and the rest of the state have become more comparable.

Figure 48. Rate of Pertussis Infections, by Year, Davis County and Utah, 2018-2023



Zoonotic & Vector-borne Disease

A zoonotic or vector-borne diseases are passed from animals or insects to humans.

Figure 49. Percent of ZVBDs Reported, by Category, Davis County, 2023

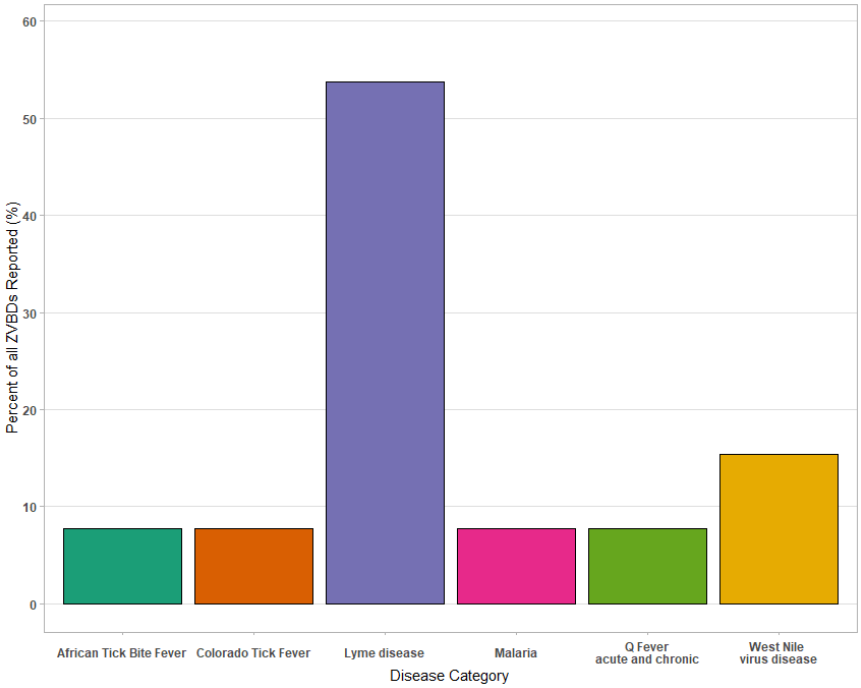
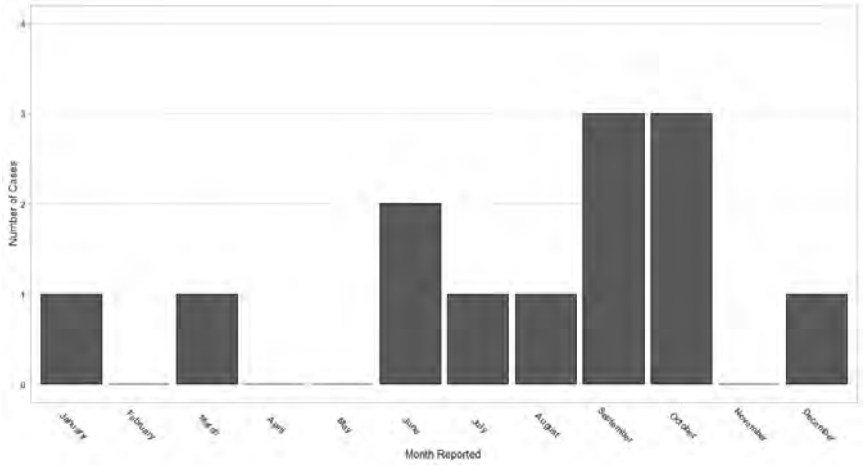


Figure 50. Number of ZVBDs Reported, by Month, Davis County, 2023



Zoonotic and vector-borne diseases (ZVBDs) are diseases that are transmitted by an animal or insect. Zoonotic (sometimes called "zoonoses") refers to diseases that are spread from animals to humans. Vector-borne diseases are spread to humans by insects or arthropods. The most common ways are through bites, or contact with animals and their feces.

While ZVBDs do not occur often in Davis County, there is still a risk of disease from viruses and bacteria spread by vectors. These diseases are typically contracted during out-of-state or international travel.

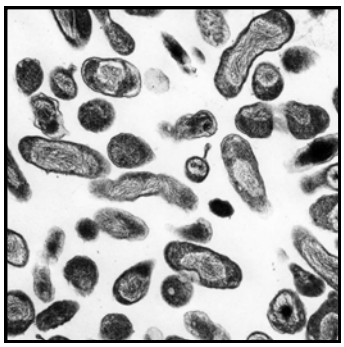
There were **13** cases of ZVBD reported in 2023. Figure 49 presents the percentage of all ZVBD reports attributed to each specific disease. Lyme disease was the most frequently reported with **7** cases (53.8%).

Others include West Nile virus disease with **two** cases (15.4%), and African Tick Bite fever, Colorado Tick Fever, malaria, and Q fever with **one** case each (7.7% each).

Figure 50 shows the number of ZVBD cases by month. The majority of cases occur during the summer and fall months when people are most likely to engage in outdoor activities.

Rates of ZVBDs are not displayed by city nor analyzed by HPI rank area due to low case counts.

Q fever is a disease caused by the bacteria *Coxiella burnetii*. It naturally infects some animals, such as goats, sheep, and cattle. It can be found in the birth products (such as placenta, amniotic fluid), urine, feces, and milk of infected animals. People can get infected by breathing in dust that has been contaminated by these infected animal fluids.[82] *C. burnetii* can survive for long periods of time in the environment and may be carried long distances by wind.[83]



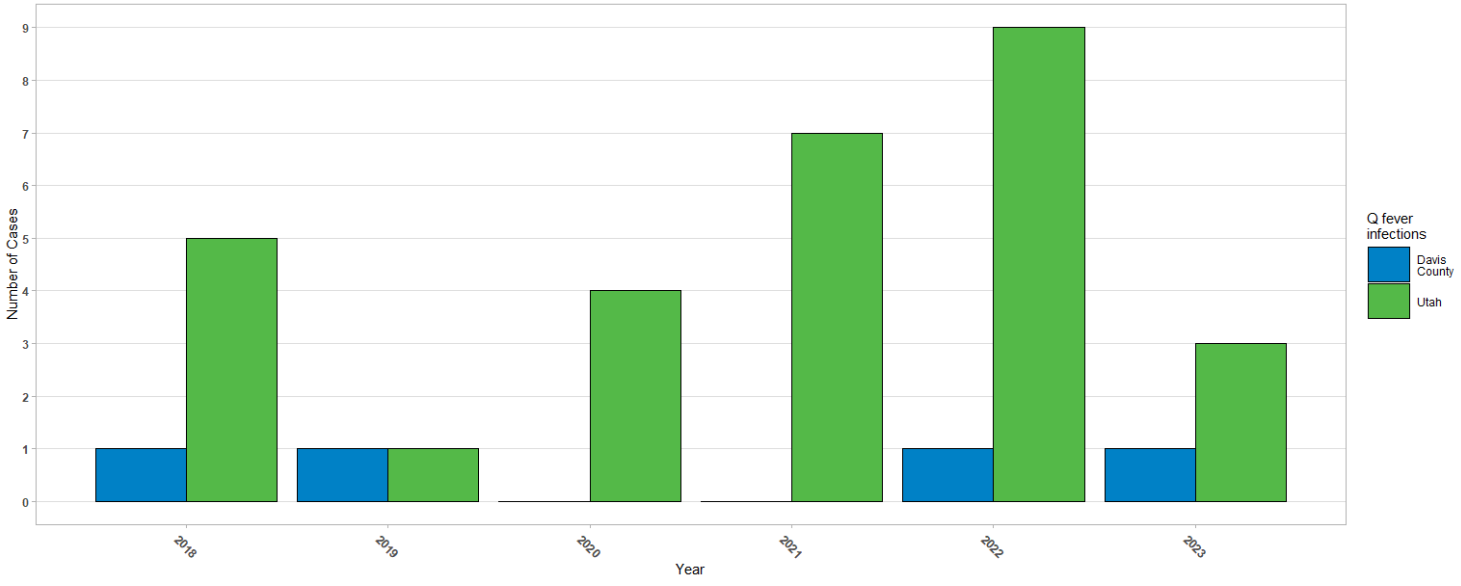
The symptoms of Q fever are similar to many other diseases, often making diagnosis difficult.

About half of people who get infected with *C. burnetii* will get sick. Illness typically develops two to three weeks after being exposed to the bacteria. This is acute Q fever. Signs and symptoms of Q fever may include fever, chills or sweats, fatigue, headache, muscle aches, vomiting, diarrhea, chest pain, stomach pain, weight loss, and non-productive cough. Symptoms can be mild or severe. People who develop severe disease may experience infection of the lungs (pneumonia) or liver (hepatitis). Women who are infected during pregnancy may be at risk for miscarriage, stillbirth, pre-term delivery, or low infant birth weight.[84]

A very small percentage of people (less than 5%) who become infected with *C. burnetii* will develop a more serious infection called chronic Q fever. Chronic Q fever develops months or years following the initial Q fever infection. People with chronic Q fever often develop an infection of one or more heart valves (called endocarditis). People with endocarditis may experience night sweats, fatigue, shortness of breath, weight loss, or swelling of their limbs. A healthcare provider will need to perform a series of tests to diagnose endocarditis. Chronic Q fever is serious and can be deadly if not treated correctly, requiring months of antibiotic treatment. It is more likely to occur in people with heart valve disease, blood vessel abnormalities, or in people with weakened immune systems. Women infected during pregnancy may also be at risk for developing chronic Q fever.[84]

During 2023, there was **one** case of Q fever reported in Davis County. Figure 51 presents counts of Q fever cases in Davis County compared to the rest of Utah from 2018 to 2023. Q fever has been relatively uncommon in Davis County.

Figure 51. Number of Q Fever Infections (Acute and Chronic), by Year, Davis County and Utah, 2018-2023



Tickborne Diseases

This is an Ixodes pacificus*—known vector for the zoonotic spirochetal bacteria,* Borrelia burgdorferi*, which is the pathogen responsible for causing Lyme disease.*

Ticks are related to spiders, but they do not spin webs or eat insects. Instead, they feed on the blood of a host, like mammals, birds, reptiles, and amphibians. After tick eggs hatch, the ticks must have a blood meal at every stage of life to survive. Most prefer to have a different host animal at each stage of their life.[85,86]

Ticks live in places where there is a lot of tall grass, shrubs, and leaves, where they wait for a host to pass by. When a tick successfully attaches to a host, it will suck the blood slowly for several days. If the host animal has an infection, the tick will ingest the pathogens with the blood. After feeding, most ticks will drop off and prepare for the next life stage. At its next feeding, the tick can then transmit an acquired disease to the new host. These feeding practices make ticks an important vector for disease transmission.[85]

Not all tick species bite people. Of those that do, different species will transmit different pathogens.[87] Figure 52 displays a dot density map of selected tickborne diseases in the contiguous US[88] This map shows regional differences in which tickborne diseases are transmitted to humans.

In 2023, Davis County saw **seven** cases of Lyme disease, **one** case of African Tick Bite Fever, and **one** case of Colorado Tick Fever. These three diseases share a few similar symptoms, such as fever, headache, myalgia, and lymphadenopathy. All are also rarely life threatening. However, there are some key differences.

Lyme Disease

Lyme disease is the most common vector-borne disease in the United States. It is caused by the bacterium *Borrelia burgdorferi.* Its characteristic symptom is the bullseye-shaped skin rash called erythema migrans. If left untreated, the infection can spread to joints, the heart, and the nervous system.[89,90]

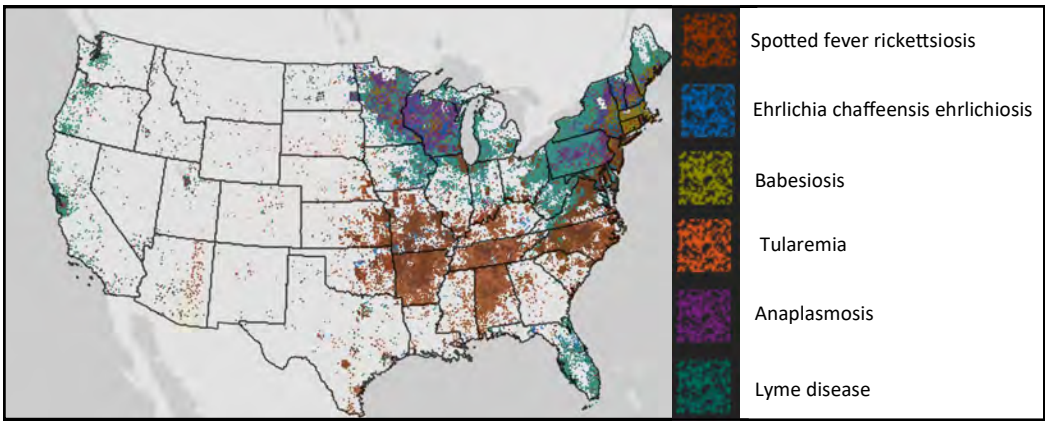
African Tick Bite Fever

African Tick Bite Fever is caused by the bacterium *Rickettsia africae*. The ticks that carry *R. africae* are found in sub-Saharan Africa, the Caribbean (West Indies), and Oceania.[89,91]

Colorado Tick Fever

Unlike the previous two diseases, Colorado Tick Fever is caused by a virus, *Colorado tick fever coltivirus*, rather than bacteria. It is found in the western US, primarily Colorado, Utah, Montana, and Wyoming. In rare cases, some people may develop more severe illness that affects the central nervous system with symptoms that include stiff neck and confusion.[89,92]

Figure 52. Reported Cases* of Selected Tickborne Diseases, by County of Residence, United States, 2016 - 2019



* 1 dot = 1 case as reported to CDC.

West Nile virus (WNV) is the leading cause of mosquito-borne disease in the continental United States. It is most commonly spread to people by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes then spread WNV to people and other animals by biting them. In a very small number of cases, WNV has been spread through exposure in a laboratory setting, blood transfusion and organ transplant, or mother to baby during pregnancy, delivery, or breastfeeding.[93,94]

A close-up view of an Aedes aegypti *mosquito. This species is one of the known vectors for West Nile virus.*

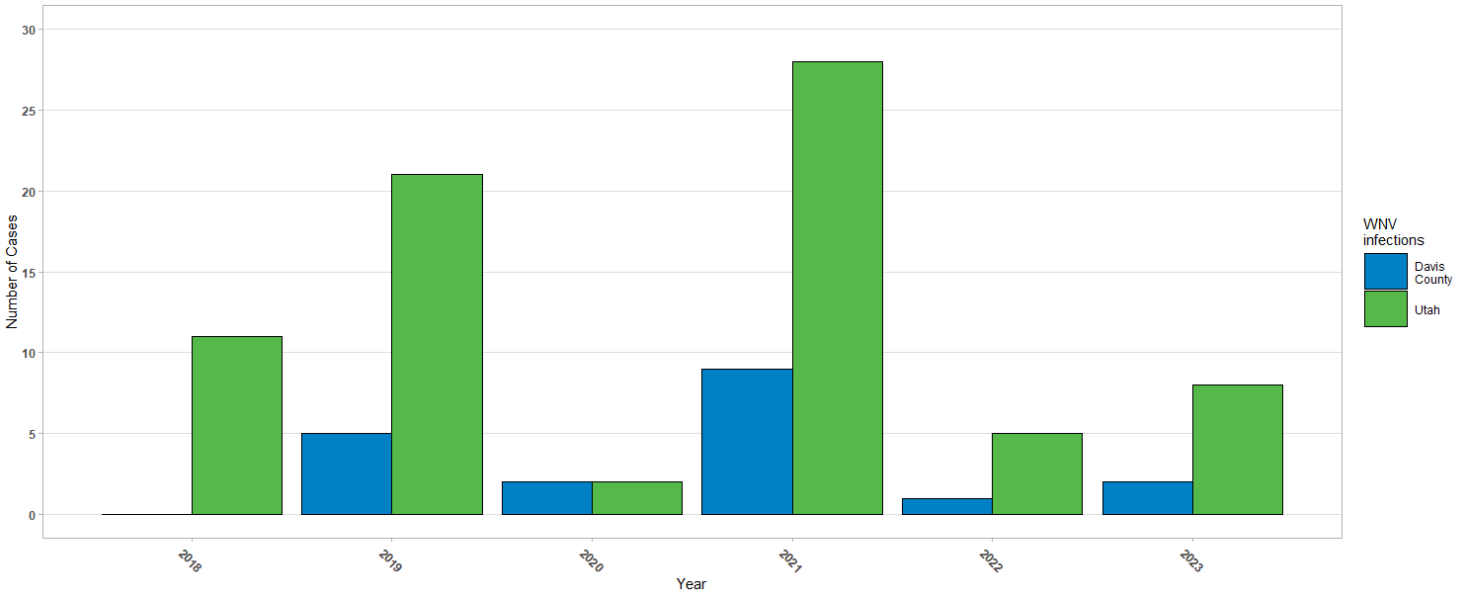
Most people (about 80%) who get infected with WNV do not develop any symptoms. About 20% of people infected with WNV will develop a fever and other symptoms such as headache, body aches, joint paints, vomiting, diarrhea, and rash. Most people with WNV disease recover completely, but fatigue and weakness can last for weeks or months.[95]

In rare cases, less than 1% of people infected with WNV will develop severe illness that affects the central nervous system. This can result in complications such as encephalitis (inflammation of the brain) or meningitis (inflammation of the membranes that surround the brain and spinal cord). Other symptoms include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. Recovery from severe illness might take several weeks or months. Some effects to the central nervous system might be permanent. About one out of 10 people who develop severe illness affecting the central nervous system die.[95]

The best way to prevent WNV is to protect yourself from mosquito bites. Use insect repellent, wear long-sleeved shirts and pants, treat clothing and gear, and take steps to control mosquitoes indoors and outdoors.[96]

During 2023, there were **two** cases of WNV reported in Davis County. Figure 53 presents counts of WNV in Davis County compared to the rest of Utah from 2018 to 2023.

Figure 53. Number of WNV Infections, by Year, Davis County, 2018-2023



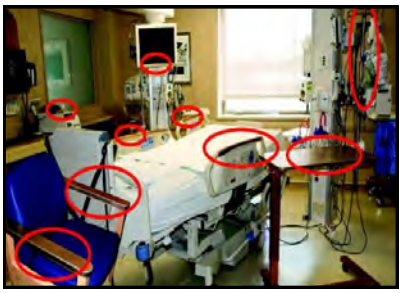
Other Diseases

Diseases that do not fall under a specific category.

Diseases that do not fall under a specific identified category will be discussed in this section. In 2023, hepatitis C (acute and chronic) infections constituted the majority of this category with **88** cases. Table 10 shows the count of all diseases in this category.

Table 10. Number of Cases of Other Reported Diseases, Davis County, 2023

Disease	Number of Cases
Carbapenem-Resistant Organisms (CROs)	43
Coccidioidomycosis	10
Hepatitis C, acute & chronic	88
Legionellosis	5
Total	**146**

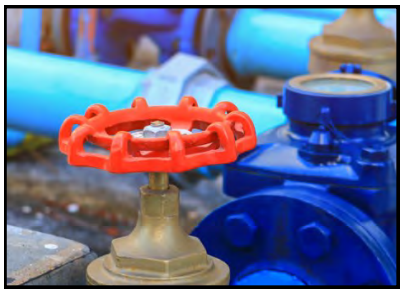


Carbapenem–Resistant Organisms

Coccidioidomycosis

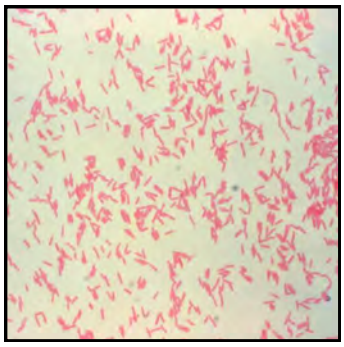
Hepatitis C

Legionellosis



Carbapenem-Resistant Organisms

The public health problem of antibiotic resistance is not new. Since the creation of antibiotic medicines, bacteria continue to evolve to find ways to kill the antibiotics created to stop their spread. Due to the overuse of antibiotics in humans and animals, the problem is increasing in magnitude and new multidrug-resistant organisms (MDROs) are emerging. Antibiotic resistance occurs when the germs no longer respond to the antibiotics designed to kill them. Bacteria are constantly finding new ways to avoid the effects of the antibiotics used to treat the infections they cause.[97]



Pseudomonas *is a type of bacteria that is found commonly in soil and water. Of the many different types of* Pseudomonas*, the one that most often causes infections in humans is* Pseudomonas aeruginosa*, which can cause infections in the blood, lungs, or other parts of the body.*

CROs are a major concern for patients in healthcare settings because they are resistant to carbapenem antibiotics, which are considered the last line of defense to treat multidrug-resistant bacterial infections. Often, high levels of antibiotic resistance in CROs leave only treatment options that are more toxic and less effective.[98]

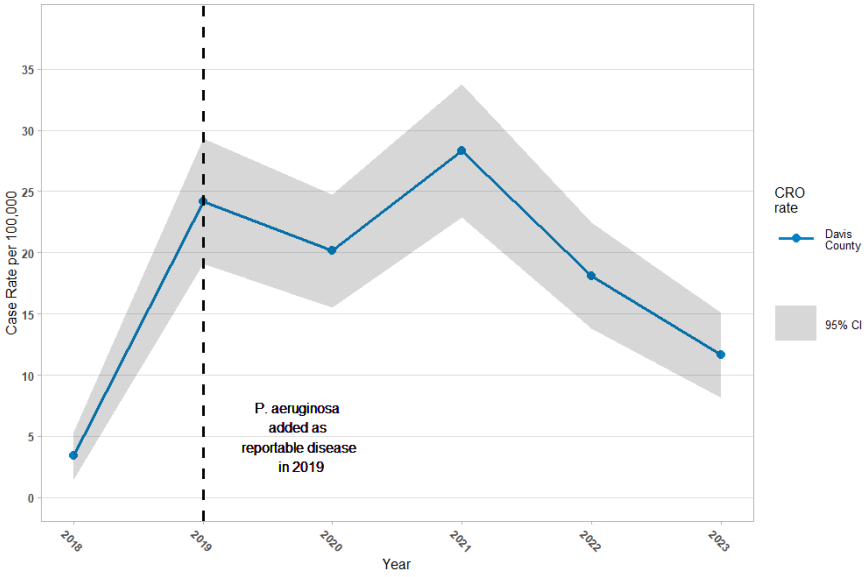
Utah laboratories and healthcare facilities are required to report the following bacterial species if they are found to have any resistance to carbapenem drugs: *Acinetobacter* species, *Enterobacter* species, *Escherichia coli*, *Klebsiella* species, and *Pseudomonas aeruginosa*

During 2023, there were **43** cases of CRO reported in Davis County. Figure 54 presents the incidence rate of CRO infections per 100,000 people in Davis County from 2018 to 2023. The addition of *Pseudomonas aeruginosa* as a reportable disease likely contributed to the increase in reported cases from 2018 to 2019.

In August 2022, DCHD was notified of a case of CRPA bacteria in an individual who resided at a health care facility. This was unusual because it was a rare carbapenemase-producing strain called VIM that had never been reported in the US. It was ultimately part of a larger outbreak of 81 cases of VIM-CRPA across 18 states. Specific brands of artificial tear products have been identified as a common exposure in many VIM-CRPA cases.[1]

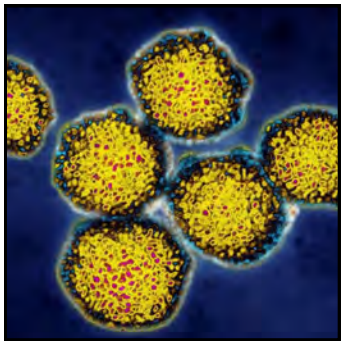
CD/Epi collaborated with DHHS and CDC to help contain the outbreak and stop the spread of VIM-CRPA at the facility. This included screening patients to find additional cases (i.e. point prevalence surveys), reviewing infection control procedures, evaluating water infection risks, and submitting product samples for testing.

Figure 54. Rate of CRO Infections, by Year, Davis County, 2018-2023



The outbreak continued into 2023 as additional cases were found in Davis County. Additional point prevalence surveys were conducted before declaring the outbreak over in July 2023. CD/Epi assisted with a total of six point prevalence surveys: two in 2022 and four in 2023. Despite the end of the outbreak, the facility continues to screen new patients upon admission for any drug-resistant organism, per their policy. Additionally, when patients are discharged to other facilities, the receiving facility is notified to keep patients in contact precautions to prohibit further transmission within the facility.

Hepatitis C



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

Hepatitis C is a liver infection caused by the hepatitis C virus (HCV). Hepatitis C is spread through contact with blood from an infected person. Today, most people become infected with the hepatitis C virus by sharing needles or other equipment used to prepare and inject drugs.[99]

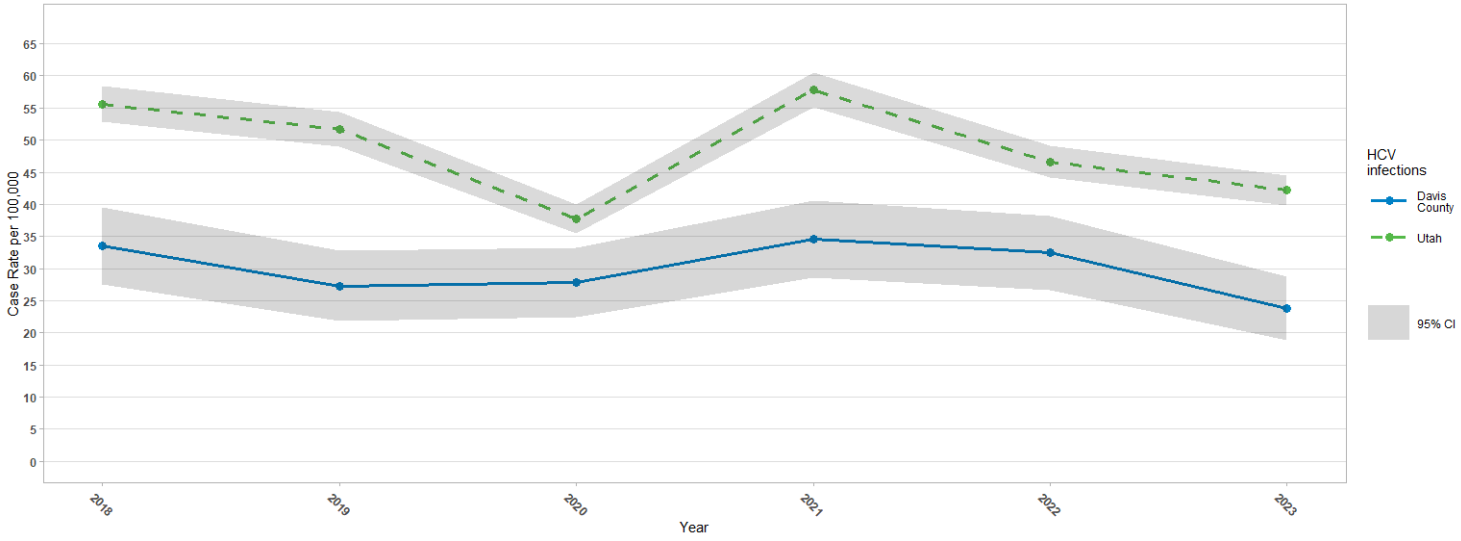
For some people, hepatitis C is a short-term illness, but for more than half of people who become infected with the hepatitis C virus, it becomes a long-term, chronic infection. Chronic hepatitis C can result in serious, even life-threatening health problems like cirrhosis and liver cancer. People with chronic hepatitis C can often have no symptoms and do not feel sick. When symptoms appear, they often are a sign of advanced liver disease.[99]

There is no vaccine for hepatitis C. The best way to prevent hepatitis C is by avoiding behaviors that can spread the disease, especially injecting drugs. Getting tested for hepatitis C is important, because treatments can cure most people with hepatitis C in 8 to 12 weeks.[99] In addition, prior infection with HCV does not protect against later infection with the same or different genotypes of the virus. This is because people infected with HCV typically have an ineffective immune response due to changes in the virus during infection.[100]

Of every 100 people infected with HCV, approximately 5-25 will develop cirrhosis within 10-20 years. Patients who develop cirrhosis have a 1%-4% annual risk of developing hepatocellular carcinoma and a 3%-6% annual risk of hepatic decompensation; for the latter patients, the risk of death in the following year is 15%-20%.[100]

During 2023, there were **88** cases of HCV reported in Davis County. Of these 88 cases, **74** of them were chronic infections and **14** were determined to be new acute infections. Figure 55 presents the incidence rate of HCV infections (both acute and chronic) per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, rates in Davis County have consistently been lower than the state.

Figure 55. Rate of Hepatitis C Infections (Acute and Chronic), by Year, Davis County and Utah, 2018-2023



Legionella bacteria are found naturally in freshwater environments, like lakes and streams. The bacteria can become a health concern when they grow and spread in human-made building water systems like showerheads and sink faucets, cooling towers, hot tubs, decorative fountains and water features, hot water tanks and heaters, and large, complex plumbing systems.[101]

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

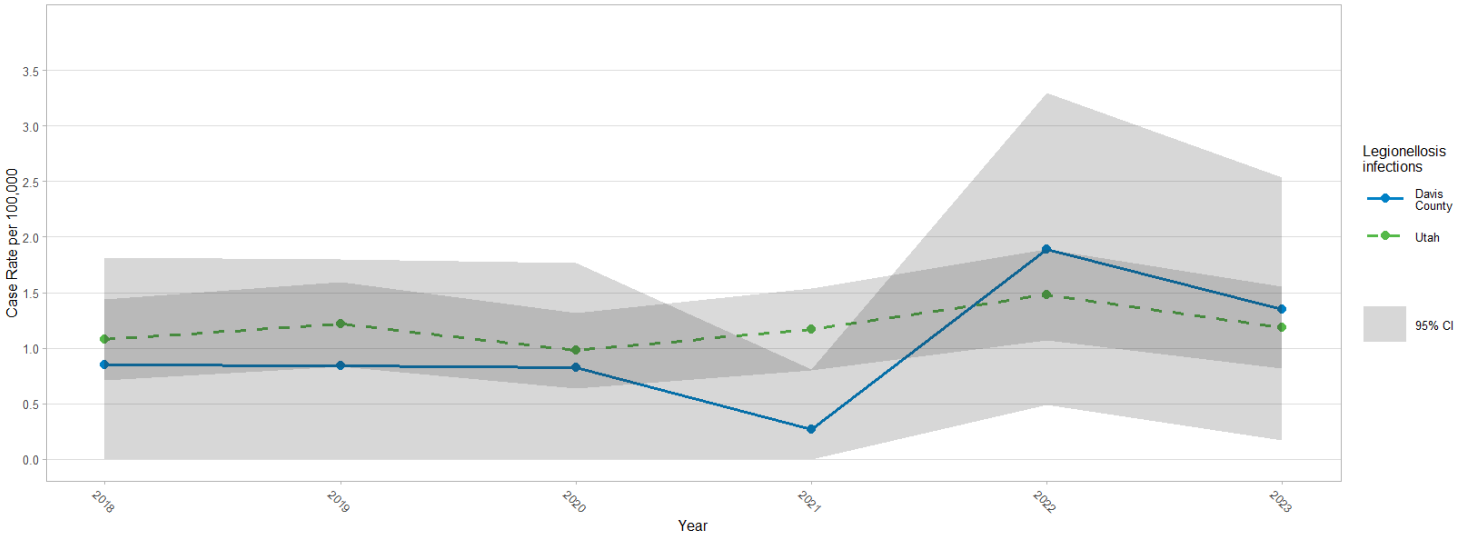
After *Legionella* grows and multiplies in a building water system, water containing *Legionella* can spread in droplets small enough for people to breathe in. The *Legionella* bacteria can cause Legionnaire's disease and Pontiac fever, collectively known as legionellosis.[101, 102] Symptoms include cough, shortness of breath, fever, muscle aches, and headaches.

Less commonly, people can get sick by aspiration of drinking water containing *Legionella*. This happens when water accidently goes into the lungs while drinking. People at increased risk of aspiration include those with swallowing difficulties.[101]

Most healthy people exposed to *Legionella* do not get sick. People at increased risk of getting sick are people 50 years or older, current or former smokers, people with a chronic lung disease (like chronic obstructive pulmonary disease or emphysema), people with weak immune systems or who take drugs that weaken the immune system (like after a transplant operation or chemotherapy), people with cancer, and people with underlying illnesses such as diabetes, kidney failure, or liver failure.[101] About one in 10 people who get sick from Legionnaire's disease will die. In general, people do not spread Legionnaires' disease to other people. However, this may be possible under rare circumstances.[102]

In 2023, Davis County had **five** cases of legionellosis. Figure 56 presents the incidence rate of legionellosis infections per 100,000 people in Davis County compared to the rest of Utah from 2018 to 2023. During this timeframe, these data suggest that Davis County rates are comparable to the rest of the state. However, this also may be a function of low case counts.

Figure 56. Rate of Legionellosis Infections, by Year, Davis County and Utah, 2018-2023



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Appendices

Appendix 1 — Davis County Demographics (2022)

Table 11. Davis County and Utah Population, Count and Percent, by Age Group, 2022

Age Group	Davis County Population	Utah Population
Under 5	25,729 7.0%	228,464 6.8%
5-14	63,768 17.2%	531,953 15.7%
15-24	57,748 15.6%	577,471 17.1%
25-44	106,502 28.8%	955,993 28.3%
45-64	75,830 20.5%	683,220 20.2%
65-84	37,066 10.0%	365,756 10.8%
85+	3,755 1.0%	37,943 1.1%
Total	**369,948 100%**	**3,380,800 100%**

Table 12. Davis County and Utah Population, Count and Percent, by Race, 2022

Race	Davis County Population	Utah Population
White alone	317,034 85.7%	2,678,510 79.2%
Black or African-American alone	5,029 1.4%	37,613 1.1%
American Indian or Alaskan Native alone	1,463 0.4%	34,434 1.0%
Asian alone	6,884 1.9%	84,324 2.5%
Native Hawaiian or Pacific Islander alone	3,618 1.0%	37,340 1.1%
Some other race alone	11,334 3.1%	210,508 6.2%
Two or more races	24,586 6.6%	298,071 8.8%
Total	**369,948 100%**	**3,380,800 100%**

Table 13. Davis County and Utah Population, Count and Percent, by Gender, 2022

Sex	Davis County Population	Utah Population
Male	187,316 50.6%	1,716,117 50.8%
Female	182,632 49.4%	1,664,683 49.2%
Total	**369,948 100%**	**3,380,800 100%**

Table 14. Davis County and Utah Population, County and Percent, by Ethnicity, 2022

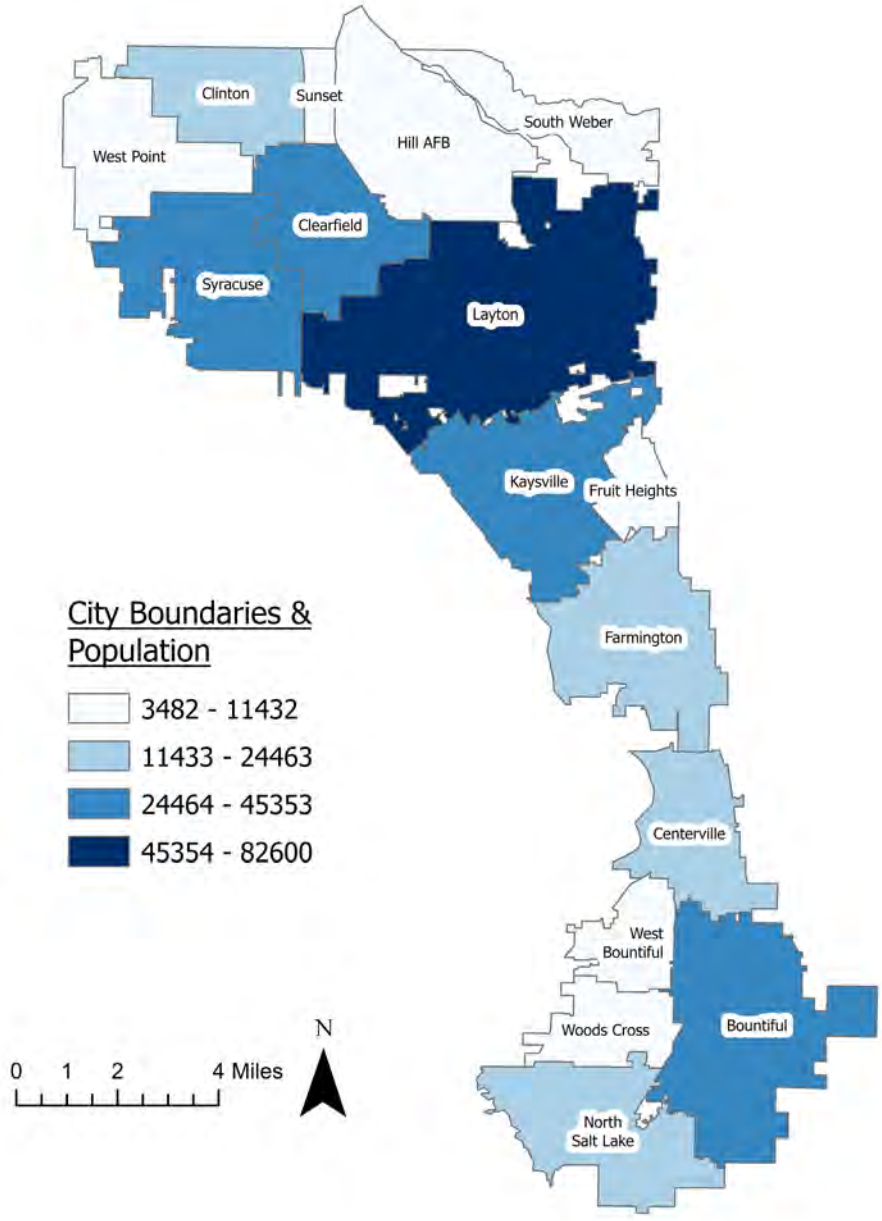
Ethnicity	Davis County Population	Utah Population
Hispanic or Latino (of any race)	41,060 11.1%	512,086 15.1%
Not Hispanic or Latino	328,888 88.9%	2,868,714 84.9%
Total	**369,948 100%**	**3,380,800 100%**

Source: US Census Bureau. 2022 American Community Survey. https://data.census.gov/. Accessed on March 15, 2024.
Population estimates for 2023 are not yet available.

Table 15. Davis County Population, by City, 2022

City	Population
Bountiful	45,353
Centerville	16,740
Clearfield	32,369
Clinton	23,389
Farmington	24,463
Fruit Heights	6,018
Hill Air Force Base	3,482
Kaysville	32,714
Layton	82,600
North Salt Lake	21,875
South Weber	7,939
Sunset	5,443
Syracuse	32,798
West Bountiful	5,905
West Point	11,226
Woods Cross	11,432

Figure 57. Davis County City Boundaries & Population, 2022



Source: US Census Bureau. 2022 American Community Survey. https://data.census.gov/. Accessed on March 15, 2024.
Population estimates for 2023 are not yet available.

Appendix 2 — Utah Reportable Diseases

UTAH REPORTABLE DISEASES

Davis County Health Department Disease Reporting Line
Phone: (801) 525-5220
Fax: (801) 525-5210

DISEASE REPORTING RULE

Utah law requires prompt disease reporting under the Communicable Disease Rule R386-702, adopted under the authority of Sections 26-1-30, 26-6-3, and 26-23b to interrupt disease transmission, locate and provide prophylaxis or treatment to exposed contacts, identify and contain outbreaks, ensure effective treatment and follow-up of cases, and alert the medical community. All reports required by rule are confidential and are not open to public inspection. Nothing in this rule, however, precludes the discussion of case information with the attending physician or public health workers. A release of information is not required to provide public health workers with patient information.

Diseases that require **immediate** reporting should be telephoned to the Disease Reporting Line at **(801) 525-5220**. The disease reporting line is available 24/7.

Non-urgent disease reports may be telephoned to the disease reporting line or faxed to **(801) 525-5210.**

For questions about disease reporting, please contact dchdepi@co.davis.ut.us or call (801) 525-5200.

Davis COUNTY HEALTH DEPARTMENT

Davis County Health Department
Communicable Disease & Epidemiology Division

22 South State Street
Clearfield, UT 84015

Disease Reporting Line
Phone: (801) 525-5220
Fax: (801) 525-5210

Revised July 2023

*Laboratories shall submit clinical material to the Utah Public Health Laboratory for all cases identified with these organisms, or any organism implicated in an outbreak when instructed by authorized local or state health department staff.

†Full panel susceptibility results, including minimum inhibitory concentration and results suppressed to the ordering clinician, are reportable when performed on the following organisms.

REPORT IMMEDIATELY

- **Anthrax*** (*Bacillus anthracis*)
- **Botulism*** (*Clostridium botulinum*)
- **Cholera** (*Vibrio cholerae*)
- **Coronavirus**, novel – including MERS and SARS
- **Diphtheria*** (*Corynebacterium diphtheriae*)
- ***Haemophilus influenzae*, invasive disease**
- **Hepatitis A**
- **Influenza infection, non-seasonal strain***
- **Measles*** (Rubeola virus)
- **Meningococcal disease*** (*Neisseria meningitidis*)
- **Plague*** (*Yersinia pestis*)
- **Poliomyelitis,** paralytic and non-paralytic
- **Rabies,** human and animal
- **Rubella,** excluding congenital syndrome
- **Smallpox** (Variola virus)
- ***Staphylococcus aureus*†,** with resistance to vancomycin (VRSA) isolated from any site
- **Transmissible spongiform encephalopathies (prion diseases), including Creutzfeldt-Jakob disease**
- **Tuberculosis*†** (*Mycobacterium tuberculosis*)
- **Tularemia*** (*Francisella tularensis*)
- **Typhoid*†** (*Salmonella typhi*), cases and carriers
- **Viral hemorrhagic fevers,** including Ebola, Lassa, and Marburg virus-related illnesses
- **Yellow Fever**
- **Any unusual diseases or outbreaks of any kind and any exposure/infection that may indicate a bioterrorism event**

REPORT WITHIN THREE (3) DAYS

- **Acute flaccid myelitis (AFM)**
- **Adverse event resulting from smallpox vaccination** (Vaccinia virus)
- **Anaplasmosis** (*Anaplasma phagocytophilum*)
- **Arbovirus infection,** including Chikungunya, West Nile virus*, and Zika virus*
- **Babesiosis** (*Babesia*)
- **Botulism, infant*** (*Clostridium botulinum*)
- **Brucellosis*** (*Brucella*)
- **Campylobacteriosis*** (*Campylobacter*)
- ***Candida auris* or *haemulonil*** from any body site*†
- **Carbapenem-resistant or carbapenemase-producing *Acinetobacter* species, *Enterobacter* species, *Escherichia coll*, *Klebsiella* species, any other Enterbacteriaceae species, or *Pseudomonas aeruginosa**†**
- **Chagas disease**
- **Chancroid** (*Haemophilus ducreyi*)
- **Chickenpox** (Varicella-zoster virus)
- ***Chlamydia trachomatis* infection**
- **Coccidioidomycosis** (*Coccidioides*)
- **Colorado tick fever**
- **COVID-19 (SARS-CoV-2) detected by NAAT***
- **Cryptosporidiosis** (*Cryptosporidium*)
- **Cyclosporiasis** (*Cyclospora*)
- **Dengue fever**
- **Ehrlichiosis** (*Ehrlichia*)
- **Encephalitis,** bacterial, fungal, parasitic, protozoan, and viral
- **Giardiasis** (*Giardia lamblia*)
- **Gonorrhea** (*Neisseria gonorrhoeae*), sexually transmitted & ophthalmia neonatorum†
- **Hantavirus infection** (Sin Nombre virus)
- **Hemolytic Uremic Syndrome,** post-diarrheal
- **Hepatitis, viral,** including hepatitis B (acute, chronic, and perinatal), C (acute, chronic, perinatal), D, and E
- **Human immunodeficiency virus (HIV) infection,** including perinatal and AIDS
- **Influenza-associated hospitalization***
- **Influenza-associated death in a person less than 18 years of age**
- **Legionellosis*** (*Legionella*)
- **Leprosy** (*Mycobacterium leprae*), Hansen's Disease
- **Leptospirosis** (*Leptospira*)
- **Listeriosis*** (*Listeria*)
- **Lyme disease** (*Borrelia burgdorferi* and *mayonli*)
- **Malaria** (*Plasmodium*)
- **Meningitis,** bacterial, fungal, parasitic, protozoan, and viral
- **Mumps**
- **Mycobacterial infections other than tuberculosis**
- **Pertussis** (*Bordetella pertussis*)
- **Pregnancy associated with a Hepatitis B, Hepatitis C, HIV, *Listeria*, Rubella, Syphilis, or Zika virus infection**
- **Psittacosis** (*Chlamydophila psittaci*)
- **Q Fever** (*Coxiella burnetii*)
- **Relapsing fever** (*Borrelia*), tick-borne and louse-borne
- **Rubella,** congenital syndrome
- **Salmonellosis*†** (*Salmonella*)
- **Shiga toxin-producing *Escherichia coll* (STEC) infection***
- **Shigellosis*†** (*Shigella*)
- **Spotted fever rickettsioses, including Rocky Mountain spotted fever** (*Rickettsia*)
- **Streptococcal disease, invasive,** due to *Streptococcus pneumoniae*†** and Groups A and B
- **Syphilis,** all stages, congenital and syphilitic stillbirths
- **Tetanus** (*Clostridium tetani*)
- **Toxic-Shock Syndrome,** staphylococcal or streptococcal
- **Trichinellosis** (*Trichinella*)
- **Vibriosis*** (*Vibrio*)

ELECTRONIC LABORATORY REPORTING (ELR)

Entities reporting via ELR have additional reporting requirements not listed on this document. Those requirements can be found under the "Information for Reporters" tab at https://epi.health.utah.gov/disease-reporting/ or by contacting the Utah Department of Health and Human Services at edx@utah.gov.

Appendix 3 — Acronyms

ATBD	Active tuberculosis disease
CD/Epi	Communicable Disease and Epidemiology Division
CDC	Centers for Disease Control and Prevention
CJCC	Clearfield Job Corps Center
COVID-19	Coronavirus disease 2019
CRO	Carbapenem-resistant organism
CRPA	Carbapenem-resistant *Pseudomonas aeruginosa*
DCHD	Davis County Health Department
DHHS	Utah Department of Health and Human Services
DIS	Disease intervention specialist
DOT	Directly observed therapy
E.coli	*Escherichia coli*
ED	Emergency department
EMS	Emergency medical services
GBS	Guillain-Barré Syndrome
HBIG	Hepatitis B virus immune globulin
HBV	Hepatitis B virus
HCV	Hepatitis C virus
Hill AFB	Hill Air Force Base
HIV	Human immunodeficiency virus
HPI	Utah Healthy Places Index
HSV	Herpes simplex virus
HUS	Hemolytic uremic syndrome
ICAR	Infection Control Assessment and Response
IGRA	Interferon gamma-release assay
ILI	Influenza-like illness
LTBI	Latent tuberculosis infection
MDR	Multidrug resistant
MDRO	Multidrug-resistant organism
MPC!	Making Proud Choices!
MSM	Men who have sex with men
OSHA	US Occupational Safety and Health Administration
PCV7	Pneumococcal conjugate vaccine
PCV13	Pneumococcal conjugate vaccine
PCV15	Pneumococcal conjugate vaccine
PCV20	Pneumococcal conjugate vaccine
PID	Pelvic inflammatory disease
PPSV23	Pneumococcal polysaccharide vaccine
PrEP	Pre-exposure prophylaxis
RIR	Respiratory Illness Report
RSV	Respiratory syncytial virus
SDOH	Social determinants of health
SHARP	Sexual Health and Adolescent Risk Prevention
STEC	Shiga-toxin producing *E. coli*
STI	Sexually transmitted infection
STSS	Streptococcal toxic shock syndrome
TB	Tuberculosis
TOP	Teen Outreach Program
TST	Tuberculin skin test
UPHL	Utah Public Health Laboratory
US	United States
VIM	Verona integron-mediated mettalo-β-lactamase
VPD	Vaccine-preventable disease
WGS	Whole genome sequencing
WNV	West Nile Virus
XDR	Extensively drug resistant
ZVBD	Zoonotic and vector-borne disease