
DISTRICT HEALTH DEPARTMENT #10
**2023 ANNUAL COMMUNICABLE
DISEASE SUMMARY**



***District Health
Department #10***
Healthy People, Healthy Communities



INTRODUCTION

BY JENNIFER MORSE, MD, MPH, FAAFP

An important function of public health is communicable disease investigation and control. The following report provides a review of the communicable disease cases in the 10 counties of District Health Department #10 (DHD10) that were reported in 2023 and the trends over time. Overall, most diseases have been stable. There are a couple of sets of data that stand out this year of which I wish to make comment:

1. High numbers of varicella (chickenpox) and pertussis (whooping cough) in Newaygo and Lake Counties respectively, and
2. Increases in vector-borne diseases, specifically Lyme disease and ehrlichiosis in recent years.

In 2023, there were a total of 38 vaccine preventable disease cases report in our district. Twelve of these illnesses were chickenpox, the highest number of cases of this disease we have had reported since 2017 when 12 cases were also reported. More cases than this have not occurred in 10 years, when in 2013 there were 15 cases reported. Most of these cases occurred during an outbreak of chickenpox in Newaygo County. There was also a high rate of pertussis, or whooping cough, in Lake County. The rate is a calculation of how many cases there would have been during the year if the population of each county were 100,000. By adjusting a total number to a rate, it allows for more equal comparisons regardless of how big or small a county is. There were only 2 cases of pertussis in 2023, both in Lake County. Those 2 cases equal a rate of 16 cases per 100,000 people for that county. Those two cases were connected to each other, so this was also [considered an outbreak](#) and a great deal of effort occurred to prevent more cases.

There are also a couple of counties with outlying amounts of vector borne diseases. Vector borne diseases are those spread by mosquitos, ticks, or other living things. The two most common in Michigan are Lyme disease and anaplasmosis, both spread by ticks. Lyme disease is still more common in certain parts of Michigan, namely the Upper Peninsula and the western Lower Peninsula but its vector, the blacklegged tick, continues to expand its territory, and the diseases it spreads, across the state.

The number of Lyme disease cases in Michigan nearly doubled from 2022 to 2023, going from 1,109 to 2,194. The cases in DHD10 likewise increased between 2022 and 2023 from 22 to 30. The county in DHD10 with the most Lyme cases reported was Mecosta County with 9, accounting for the high rate of disease seen in this report. This was a 33% increase in Mecosta County compared to 2022. Manistee County also saw an increase in reported Lyme Disease cases, having 1 in 2022 and 7 in 2023. Also noted in the report, Manistee County is our only county to have reported ehrlichiosis cases. This was also true in 2022. There were 7 cases of ehrlichiosis cases reported for Manistee County in 2022 and 3 in 2023.

There may be many reasons for the increasing reports of these vector borne disease. We have been changing how we use our land over time, with suburban development bringing people, deer, and ticks into closer contact with each other. Changing climate patterns can change our natural environment and seasonality. These changing climate patterns can change the areas ticks live, taking their diseases with them. Awareness of and testing for these illnesses has also improved, so some increase may be due to better identification.

Sincerely,



Jennifer Morse, MD, MPH, FAAFP
Medical Director
District Health Department #10



***District Health
Department #10***

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2024 MICHIGAN REPORTABLE CONDITIONS

The health of our public depends on reporting serious and contagious diseases to the local health department so that preventative measures can be taken. Michigan Law requires physicians, laboratories, primary and secondary schools, child daycares, and camps to report specific diseases according to Act No. 368 of the Public Acts of 1978. These diseases are listed below. Outbreaks, epidemics, and any unusual occurrence of any disease or condition must also be reported. The categories the illnesses are listed in below are not absolute. For example, giardia could spread by contaminated food, but also in contaminated pool or lake water. Tuberculosis is a lung (respiratory) disease 3 out of 4 times, but the other 25% of the time infects other parts of the body.

Note that for every case of illness discussed below, local public health department professionals, including nurses, sanitarians, and others, had to investigate how it happened, if it was treated properly, if education was properly provided, and make sure steps were taken to keep illness from spreading to others. This is just one of the many services of public health. Click on any of the conditions in blue to learn more.

Foodborne Illnesses

(illness that spreads through things we eat)

B. cereus serovar anthracis (Anthrax)	Listeria monocytogenes (Listeriosis)
Campylobacteriosis	Trichinella spiralis (Trichinellosis)
Cryptosporidiosis	Salmonella Paratyphi (Paratyphoid Fever)
2 Cronobacter sakazakii	Salmonellosis
Cyclospora species (Cyclosporiasis)	Shigellosis
2 Clostridium botulinum (Botulism)	Yersinia enterocolitica (Yersiniosis)
Giardiasis	2 Vibrio cholera (Cholera)
Shiga Toxin-producing Escherichia coli (STEC)	Vibrio species (Vibriosis: non-cholera species)
Hemolytic Uremic Syndrome (a complication of STEC)	

Sexually Transmitted Infections

(infections spread during sex or other intimate contact)

Chlamydia trachomatis	Neisseria gonorrhoeae (Gonorrhea)
Haemophilus ducreyi (Chancroid)	Treponema pallidum (Syphilis)
Human Immunodeficiency Virus (HIV)	

Respiratory Conditions

(diseases of the airways or lungs)

Blastomycosis	2 Tuberculosis (Mycobacterium tuberculosis complex)
Coccidioidomycosis (Valley Fever)	Novel Coronavirus COVID-19
Cryptococcosis	Legionellosis
Histoplasmosis	

Antibiotic Resistant Organisms

- 2 Carbapenemase Producing - Carbapenem Resistant Enterobacterales (CP-CRE)
- 2 Candida auris (Candidiasis)
- 2 Staphylococcus aureus, vancomycin intermediate/ resistant (VISA/VRSA)

Viral Hepatitis

Hepatitis A (HAV), Hepatitis B (HBV), and Hepatitis C (HCV) viruses

Vaccine Preventable Diseases

(diseases that can be prevented by effective vaccines)

- | | |
|---|-------------------------------------|
| Bordetella pertussis (Pertussis/"Whooping Cough") | Poliovirus (Polio) |
| Clostridium tetani (Tetanus/"Lockjaw") | 2 Rubella virus |
| Corynebacterium diptheriae (Diphtheria) | Varicella-zoster virus (Chickenpox) |
| Haemophilis influenzae | Measles virus (Measles/Rubeola) |
| Mumps | |

Neurologic Diseases

(diseases that affect the brain or nerves)

- | | |
|------------------------------------|---------------------------|
| Meningitis (all) | 1 Guillain-Barre Syndrome |
| Neisseria meningitidis | 1 Acute flaccid myelitis |
| Encephalitis, viral or unspecified | Prion Disease (CJD) |

Zoonotic Diseases

(diseases spread to people by animals)

- | | |
|--|---------------------------------------|
| 2 Brucella species (Brucellosis) | 2 Coxiella burnetii (Q Fever) |
| 2 Burkholderia pseudomallei (Meloidosis) | 2 Rabies and possible rabies exposure |
| 2 Burkholderia mallei (Glanders) | 2 Francisella tularensis (Tularemia) |
| 2 Bacillus anthracis (Anthrax) | 2 Leptospira species (Leptospirosis) |
| Chlamydia psittaci (Psittacosis) | |

Antibiotic Resistant Organisms

- | | |
|---|--|
| Multisystem Inflammatory Syndrome (MIS) | 2 Orthopox viruses (Smallpox/Mpox) |
| Staphylococcus pneumoniae (in the blood, brain, or other parts of body that should not have bacteria) | 1 Staphylococcus aureus (Toxic Shock Syndrome/TSS) |
| 2 Hemorrhagic Fever Viruses | Streptococcus pyogenes, group A, Streptococcal Toxic Shock Syndrome (STSS) |
| 1 Kawasaki Disease | |
| Mycobacterium leprae (Leprosy) | |

Clarification of "Rate per 100,000 Population"

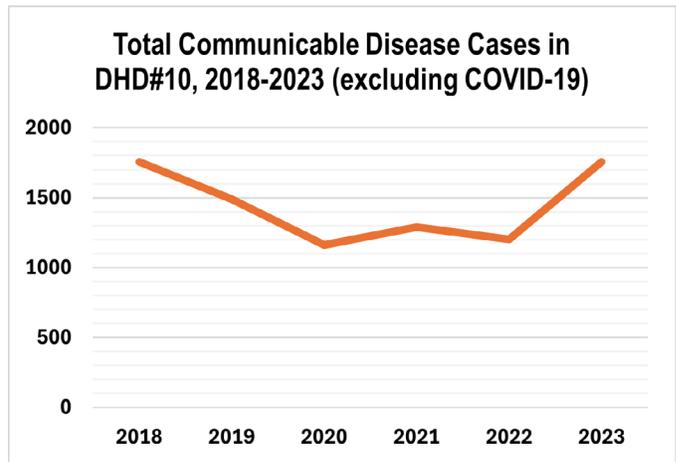
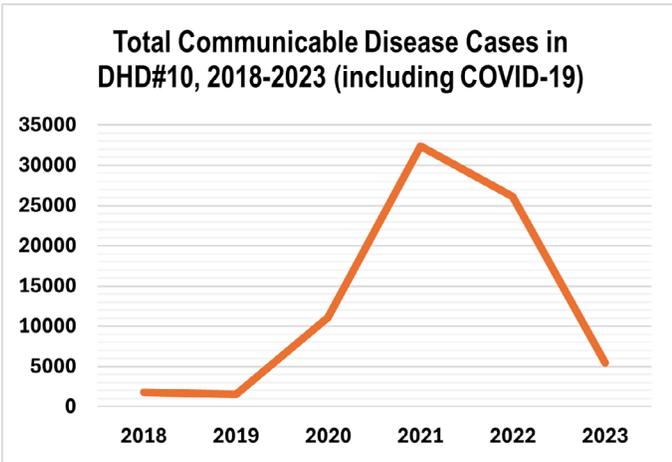
This report uses population standardized rates in order to more accurately estimate and compare how often diseases occur in populations of different sizes. These rates are reported as the number per 100,000

population and adjusted to year 2000 standard population sizes. This can be interpreted as the number of cases that is estimated to occur in every 100,000 people. This method is more widely familiar on a smaller scale, for example, news media may report "1 in 10 people" or "5 in 10 people." Here is a good video that gives a quick explanation of epidemiology and its terms <https://youtu.be/V1sIYP0h2xk>.

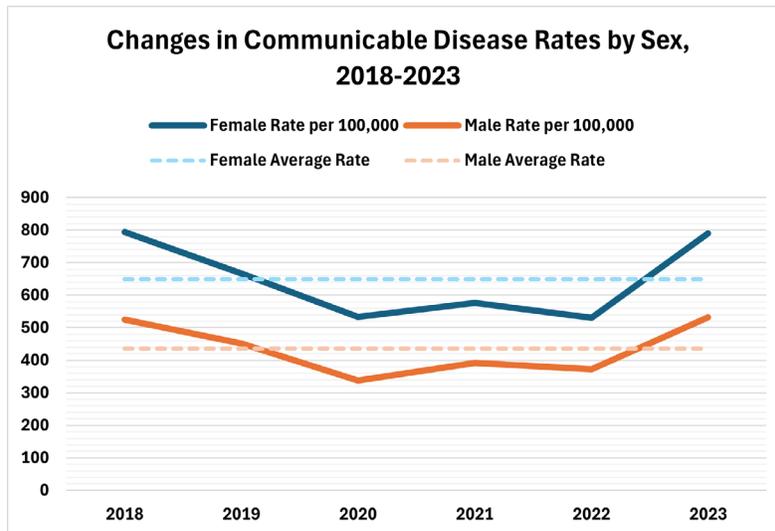
Note: Reporting is required within 3 days for " 1 " labeled conditions; labs must submit suspect or confirmed isolates immediately for " 2 " conditions.

DISTRICT HEALTH DEPARTMENT #10 COMMUNICABLE DISEASE SUMMARY

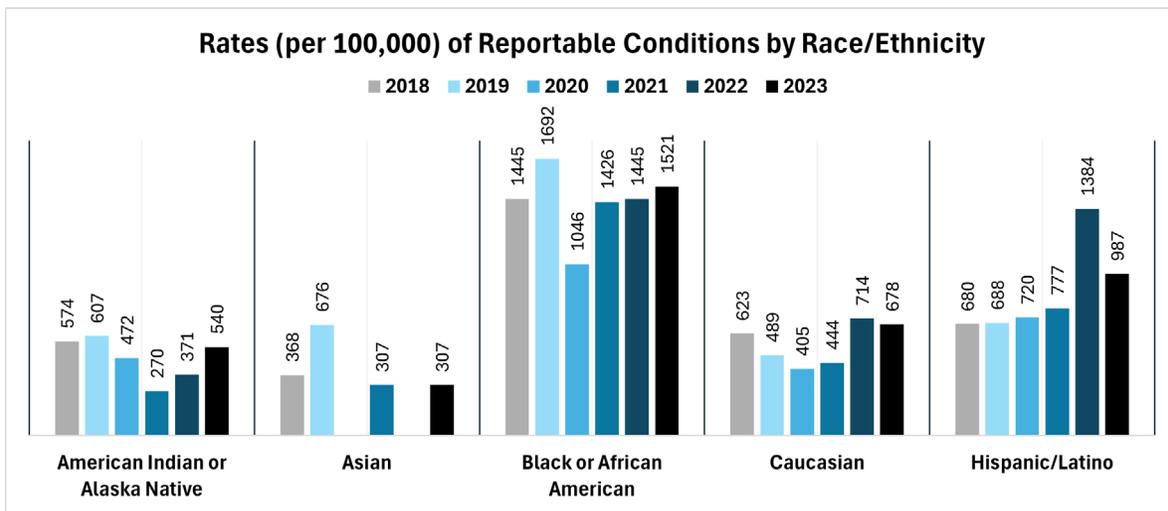
The total number of communicable disease cases in the District Health Department #10 (DHD#10) jurisdiction significantly increased with the arrival of the novel coronavirus, COVID-19, in March of 2020. Likely because of increased COVID-19 testing protocols, there was also a significant increase of reported influenza. The overall decrease of non-COVID-19 and influenza communicable diseases during the pandemic were due to the pandemic itself. People were less likely to have routine testing done and seek care when ill, leading to a decrease in diagnosis of illness. Healthcare providers and laboratories were overwhelmed with duties due to the pandemic and reporting of communicable diseases stopped or slowed greatly. Whereas in 2023 we see the reverse happening. As emergency orders ended and healthcare providers and laboratories went back to normal duties, the reporting of conditions increased to levels very close to what it was in 2018. This relationship is demonstrated in the graphs below.



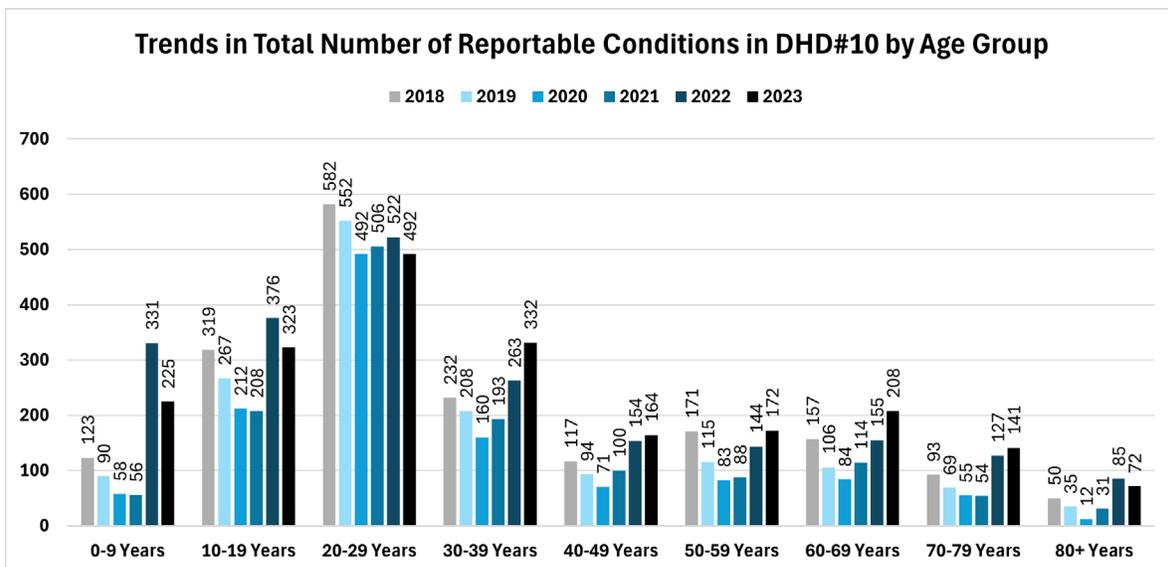
Looking at differences in prevalence of communicable disease between men and women of DHD#10, women have been diagnosed with communicable diseases at a higher rate than men. Women make up 49.1% of the total DHD#10 population but accounted for about 59% of all communicable disease cases in 2023.

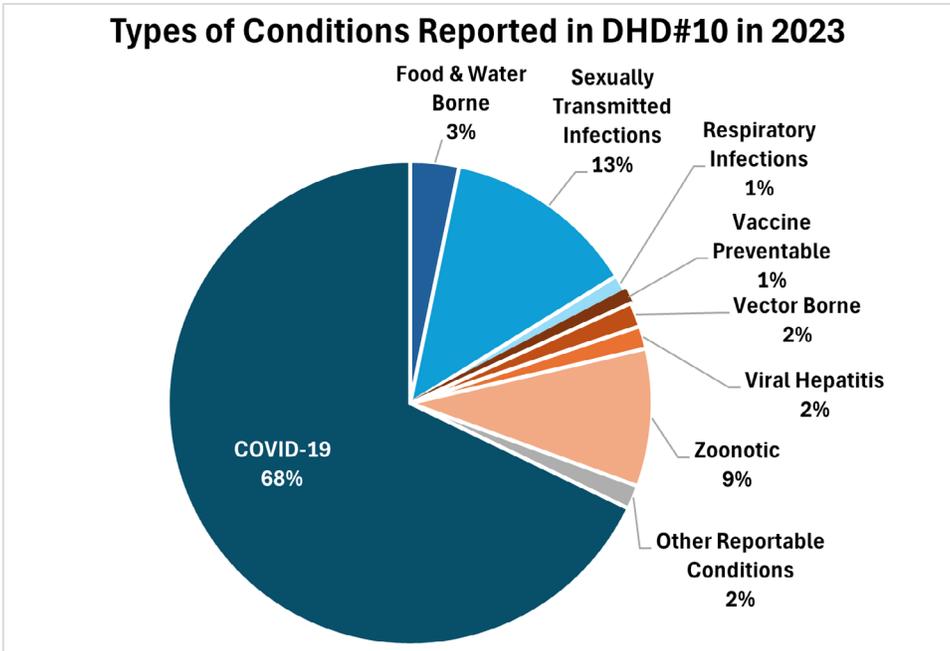


The graph below displays reported conditions (excluding COVID-19) distributed by race/ethnicity from 2018 to 2023 in the DHD#10 jurisdiction. The average rate of disease in DHD#10 is 640 cases per 100,000 people. In DHD#10, the Black or African American population has had consistently higher rates of disease than the other race/ethnicities and well above the average rate. The Hispanic population has also had higher rates of disease than average, and the rate of disease has been increasing over the last 6 years. As stated above, decreased rates of reported conditions



The 20-29 age group has the highest number of cases each year, but also saw a 15% decrease in cases over the past 5 years. The 20-29-year age group is also the largest age group by population size which contributes to the higher number of cases. Each age group has seen higher counts of disease in the last 2 years (except for the 20-29 age group), which is likely due to the return to normal activities as COVID-19 emergency and restriction orders ended, resulting in increased exposure and contracting of disease.





In 2023, COVID-19 was the most commonly reported disease in DHD#10, accounting for over two-thirds of all communicable disease cases reported. This was followed by sexually transmitted infections, which made up 13% of all cases. Other respiratory conditions, vector borne diseases, vaccine preventable diseases, viral hepatitis, foodborne illnesses, and other reportable conditions made up the remaining 19% of all communicable diseases in the DHD#10 jurisdiction in 2023. Below is a summary of significant diseases in the DHD#10 jurisdiction that are monitored on a quarterly and monthly basis.

Communicable Disease	2018	2019	2020	2021	2022	2023	5-Year Average Rate per 100,000
Campylobacter	50	46	31	37	27	78	16.4
Giardiasis	18	10	13	20	3	15	4.6
Salmonellosis	36	35	29	36	39	47	13.9
Shiga toxin-producing Escherichia coli	11	5	5	8	9	15	3.1
Chlamydia	700	753	575	604	566	596	231.8
Gonorrhea	84	84	151	167	101	87	44.2
COVID-19	0	0	9,418	27,458	19,287	3,667	4,482.5
Multisystem Inflammatory Syndrome	0	0	3	4	4	0	1
Lyme Disease	13	22	11	21	31	81	12.4
Pertussis	6	16	0	3	4	4	2.0
Chickenpox	2	8	2	2	2	15	2.2
Hepatitis A	5	7	1	2	0	0	1
Hepatitis C (Chronic)	146	116	85	75	82	74	32.4
Streptococcal diseases	50	52	29	25	34	77	16.3
Rabies infected animal	8	1	1	2	1	2	0.5
Rabies (Potential Exposure to Human)	283	100	42	42	18	496	52.3

FOOD & WATER BORNE ILLNESSES

Food and water borne illnesses are conditions that can be caused by eating contaminated food or water. Many of these illnesses are carried by animals and spread to people when animal products or meat are not handled properly. However, these illnesses can also be spread to people without consuming contaminated animal products. For example, salmonella can be carried by chickens without making the chicken sick. Any time people handle, carry, or pet chickens, they could become sick with salmonella if they do not take necessary precautions to prevent it. This is why it is important to wash your hands after interacting with animals before you cook, eat, touch your face, etc.

Cryptosporidiosis ("Crypto") is the leading cause of waterborne disease outbreaks in the US and is an infection caused by a parasite found in stool (poop) of human and animals, particularly cows. The parasite is transmitted when people ingest contaminated food or water. The most common symptoms are diarrhea, vomiting, and weight loss. The average incidence rate per 100,000 population is between 4.1 to 4.7 in the US, and 4.2 in Michigan. Cryptosporidiosis is slightly more common in DHD#10 compared to Michigan and the US with 5.2 cases per 100,000 residents on average. However, the rate in 2023 was below average at 3.7 per 100,000.

Giardiasis is also caused by a parasite found in stool (poop) of human and animals, and spreads easily through direct contact and causes a variety of symptoms including diarrhea, stomach cramps or pain, greasy stool that may float, nausea, and dehydration. The average incidence rate per 100,000 for Giardiasis is 5.1 to 7.5 in the US. The average rate Michigan and in DHD#10 are the same at 4.3 per 100,000 people.

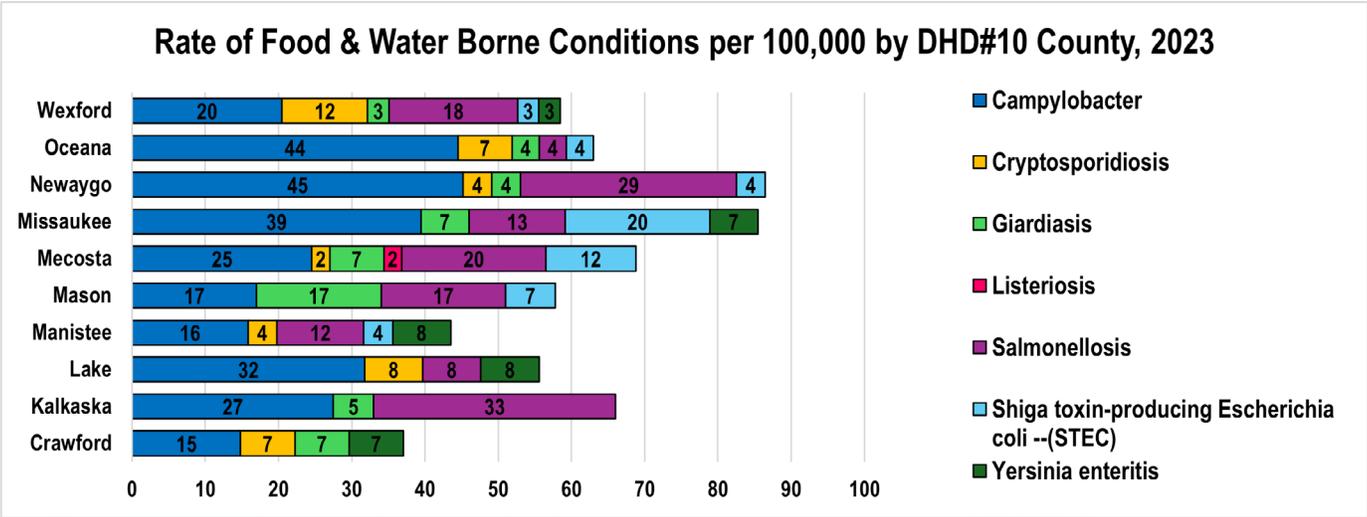
Shiga Toxin-Producing Escherichia Coli (STEC) is a strain of E. coli that causes disease with symptoms that included severe stomach cramps, mild to bloody diarrhea, vomiting and a low-grade fever. It is transmitted to humans through ingestion of contaminated foods, water, raw milk, or contact with cattle. STEC can also cause a life-threatening condition called Hemolytic Uremic Syndrome (HUS), which is caused by inflammation in the kidneys and can lead to kidney failure and occurs in 5% -10% of all STEC infections. The average incidence rate of STEC in the US is 34 per 100,000, and about 2.8 per 100,000 in Michigan. The most recent 5-year average rate in DHD#10 matched the state at 2.8 per 100,000. A multistate STEC outbreak in late summer of 2022, which included Michigan, resulting in about a 50% increase in STEC cases in Michigan. In 2023, there were more cases in DHD#10 than in recent years, however rates of STEC can vary considerably year-to-year.

	2018	2019	2020	2021	2022	2023	2023 Rate per 100,000	5-Year Rate per 100,000
Campylobacter	50	46	31	37	27	22	8.2	12.2
Cryptosporidiosis	19	21	15	15	8	10	3.7	5.2
Giardiasis	18	10	13	20	3	11	5.6	4.3
Salmonellosis	36	35	29	36	39	40	15.0	13.4
Shiga toxin-producing E. coli	0	5	5	8	9	11	5.6	2.8
Hemolytic Uremic Syndrome	2	0	0	0	0	0	0	0
Listeriosis	0	0	0	0	0	1	0.4	0.1
Shigellosis	4	0	4	2	1	0	0	0.5
Yersinia enteritis	0	0	1	5	8	5	1.9	1.4
Vibriosis (Non-Cholera)	0	1	1	0	0	0	0	0.2
Cyclosporiasis	0	0	0	6	0	0	0	0.4
Total	129	118	99	129	95	100	37.5	40.5

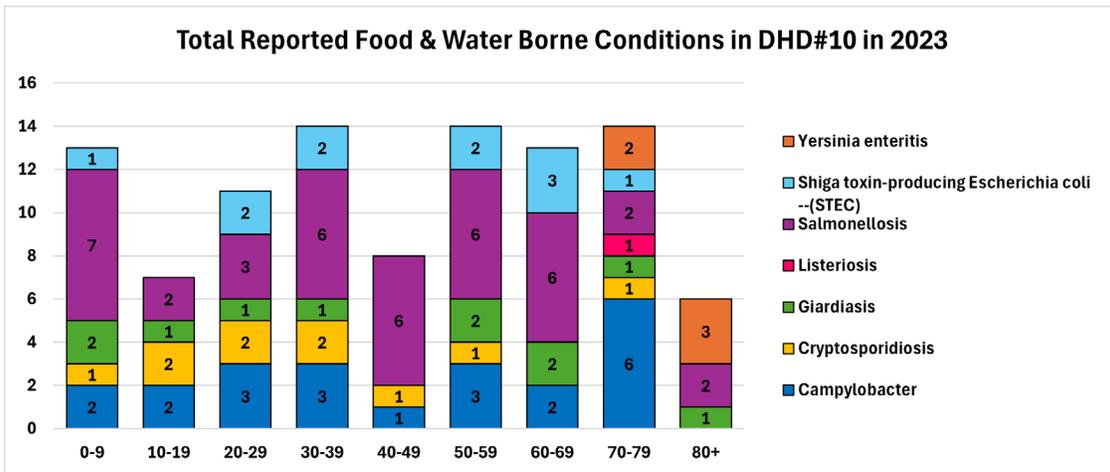
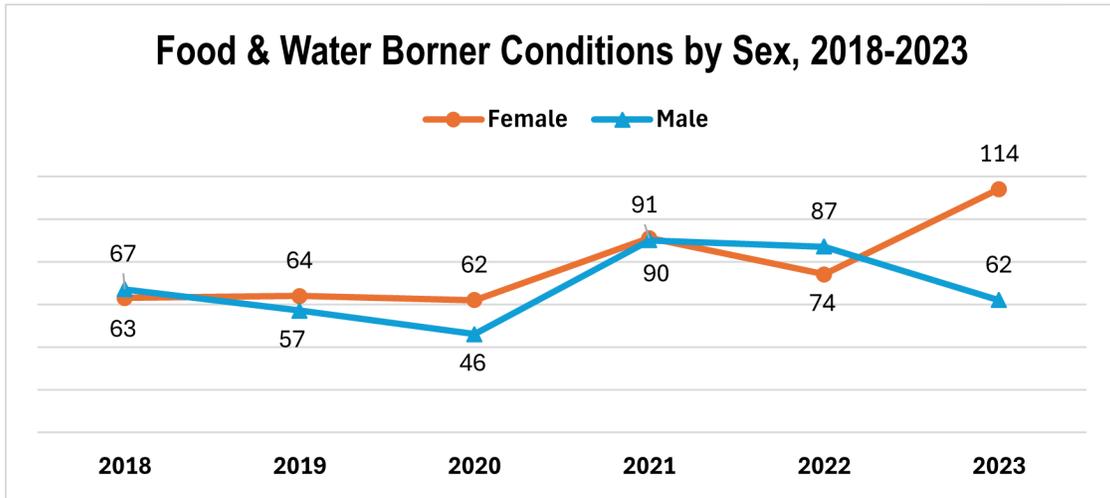
Shigellosis is an infection that occurs after ingestion of Shigella bacteria. Shigella is found in stool and spreads easily via the fecal oral route causing prolonged or bloody diarrhea, fever, and stomach pain. According to the CDC, extensively drug resistant Shigella infections in the US have increased from 0% in 2015 to 5% in 2022. This is a significant public health concern as Shigella is easily transmissible and has limited antimicrobial treatment options. In Michigan there was an 11% increase in Shigellosis from 2021 to 2022, while in DHD#10 there has been only a few confirmed cases over the past 5 years with a decreasing trend from 2018 to 2023.

Yersinia Enteritis is a condition caused by eating contaminated food, especially raw or undercooked pork products. It can also spread during contact with pigs, or products from pigs, as they are a major animal reservoir for yersinia. Young children are the most often affected, with symptoms including fever, abdominal pain, and often bloody diarrhea. Adults may experience right-sided abdominal pain and fever as predominant symptoms. Michigan and DHD#10 have a 5-year average incidence rate of 1.1-1.4 yersinosis cases per 100,000 residents.

Newaygo, Missaukee, and Kalkaska counties had the highest burden of these conditions. Newaygo had the highest rate of campylobacter (45), while Kalkaska had the highest rate of salmonella (33). Campylobacteriosis and Salmonellosis are the 2 most commonly occurring foodborne illnesses in DHD#10, Michigan, and across the US. The majority of cases of these illnesses are related to exposures in the natural environment, such as those who live or work with the common farm animals associated with these conditions, or from the mishandling of animal products, which can happen when you do not wash your hands appropriately after handling raw meat. Cases resulting from exposure at places where food is prepared and served, such as restaurants or food trucks, can happen but are not common.



The first graph on the following page looks at foodborne illnesses by gender. Rates of foodborne illnesses can vary significantly from year-to-year and so can the rate among men and women but generally the difference between men and women is small. In 2023, there was a 55% increase in cases among women. The next graph on the following page describes these conditions among age groups.



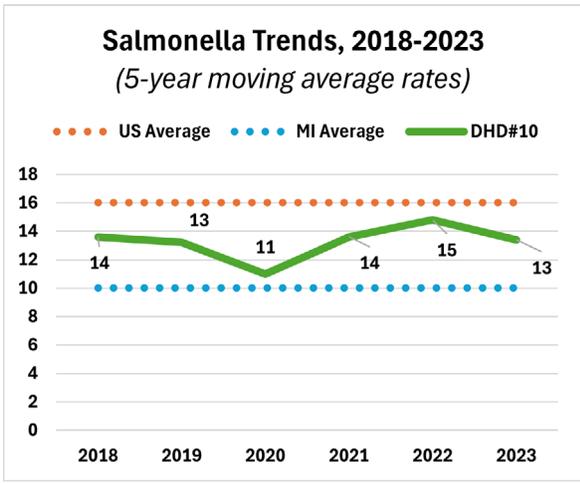
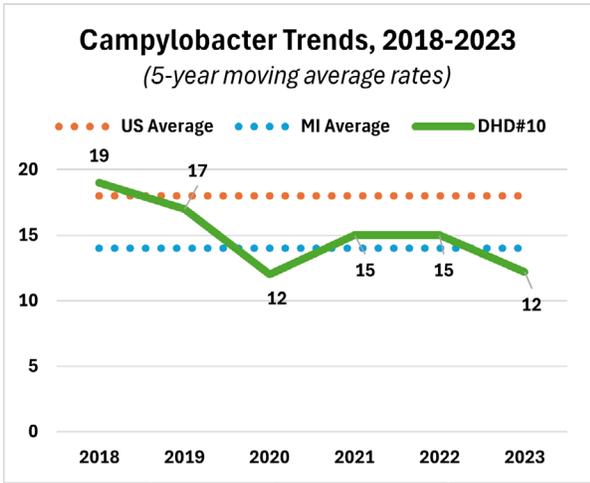
CAMPYLOBACTERIOSIS & SALMONELLOSIS

Campylobacteriosis is the most common cause of diarrhea in the US. The bacteria is carried by many common farm animals, can contaminate their milk, and is easily spread when eating contaminated animal products. CDC data shows on average 18 cases for every 100,000 people in the US each year. The average incidence rate in Michigan (2018-2023) was 14 per 100,000. Campylobacter in DHD#10 has seen a decreasing trend over the last 6 years. From 2018 to 2023, campylobacter cases decreased by 56% with an average rate of 12 cases per 100,000 people.

Campylobacter can affect people of all ages but in DHD#10 most cases occurred in older adults. The highest rate being the 70-79 age group in 2023. This is likely due to elderly people being at higher risk because of weakened immune systems. Those unable to cook for themselves are also more likely to eat foods handled by other people, which increases the risk of contamination by a variety of bacteria. We also see cases in all 10 of our counties but the highest rates in 2023 were in Newaygo and Oceana, both of which contain many farms and agricultural areas.

Salmonella is found in the intestinal tracts of animals and spreads to people by ingesting food that is contaminated with animal feces. It can also spread when interacting with animals that carry salmonella, such as baby chicks, reptiles, and cows. Antibiotics are not normally needed as symptoms usually go away on their own but are prescribed for those with or at risk for severe disease.

Most salmonellosis cases in DHD#10 occurred in Newaygo and Kalkaska. Crawford county was the only DHD#10 county that reported 0 cases in 2023. Most cases occurred in the 30-69 age range but there was also a higher rate among the 0-9 age group. This is a common trend as young children and the elderly are high risk populations and the middle age groups are more likely to be exposed. Average incidence of salmonellosis in the US is about 16 per 100,000 people, and about 10 per 100,000 in Michigan. In DHD#10, we tend to have higher rates than the Michigan average due to the ruralness of the jurisdiction compared to the rest of Michigan.



SEXUALLY TRANSMITTED INFECTIONS

Sexually transmitted infections are very common in the US, but it is difficult to accurately estimate how often they occur in the population as they do not always cause symptoms or symptoms may be mild enough to go away on their own. However, it is estimated that at least 1 in 5 people in the US have an STI and almost half of new STIs are among young adults. All STIs are treatable with medication, however some are incurable diseases, such as HIV.

Condition	2018	2019	2020	2021	2022	2023	2023 Incidence Rate per 100,000	5-Year Incidence Rate per 100,000
Chlamydia	700	753	575	604	566	596	223.3	231.8
Gonorrhea	84	84	151	167	101	87	32.6	44.2
Syphilis (no latent)	4	2	4	5	12	N/A	**4.5	**2.04
*HIV	20	27	19	17	N/A	N/A	N/A	N/A
Total	823	874	751	795	673	692	259.2	283.6

*HIV data is combined with Central Michigan Health Department data by the state of Michigan to protect possibly identifiable health information. For more information on syphilis and HIV in Michigan, please go to <https://www.michigan.gov/mdhhs/keep-mi-healthy/chronicdiseases/hivsti/data-and-statistics>.
 ** Most recent publicly available Syphilis and HIV data is from 2022

Syphilis is a bacterial STI that can also spread from mother to child during pregnancy. Anyone can get syphilis, but in the US, it is more common among men who have sex with men (MSM) and African Americans. Primary syphilis (PS) and secondary syphilis (SS) are the earliest stages of

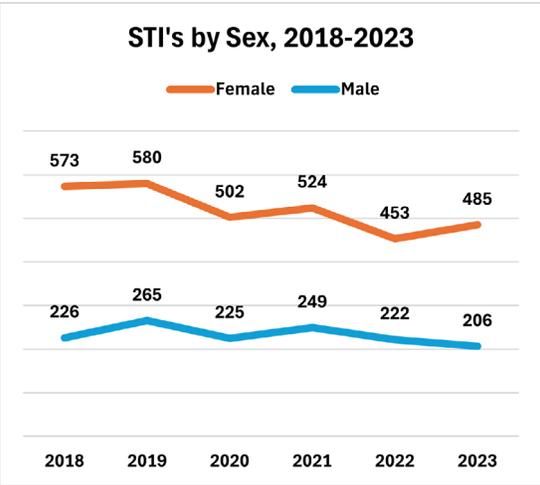
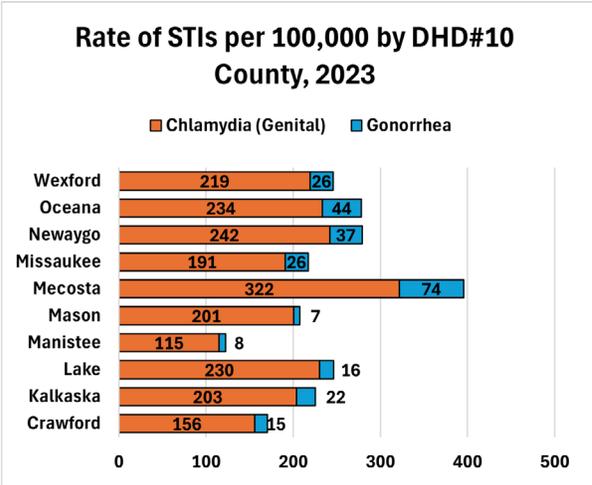
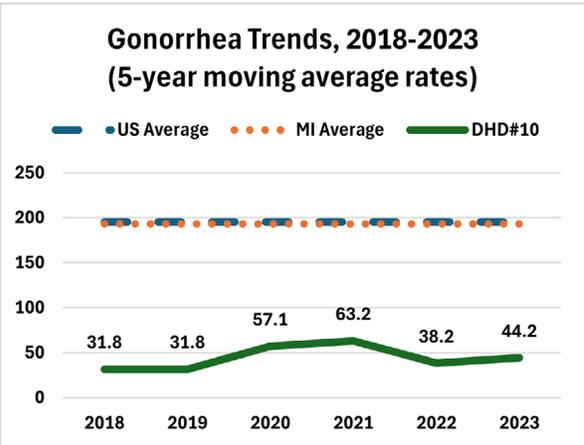
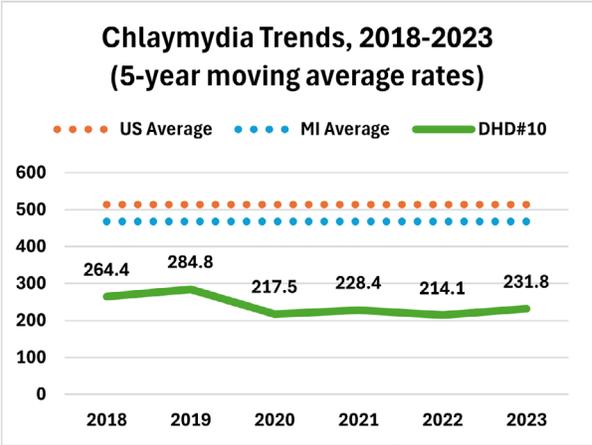
syphilis where symptoms are present. PS can last 3-6 weeks and 2-10 weeks for SS. After these stages, syphilis is called latent, but can still be infectious and cause long-term health issues. For the purpose of this report, PS and SS are included and latent syphilis is not.

According to the CDC, the US saw historically low counts of syphilis in 2000-2001. However, cases have been increasing every year since. On average, there are 48 cases per 100,000 in the US and 22 cases per 100,000 in Michigan. In Michigan, rates of syphilis have been increasing by 11% each year since 2013. The average rate in DHD#10 is 4.5 cases of PS or SS per 100,000 residents. However, it is likely that the rate is actually higher than this due to the fact that DHD#10 is a rural region where it is harder to access healthcare to get tested for syphilis

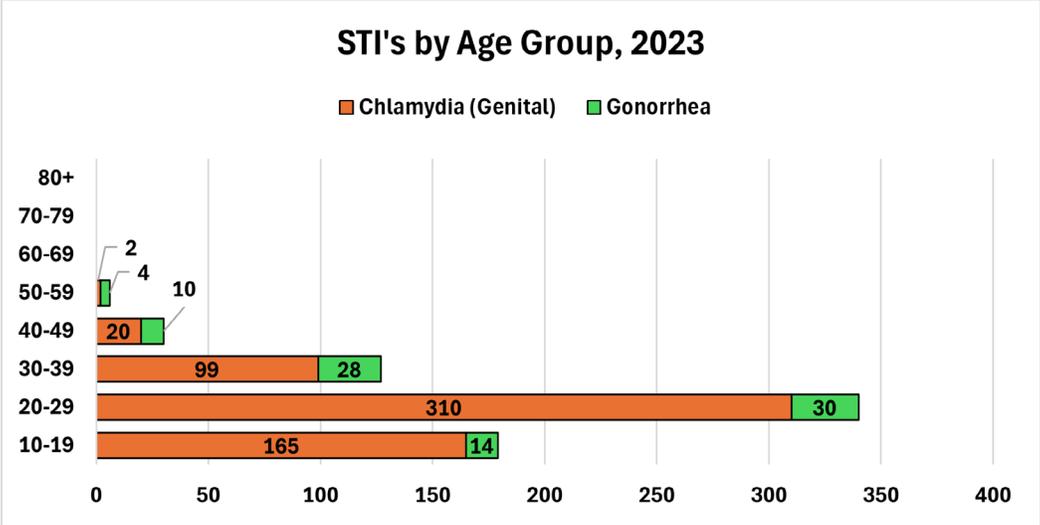
Human Immunodeficiency Syndrome (HIV) is a virus that attacks the body's immune system, hence the name "immunodeficiency." This is a serious infection as the immune system is how the body fights against viruses, bacteria, and other disease-causing agents. If left untreated, infected people may develop acquired immunodeficiency syndrome (AIDS). HIV can also be transmitted from mother to child during pregnancy, birth, or breastfeeding. The only way to know if you have HIV is to get tested. People may develop some flu-like symptoms, but some have none at all. Because of this it is important to get tested regularly if you are at risk of getting HIV. Early detection of HIV is the best way to prevent the spread of disease to others. While there is no cure for HIV or AIDS, treatments are effective and may make the infection undetectable. Infection that is undetectable is not able to spread through sex. HIV is a complex condition, for more information on how to protect yourself or others, symptoms, and treatment, [click here](#). For information on no- and low-cost STI/HIV testing available in DHD#10, [follow this link](#).

Chlamydia is the most reported bacterial STI in DHD#10, Michigan, and the US. It often does not cause symptoms but can still damage the reproductive system. When symptoms do occur, they can include vaginal discharge and a burning sensation during urination for women, and discharge from the penis, burning during urination, and pain or swelling in the testicles for men. If left untreated it can lead to severe reproductive damage, which is much more common in women. The average rate of chlamydia in DHD#10 in 2023 was 223 cases per 100,000 people. This was slightly lower than the average of 231 and much lower than the Michigan and national average rates. However, many cases go undetected due to factors such as individuals being asymptomatic, the difficulty of accessing care in rural areas, and stigmas against STI's that prevent people from seeking testing and treatment.

Gonorrhea is the second most common bacterial STI with the highest infection rates among sexually active teenagers, young adults, and African Americans. Most women do not develop symptoms of gonorrhea, but they can include vaginal discharge and bleeding between periods. With both gonorrhea and chlamydia, serious risks to health and permanent damage can develop if left untreated. The infections can spread to the uterus or fallopian tubes resulting in pelvic inflammatory disease which causes abdominal pain and fever and can lead to internal abscesses and chronic pain, as well as infertility. As stated above, it may look like DHD#10 has low rates of gonorrhea compared to Michigan and the US, but many cases go undetected due to lack of symptoms, difficulty accessing care and social stigmas. However, while most rates of communicable disease decreased during the pandemic due to decreased activities that spread disease, we actually saw an increase in gonorrhea rates during those times in DHD#10. This is a concerning trend for public health as gonorrhea can quickly develop antibiotic resistance, according to the CDC. In fact, there is only one remaining antibiotic currently recommended for gonorrhea treatment and there have even been cases of antibiotic resistance to that as well. To learn more about trends of STIs and antibiotic resistance, you can go to [this CDC webpage](#).



The average rate of chlamydia in DHD#10 was 238 cases for every 100,000 people in 2023. Mecosta and Newaygo counties has the highest rates in 2023 and were the only 2 counties that had rates above the DHD#10 average. Mecosta often has a higher rate of STI due to the population of college students and the on-campus clinic can help students connect with providers and access treatment. STIs were most common among those under 40 years old, with the highest rates in the 20-29 age group. STI rates in the 20-29 age group were nearly double that of any other age group. In the US, over half of STIs occur in the 15-34 age group according to the CDC, which is similar to what we see in DHD#10.



RESPIRATORY INFECTIONS

Due to significant differences in prevalence of COVID-19 compared to other reportable respiratory conditions, COVID-19 cases will be analyzed and graphed separately. This will give us a better look at the trends in reportable respiratory conditions. The graphs below do not include cases of COVID-19 or influenza unless stated otherwise.

	2018	2019	2020	2021	2022	2023	2023 Incidence Rate per 100,000	5-Year Incidence Rate per 100,000
Tuberculosis	0	2	2	2	0	1	0.4	0.5
LTBI*	16	24	8	24	27	25	9.4	8.1
Legionellosis	2	4	5	6	5	6	2.2	1.9
Blastomycosis	1	0	5	2	2	0	0.0	0.7
Coccidioidomycosis	2	5	4	0	1	0	0.0	0.7
Histoplasmosis	6	9	14	11	8	6	2.2	3.6
Cryptococcosis	0	0	1	0	0	0	0	0.1
Total	38	56	44	57	57	38	14.2	18.9
COVID-19	0	0	9,937	31,055	24,894	3,667	1,373.7	5,210.9

*LTBI is not required to be reported and actual numbers are likely higher.

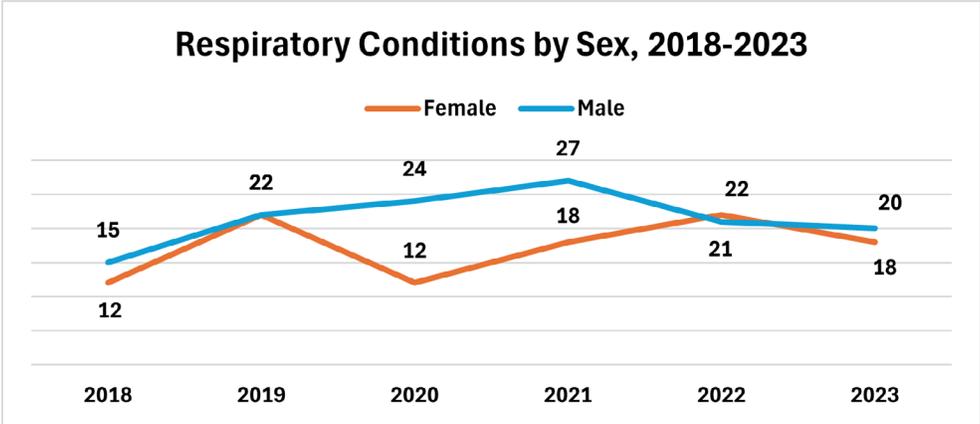
Blastomycosis is a fungal infection that is transmitted when a person inhales the fungal spores. Blastomycosis is present in the environment in US states from the Midwest to Southeast. Those at highest risk are those exposed to wooded areas and moist or disturbed soil, especially near the Great Lakes, the Ohio and Mississippi River Valleys, and the Saint Lawrence River. The rate of Blastomycosis in the US is about 1-2 cases per 100,000, in Michigan it's about 0.3, and in DHD#10 it's 0.7 on average.

Coccidioidomycosis (Valley Fever) causes a fungal infection when fungal spores are inhaled. The fungus is known to be found in the soil in the southwest of the US and doesn't cause illness in most people, but those over the age of 60 are at more risk for severe illness. Valley Fever has also been found to be more prevalent in African Americans, Filipinos, and those living in Arizona or California. As Michigan is far away from the southwestern states it does not have as high of an incidence. The average incidence in the US is 7.1 cases per 100,000 but for Michigan the incidence is about 0.6 cases, and in DHD#10 the incidence is slightly higher at about 0.7 cases.

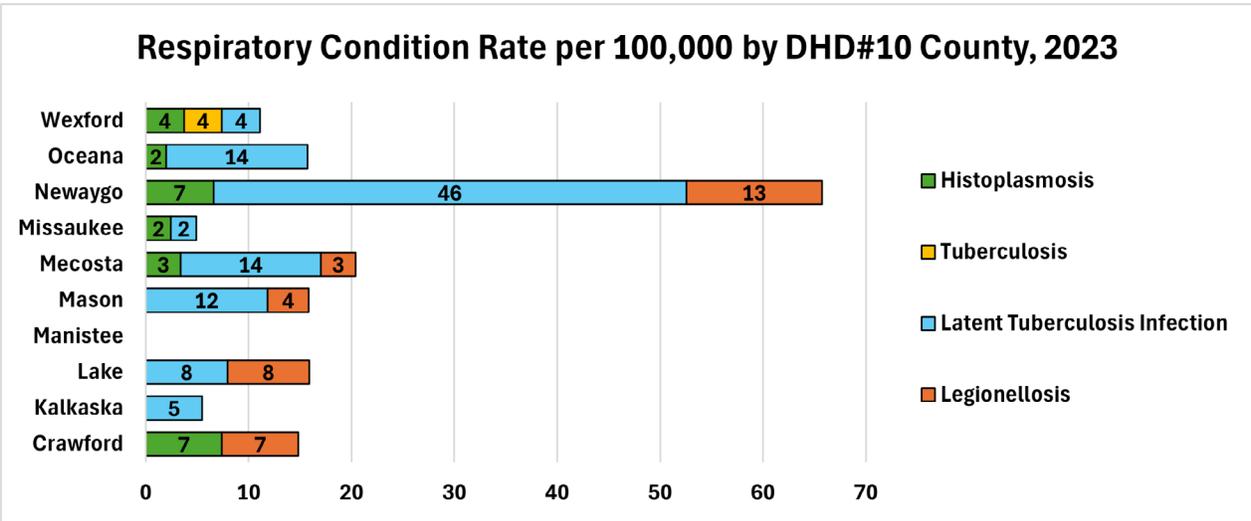
Histoplasmosis is also an infection caused by breathing fungal spores that originate from bird and bat droppings. Often during projects such as building demolition, renovation, or cleanup, the bird and bat droppings are disturbed causing the spores to be dispersed into the air, increasing the risk for laborers such as construction workers. However, soil can also be contaminated and pose risks to farmers and landscapers. Most people do not develop symptoms, but illness can be fatal for infants and those with weakened immune systems. Rates in the US are estimated to be between 3-5 cases per 100,000 population with the highest rates occurring in midwestern states. Average rates are slightly higher in DHD#10 at 3.6 cases per 100,000, compared to Michigan, which had an average of 2.5 cases per 100,000.

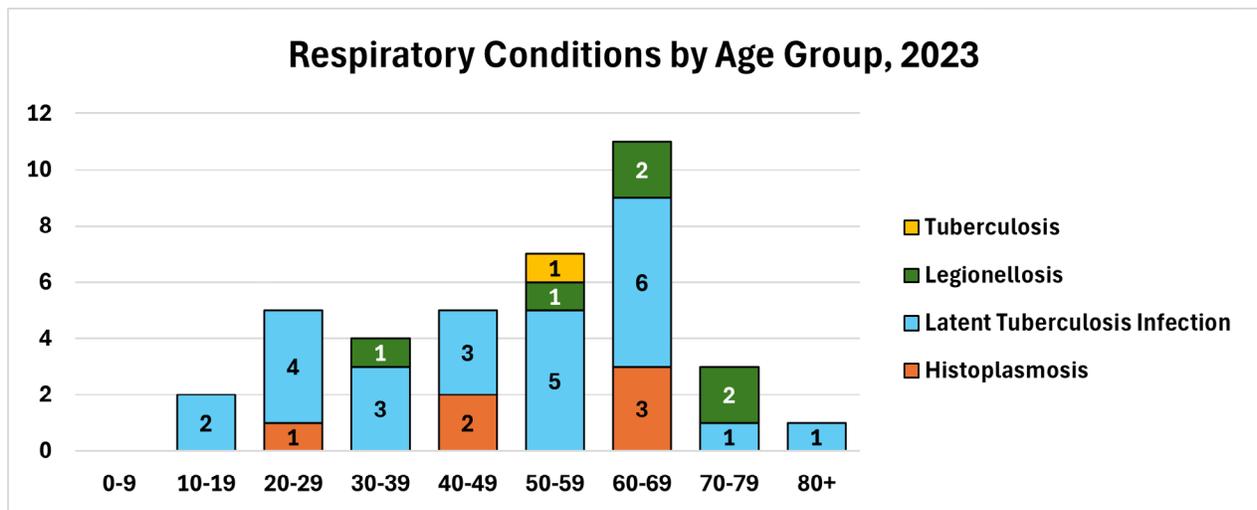
Cryptococcosis is caused by the fungus, *Cryptococcus neoformans*, and is present in the environment all over the world. Although this fungus is common, it rarely causes infection except for those with weakened immune systems, especially those living with HIV/AIDS. In the US there are about 0.4 to 1.3 cases for every 100,000 people. The rate is lower in Michigan at 0.2 per 100,000 and in DHD#10 at 0.1 per 100,000, but the number of cases occurring in Michigan over the past 5 years has increased by almost 3 cases a year. In DHD#10 there has only been 1 case in the past 5 years.

Legionellosis is an infection caused when water droplets contaminated with Legionella are inhaled. Legionella can cause 2 different diseases, Legionnaires' Disease which causes severe pneumonia, and Pontiac Fever which causes mild respiratory symptoms. Legionellosis has been increasing in the US since 2000 but this could be partly due to improved testing and reporting. The average incidence in Michigan for legionellosis is 5.1 cases per 100,000 people and DHD#10 is significantly lower at 1.9 per 100,000, but this difference could also be partly due to underdiagnosis.



In 2023, the most cases occurred in Newaygo county, however a majority of the cases were LTBI cases, which is highly variable from year-to-year because someone with LTBI does not show symptoms. LTBI is discussed more in depth in the Tuberculosis and LTBI section of this report on page 16. Respiratory conditions were the most common in DHD#10 among the 60-69 age group, and the number of cases tended to increase with age and dropped off after age 69. There were no significant differences in incidence of respiratory conditions between men and women.





TUBERCULOSIS & LATENT TUBERCULOSIS INFECTIONS

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis*, which normally affects the lungs but can infect any part of the body. TB spreads through the air from person-to-person when a person with respiratory TB coughs, speaks, or sings near other people. TB can be fatal if left untreated, but TB does not cause everyone to get sick, which is called Latent Tuberculosis Infection (LTBI). Those with LTBI do not have symptoms or feel sick, are not contagious to others, but usually test positive on TB skin tests or blood tests. Since those with LTBI carry the TB bacteria, they can develop TB disease and become contagious to others. This does not always occur but is more likely in those with weakened immune systems. The immune system is what keeps the TB bacteria under control in a person with LTBI. About 1-2 out of 20 people with LTBI will develop contagious TB. The best way to eliminate contagious TB is to find LTBI and treat it to prevent the spread of the TB bacteria.

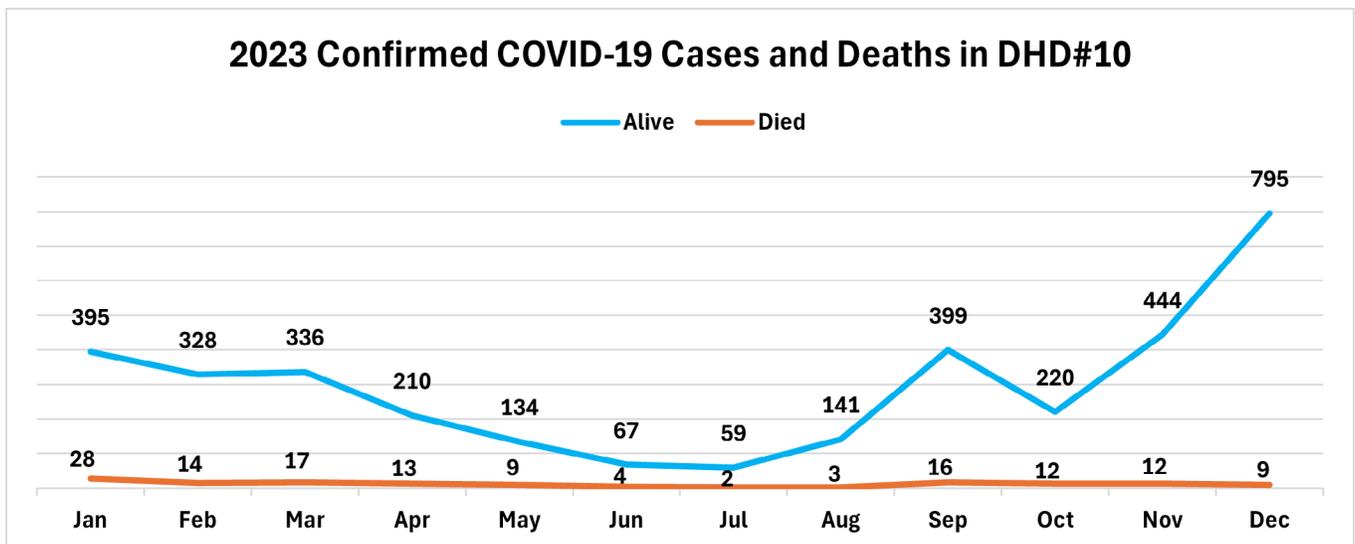
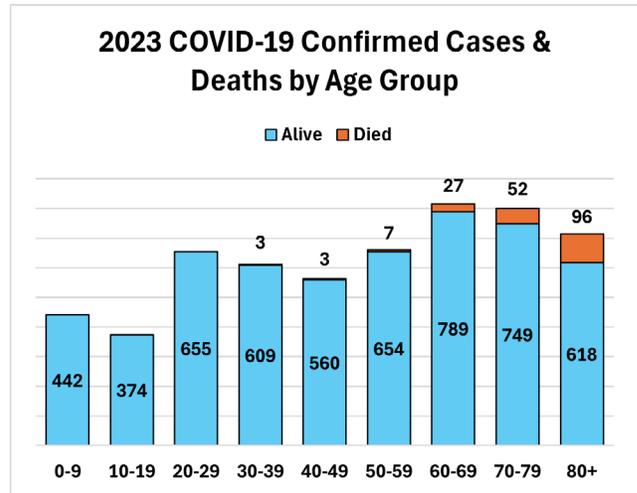
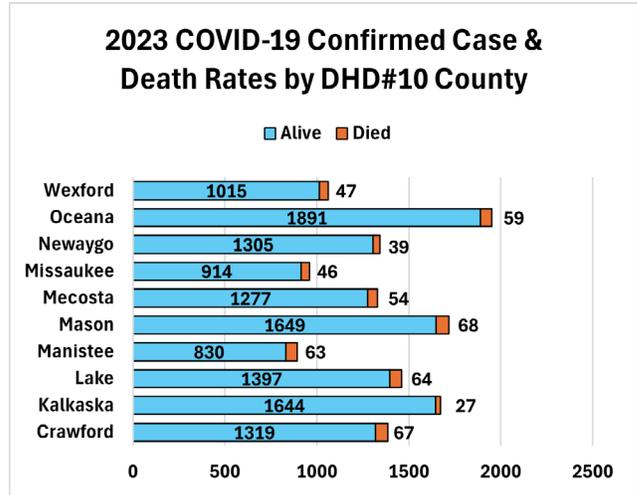
The rate of TB disease in the US is about 2.4 cases per 100,000 population. On average, the rate of TB is lower in DHD#10 than in Michigan and in the US. DHD#10 has a lower rate than the US at 0.5 per 100,000 people while the average rate in Michigan is 1.2 per 100,000 people. There was 1 confirmed case of TB in DHD#10 in 2023.

LTBIs are estimated by the CDC to be present in 13 million people in the US. The rate of LTBI reported to DHD#10 (10.2 per 100,000) is much lower than the average rate in Michigan (18.6 per 100,000) but may not be accounting for all cases as LTBI are not required to be reported to health departments. However, the reported cases are likely a result of blood testing for LTBI diagnosis, which is often reported automatically to the health department. Health departments are also not required to follow up on LTBI cases. However, DHD#10 staff do follow up on LTBI cases, even though it is a time-consuming task, because it is a highly effective way of reducing the spread of TB bacteria and TB disease. Although it is a lot of extra work on behalf of our communicable disease staff, it protects the community by preventing a very serious disease that can have long lasting health consequences, in addition to significant financial burdens as TB treatment can last for 6 months or longer.

NOVEL CORONAVIRUS COVID-19

COVID-19 has been the predominate communicable disease since its emergence in March of 2020. As of 2023, emergency orders in Michigan have ended and as a result, along with widely available home testing kits and vaccines, the reporting of COVID-19 infections has greatly been reduced. In 2022, most employers ended the mandatory testing of employees which also contributed to fewer cases being detected, especially asymptomatic cases. This report only includes cases that were confirmed by laboratory PCR testing.

In 2023, the average incidence rate of COVID-19 was 1,374 per 100,000 people. There were 3 of our 10 counties with a higher rate than the DHD#10 average with the highest rate in Oceana County (1,891), followed by Mason County (1,649) and Kalkaska County (1,644). Mason County had the highest mortality rate from COVID-19 at 68 per 100,000. There were no deaths among those under the age of 30 in DHD#10. Although the elderly population is more at risk, and we did see higher rates of death among the 60+ age groups, we also had some deaths occur in the 3 middle age groups ranging from 30 to 59 years old. Over the course of 2023, DHD#10 saw a very familiar seasonal trend in COVID-19 diagnosis that is similar to seasonal influenza. Cases decreased through the spring and summer months with a spike in cases around the start of the school year. New diagnoses were the highest from September through December, with 795 cases reported in December of 2023.



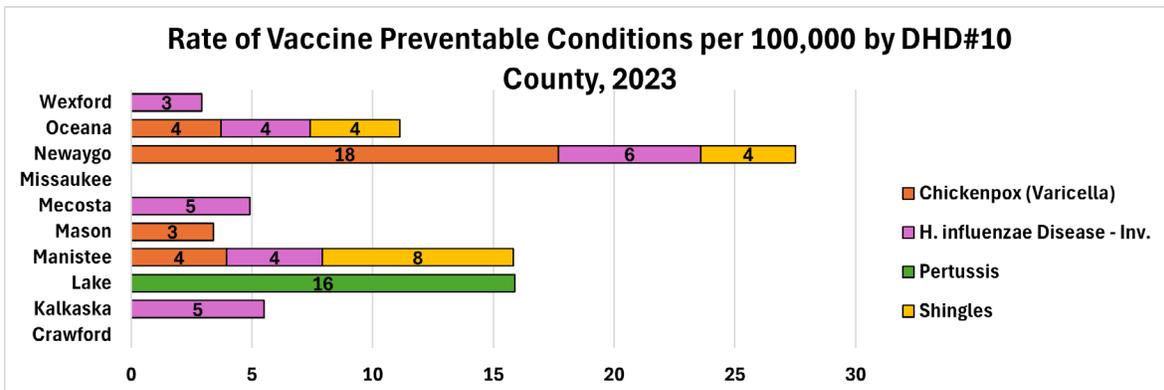
VACCINE PREVENTABLE DISEASES

Rates of vaccine preventable diseases have been greatly reduced in the United States due to vaccination efforts. For those following the recommended vaccination schedule, children are protected against hepatitis B, diphtheria, pertussis, tetanus, H. influenzae type b (Hib), pneumococcal disease, polio, measles, mumps, rubella, chickenpox, and hepatitis A by the time they are 6 years old. Prevention against these diseases is important as they can result in long-term illnesses, hospitalizations, or death. For example, according to the CDC, before vaccines, pertussis (also known as whooping cough) was responsible for about 9,000 deaths every year, and since vaccines, about 10 people die from pertussis each year.

	2018	2019	2020	2021	2022	2023	2023 Rate per 100,000	5-Year Incidence Rate per 100,000
H. influenzae	15	8	2	2	6	9	3.4	2.0
Pertussis	6	16	0	3	4	2	0.7	1.9
Chickenpox	2	8	2	2	2	12	4.5	1.9
Shingles	5	3	2	4	6	5	1.9	1.5
Mumps	1	0	0	0	0	0	0	0
Total	29	35	6	11	18	28	8.6	9.5

Haemophilus Influenzae (H. influenzae) is a common bacteria that causes a variety of infections from mild ear infections, sinus infections, and pneumonia, to life threatening bloodstream infections and meningitis. Different serotypes of H. influenzae seem to cause more serious disease. H. influenza type b (Hib) is one of the types that most commonly causes serious disease and is the only type out of 6 that is vaccine preventable. H. influenzae is spread person-to-person through respiratory droplets, which are produced when an infected person coughs or sneezes. Serious disease is most common in children under 5 and adults over 65 years of age, American Indian people, and Alaska Native people. Rates of H. influenzae are 0.9 cases per 100,000 in the US, 1.8 per 100,000 in Michigan, and about 2 per 100,000 in DHD#10 as of 2023.

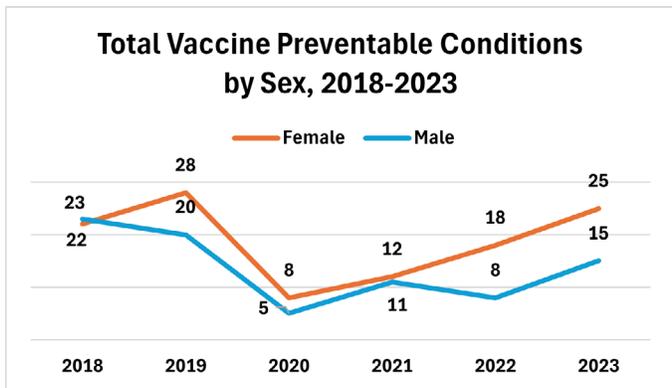
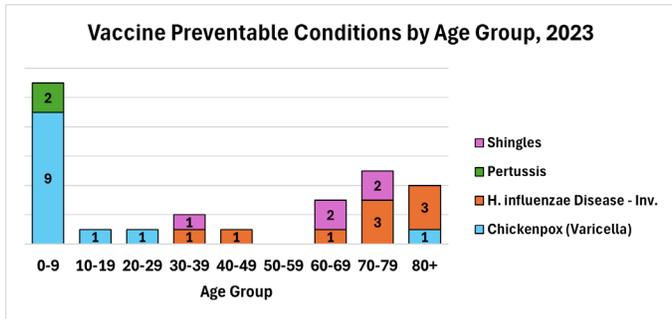
Mumps is a viral disease transmitted through direct contact with saliva or respiratory droplets from the mouth, nose, or throat of an infected person. Direct contact in this case includes coughing, sneezing, talking, sharing things with saliva on them, and close-contact activities such as sports, dancing, and kissing. Mumps is characterized by swollen cheeks and swollen salivary glands. There haven't been any cases in DHD#10 since 2018. In the US, and to a similar extent in Michigan, there was a significant decrease in reported mumps cases after the start of the COVID-19 pandemic. The decrease in cases is very likely a direct result of pandemic restrictions that were created to reduce COVID-19 transmission, which also reduced mumps transmission.



In the past 5 years, vaccine preventable diseases were more commonly reported in women than men. Cases dropped significantly during the COVID-19 pandemic but have been increasing again each year since 2020. In 2023, there were a total of 40 reported in DHD#10 which is similar to case counts prior to the pandemic. Because of vaccination efforts, the spread of VPDs is low and most cases occur among the unvaccinated. The total incidence rate of all vaccine preventable diseases (VPDs) occurring in DHD#10 was 15 cases per 100,000 population in 2023. This is higher than the 5-year average incidence rate of 11.2 per 100,000. Newaygo and Oceana had the highest rates of vaccine preventable diseases in 2023 which reflects the effects of the chickenpox outbreak.

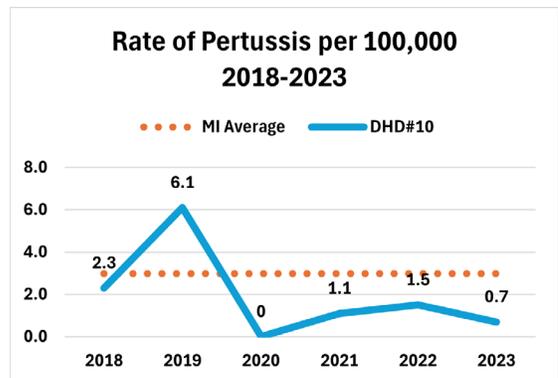
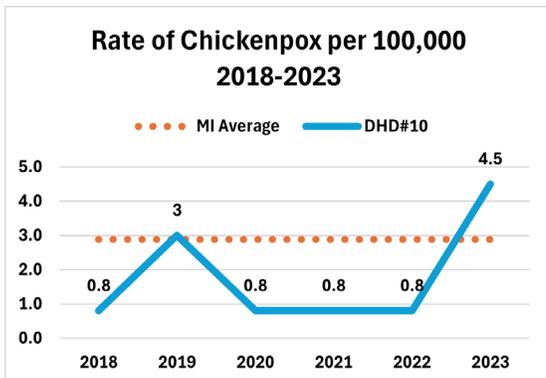
Chickenpox is highly contagious caused by the varicella-zoster virus and is characterized by an itchy, and blister-like rash. It causes disease in 90% of people who are exposed and unvaccinated. The disease can be especially serious during pregnancy and in those with weakened immune systems. Those who get chickenpox are at risk of developing shingles later in life, which is caused by the reactivation of the varicella zoster virus in the body. Those with shingles are very minimally contagious and it is possible to infect very close contacts that are not immune to chickenpox.

In 2023, there were 12 confirmed cases of Chickenpox in DHD#10, the majority occurring in Newaygo County, which are related to an outbreak that occurred early in the year. This is also why the majority of cases were 0-9 years old. The average rate of Chickenpox in Michigan is 2.9 cases per 100,000 people.



Pertussis (Whooping Cough) is caused by the Bordetella pertussis bacteria and spreads through airborne respiratory droplets. While pertussis can start with common respiratory symptoms like a runny nose, fever, and cough, it can also cause life-threatening apnea and cyanosis in infants. Eventually the characteristic "whooping" noise may develop following the rapid, violent, and repetitive coughing fits that can last 6 weeks or more.

The average rate of pertussis in Michigan is about 3 cases per 100,000 people and in DHD#10 it's 1.9 per 100,000. There were 2 pertussis cases in DHD#10 in 2023, these occurred in Lake County in children under the age of 10.



VECTOR BORNE DISEASES

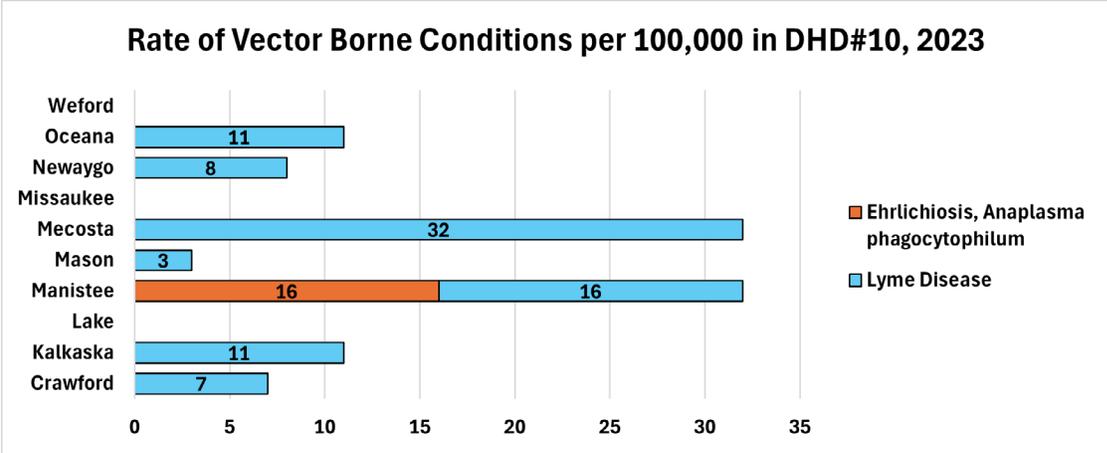
Vector borne diseases are diseases that are spread by living things such as mosquitos, ticks, and fleas. These vectors carry some disease-causing pathogen that is transmitted when they bite humans or other animals. In DHD#10, we typically see diseases caused by ticks, which are described below. While not common in the DHD#10 jurisdiction, Michigan has had cases in the past of mosquito borne illnesses such as Eastern Equine Encephalitis (EEE or "Triple E"), West Nile Virus, and Zika.

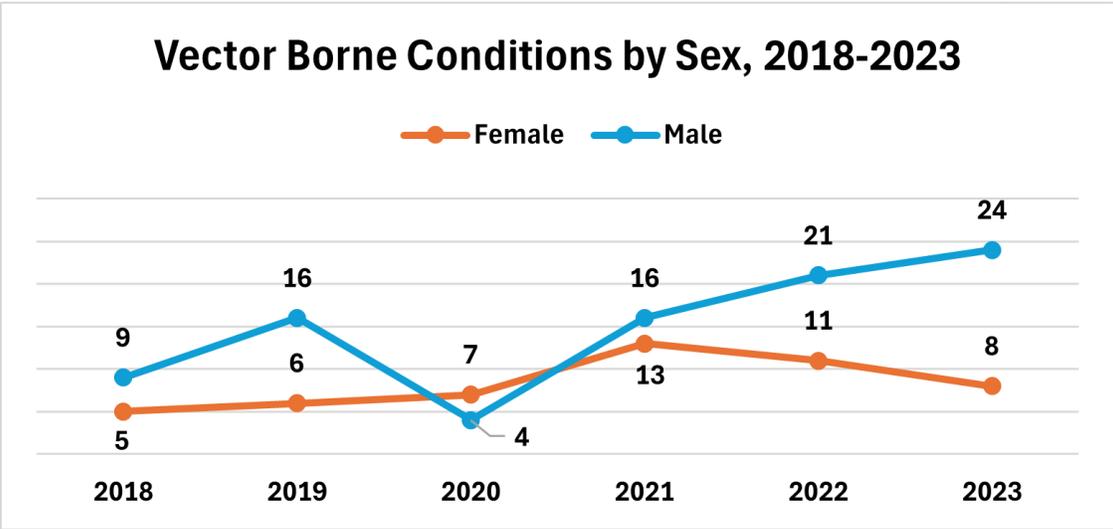
Anaplasmosis is a tick-borne bacterial infection and is the second most common tick-borne illness in Michigan. Blacklegged ticks are the primary source of this disease in Michigan. Anaplasmosis cases are most common in June and July, in the upper midwestern and northeastern US, which corresponds with where blacklegged ticks live. People at highest risk of contracting anaplasmosis are men and people over 40 years or with weakened immune systems. Symptoms include fever, headache, chills, and muscle aches. About 2 cases per 100,000 occur in the US, 0.4 cases per 100,000 in Michigan, and 1.3 cases per 100,000 in DHD#10 on average. Rates have been increasing in the US since around 2000, partly due to it being added as a nationally notifiable condition.

Lyme Disease, the most common tick-borne illness in Michigan, is also a tick-borne disease spread to people by blacklegged ticks. Symptoms are similar to anaplasmosis but also include an erythema migrans skin rash that is characteristic of Lyme disease. Lyme disease can lead to a variety of severe symptoms the longer it is left untreated, which can include facial paralysis,

	2018	2019	2020	2021	2022	2023	2023 Rate per 100,000	5-Year Incidence Rate per 100,000
Anaplasmosis	0	0	0	6	7	4	1.5	1.3
Lyme Disease	13	22	11	21	31	28	10.5	8.5
Total	13	22	11	27	38	32	12.0	9.7

In DHD#10, Mecosta County has the highest rate of Lyme Disease in 2023. Manistee County had the second highest rate of Lyme Disease with an equal rate of anaplasmosis. Manistee was also the only DHD#10 county in 2023 to have confirmed anaplasmosis. We do tend to see higher rates in the counties along the lakeshore as that environment is a reservoir for ticks. There were zero confirmed vector borne cases in Wexford, Missaukee, and Lake counties in 2023. Across the US, vector borne diseases are more common among men, which we did also see in DHD#10. In fact, we have seen an increasing trend in cases among men over the last 6 years.

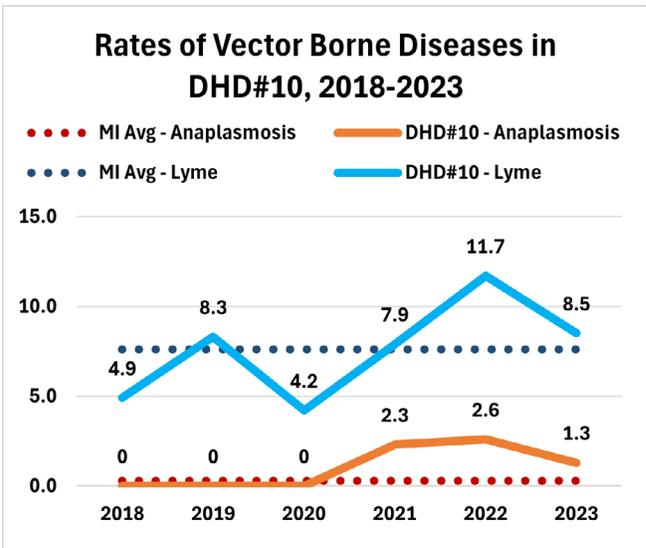
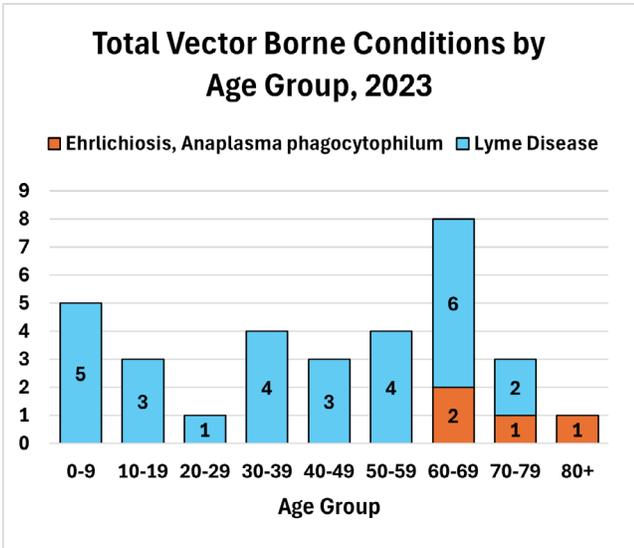




When comparing age groups, the 60-69 had the highest rate of cases. All cases of anaplasmosis occurred in those 60 years and older. The largest amount of Lyme disease cases were reported in the 60-69 age group and the 0-9 age group, which is similar to age group trends in the US.

Anaplasmosis is relatively low in Michigan and DHD#10 but DHD#10 has seen slight increases above the state average in the past few years. Anaplasmosis case demographics are suppressed due to potentially identifiable health information but did follow US trends with more cases among men and those over 40 years of age.

Lyme disease is more common and has seen an increasing trend in cases over the past 6 years in DHD#10. The highest rates of Lyme disease in 2023 were found in Oceana county and in the 60-69 age group, while the 0-9 age group had the second highest rate of Lyme disease.



VIRAL HEPATITIS

Hepatitis A (HAV) is a virus that infects the liver causing fatigue, nausea, stomach pain, and jaundice, that can last about 2 months. HAV lives in the stool of an infected person, it is highly contagious, and transmitted via the fecal-oral route. Vaccines are available to prevent the disease for anyone over a year old. According to the CDC, while anyone can be at risk of HAV, most outbreaks occur among adults experiencing homelessness and adults using injection drugs. As of 2020 the rate of HAV in the US was about 3 cases per 100,000. The most recent 5-year average rate for Michigan and DHD#10 was about 1 case per 100,000 population.

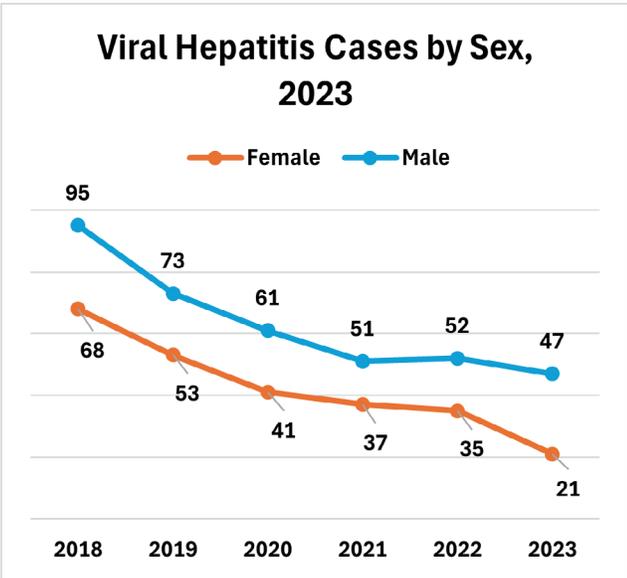
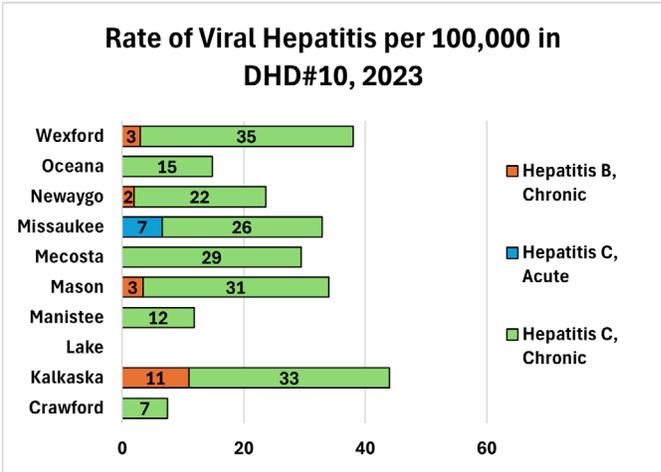
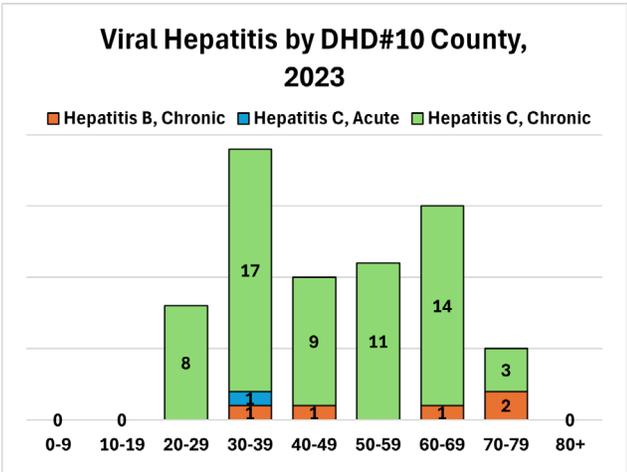
Hepatitis B (HBV) is also a vaccine preventable virus that causes liver infection and can cause symptoms similar to HAV, but most often new infections cause no symptoms at all. There is no cure for HBV and infections can be long lasting, also known as chronic, leading to an increased risk of liver cancer, cirrhosis, and death. HBV is found in blood and some other bodily fluids. The virus can be sexually transmitted and transmitted from parent to fetus during pregnancy. Transmission is also common among those who use injection drugs or those sharing needles or syringes. The rate of HBV in the US is about 5 cases per 100,000 people. The average rate in DHD#10 is much lower than the US at about 2 cases, but in Michigan the rate is much higher at 10 cases per 100,000 people.

Hepatitis C (HCV) also results in liver disease and is found in the blood, but not other body fluids. Most of the transmission occurs when sharing needles and syringes contaminated with HCV, mostly during injection drug use. Some people develop acute illness, but more than half develop a chronic (long-lasting) infection, according to the CDC.

Chronic HCV is a serious health condition as it can result in cirrhosis, liver cancer, and death. There is treatment available that is highly effective in curing most cases of HCV but there is no vaccine to prevent it. HCV is very common in the US, which is related to the opioid epidemic, with a rate of about 41 cases per 100,000 people. The rate is much higher in Michigan at 58 cases per 100,000. The rate in DHD#10 is lower than the US and Michigan rate at 31 cases per 100,000 people. While these rates are still high, chronic HCV has been decreasing when compared to rates before 2019, which averaged more than 100 cases per 100,000 people in DHD#10. As with other diseases discussed in this report, the rates may have decreased during the pandemic due to decreased testing.

	2018	2019	2020	2021	2022	2023	2023 Rate per 100,000	5-Year Rate per 100,000
Hepatitis A	5	7	1	2	0	0	0	0.7
Hepatitis B (Acute)	2	2	0	1	1	0	0	0.3
Hepatitis B (Chronic)	3	0	4	5	3	5	1.9	1.3
Hepatitis C (Acute)	5	2	11	3	5	1	0.4	1.6
Hepatitis C (Chronic)	146	115	84	76	78	62	23.2	31.1
Hepatitis C, Perinatal	2	0	1	0	0	0	0	0.1
Hepatitis D	0	0	1	1	0	0	0	0.1
Total	163	126	102	88	87	68	25.5	35.3

Kalkaska county had the highest burden of viral hepatitis cases with a rate of about 44 cases per 100,000 in 2023, which is down from 67 in 2022. The average rate in Michigan is 68 cases per 100,000. The most common viral hepatitis is chronic Hepatitis C, followed by Hepatitis B which is significantly less prevalent. Cases of viral hepatitis tend to be more common in men than women but cases for both men and women have seen a decreasing trend over the past 6 years. From 2018 to 2023, DHD#10 has seen an overall decreasing trend in viral hepatitis. Cases among women have been cut in half since 2018 and cases among men have decreased by 69%. When looking at the difference between age groups, the all cases occurred in those between the ages of 20 and 79, with the highest counts in those 30-39 years old.



OTHER COMMUNICABLE DISEASES

	2018	2019	2020	2021	2022	2023	2023 Rate per 100,000	5-Year Rate per 100,000
Neurologic Conditions								
Meningitis - Aseptic	13	5	3	2	7	2	0.7	1.4
Meningitis - Bacterial Other	7	8	4	3	1	4	1.5	1.5
Encephalitis, Primary	1				1	1	0.4	0.4
Guillain-Barre Syndrome	1	2				1	0.4	0.6
Creutzfeldt-Jakob Disease				1			NA	0.4
Neurologic Total	22	15	7	6	9	8	0.6	0.8
Zoonotic Conditions								
Q Fever Chronic	1						NA	NA
Rabies Animal	8	1	1	2	1	1	0.4	0.4
Rabies: Potential Exposure & PEP	283	100	42	42	18	167	62.6	27.6
Zoonotic Total	292	101	43	44	19	168	21.0	9.4
Antibiotic-Resistant Organisms								
CP-CRE		3					NA	1.1
Candidiasis/Candida auris						1	0.4	0.4
VISA		1					NA	0.4
CPO					1		NA	0.4
Antibiotic-Resistant Total		4			1	1	NA	0.6
Other Conditions								
Kawasaki							NA	NA
Leprosy	1						NA	NA
Nontuberculous Mycobacterium	13	16	7	14	15	14	5.2	4.9
Staphylococcus Aureus Infect.			1			1	0.4	0.4
Unusual Outbreak or Occurrence	7	5	6	1	1	4	1.5	1.3
Grand Total	335	141	64	65	45	196	73.4	38.3

Carbapenemase Producing - Carbapenem Resistant Enterobacterales (CP-CRE) is an antibiotic-resistant healthcare-associated infection and is transmitted through direct contact. Those in an ICU, needing mechanical ventilation, or using other antibiotics are at higher risk. Location of the infection will cause symptoms to vary but in general symptoms include a fever and chills, coughing if in the lungs, and pain with urination if in the urinary tract. In Michigan, there are an average of 3 CP-CRE cases per 100,000 people.

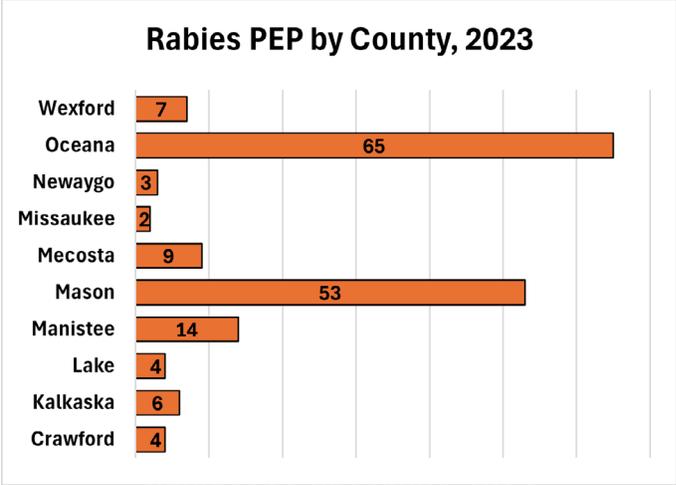
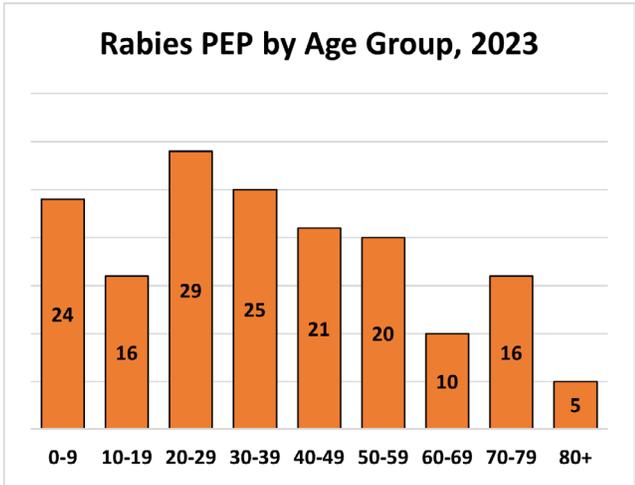
Creutzfeldt-Jakob Disease (CJD) is a prion disease that is always fatal within about one year after illness onset. Prion disease is a disease caused by incorrectly folded proteins that build up in the brain and cause damage. According to the CDC, about 85% of CJD cases are random without a known cause of transmission, the remaining 15% of cases occur due to inherited gene mutations. Symptoms include progressive loss of brain function and mobility, changes in personality, loss of balance and coordination, slurred speech, and vision problems. In Michigan, there are an average of 0.2 cases per 100,000 people. The most recent case of CJD in DHD#10 was in 2021.

Primary Encephalitis is inflammation and damage of the brain typically caused by one of many viruses. Multiple viruses have been identified that can cause encephalitis, including arboviruses, enteroviruses, herpesviruses, retroviruses, coronaviruses, influenza, vaccine preventable diseases, and others. Symptoms include fever, seizures, headache, sensitivity to light and sound, stiff neck, and loss of consciousness. There are an average of 0.5 primary encephalitis cases per 100,000 in Michigan, and there was 1 confirmed case in DHD#10 in 2023.

Meningitis can be caused by many different bacterial or viral infections, fungal infections, cancer, and certain drugs. Bacterial meningitis is potentially deadly within a few hours if not given immediate medical attention. Bacterial meningitis is not common but is most likely to occur in congregate living situations, such as college dorms. There is a vaccine available to protect against bacterial meningitis. Viral meningitis is the most common and most people get better on their own without complications. Young children, older adults, and those with weakened immune systems are the most at risk for meningitis infections. Symptoms include stiff neck, headache, fever, light sensitivity, drowsiness, and seizures. There were 6 meningitis cases in 2023 in DHD#10, 4 of which were bacterial meningitis and resulted in 1 death.

RABIES (ANIMAL & POTENTIAL EXPOSURE/PEP)

Rabies is a viral disease affecting only mammals, most commonly occurring in bats, raccoons, skunks, and foxes. In the DHD#10 area, the only animal that naturally carries rabies is bats. Although 90% of rabies cases occur in wild animals and cases in humans are rare, contact with bats accounts for 7 out of every 10 deaths from rabies in the United States. Rabies is transmitted most often through the bite of an infected animal to another but can spread through any direct contact with saliva or brain/nervous system tissue from an infected animal. Rabies infection affects only 1 to 3 Americans each year according to the CDC. However, rabies is considered to be uniformly fatal in humans after symptom onset. If exposed to rabies, infection can be prevented with a series of vaccinations and injections of immunoglobulins, known as post-exposure prophylaxis (PEP). Nearly 60,000 people in the US seek post-exposure prophylaxis (PEP) treatment each year.



In DHD#10 in 2023, there was 1 confirmed case of rabies reported in an animal and 167 residents were potentially exposed to rabies. In 2023, the largest number of cases were in Oceana County (65) and Mason County (53). All other counties had less than 15 reported potential exposures.

CONCLUSION

While DHD#10 saw significant decreases in communicable disease rates during the COVID-19 pandemic, we have seen some rates possibly returning to pre-pandemic levels. COVID-19 still makes up a significant proportion of cases reported to the health department even though there have been significant reductions in reporting of these cases in general. Outside of COVID-19, STI's continue to be the most common reportable conditions in DHD#10. In 2023, most communicable diseases occurred in those 10-39 years of age, with the highest counts among the 20-29 year age group. Rates were higher among women, and we continue to see a trend of disproportionately higher rates among the Black or African American and Hispanic or Latino populations.

In total, staff at DHD#10 were involved in the investigation of 2,134 reportable communicable disease cases in 2023. Of which, 1,605 were confirmed communicable diseases and 529 were probable cases. In addition, there were 3,667 confirmed COVID-19 cases. Using information such as what is provided in this report, DHD#10 staff continually work to reduce and prevent the spread of communicable diseases in our communities by educating on how to prevent disease, investigating cases, and providing testing services.

SOURCES

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