Pertussis Update

Oakland County Health Division, Communicable Disease Unit | October 17, 2024

The purpose of this report is to detail the current trends in pertussis cases in Oakland County, Michigan. This report will first provide a brief overview of pertussis followed by yearly case trends, seasonality, and demographic distributions specific to Oakland County. The intended audience of this report is clinicians and health professionals, state and local public health, and private citizens.

Methods

Cases meeting the Council of State and Territorial Epidemiologists (CSTE) case definition of Confirmed or Probable were pulled from the Michigan Disease Surveillance System (MDSS) for this analysis (CSTE, 2021). Statistical analysis and visuals were created using RStudio (version 2022.12.0+353). Only cases with an Oakland County address were used in this report. Onset date was used for analysis when available. If the onset date was unknown, then referral date was used. In this report, "sex" is the reported sex of the person at birth and does not represent gender identity.

Pertussis Overview

Pertussis, also known as "Whooping Cough" is a bacterial respiratory illness that is caused by Bordetella pertussis. Symptoms within the first week include a mild cough often with a runny nose and may include a low-grade fever. As the illness progresses, symptoms may increase to include paroxysms or "violent coughing fits", vomiting during or after paroxysms, a high pitched "whoop" sound when inhaling after coughing, fatigue, pneumonia, sleep disturbance, apnea, and cyanosis (bluish color of the skin, lips, and nail beds caused by lack of oxygen). These symptoms usually last 1 to 6 weeks but may be up to 10 in some cases. Illness severity often depends on age, history of Tdap or DTaP vaccines, and medical conditions such as asthma and immunocompromising conditions.

Babies under 1 year old and even more so infants under 6 months old are at greatest risk of severe complications such as pneumonia (23% of cases), pulmonary hypertension, subdural bleeding, conjunctival bleeding, hernia, hypoxia, seizures (2% of cases), encephalopathy (less than 0.5% of cases), apnea, and death. Case fatality rates are approximately 1% in infants less than 2 months old and less than 0.5% in babies 2 to 11 months old. Tdap vaccination during pregnancy between 27 and 36 weeks gestation can help provide passive immunity to the infant during the first two months prior to vaccine eligibility for the infant, reducing the risk of hospitalization and deaths from pertussis. According to the 2023 Morbidity and Mortality Weekly Report (MMWR) titled Influenza, Tdap, and COVID-19 Vaccination Coverage and Hesitancy Among Pregnant Women — United States, April 2023, only 55.4% of women receive Tdap during pregnancy in the United States. (Razzaghi H, 2023), (Diseases., 2015), (CDC, 2024)

Transmission and Incubation Period

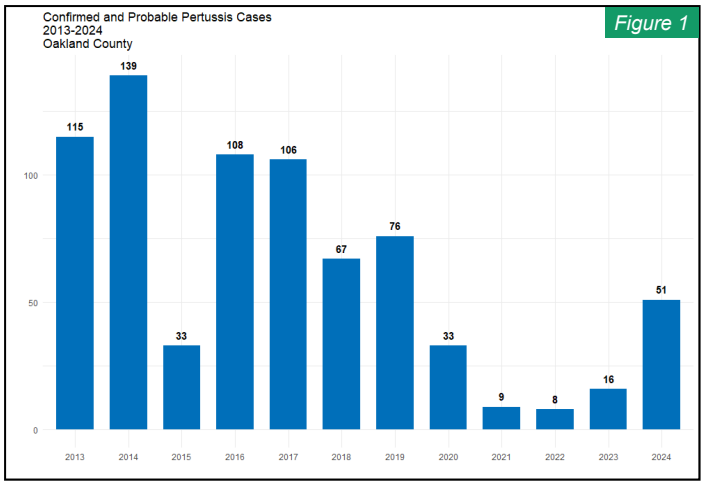
Pertussis is spread from person to person through droplets in the air when a person sneezes or coughs. People are contagious from the start of their symptoms and for at least 2 weeks after their symptoms begin. It can take anywhere from 4 to 21 days for a person that has been exposed to develop symptoms with the most common timeframe being between 7 and 10 days. (Diseases., 2015), (CDC, 2024)

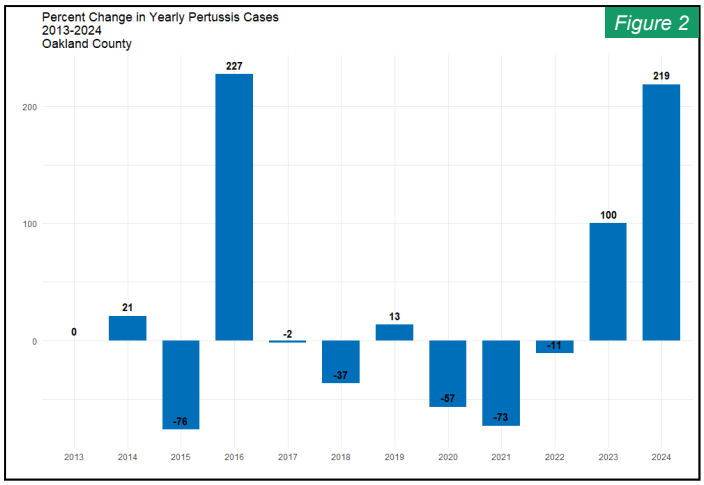
Pertussis in Oakland County

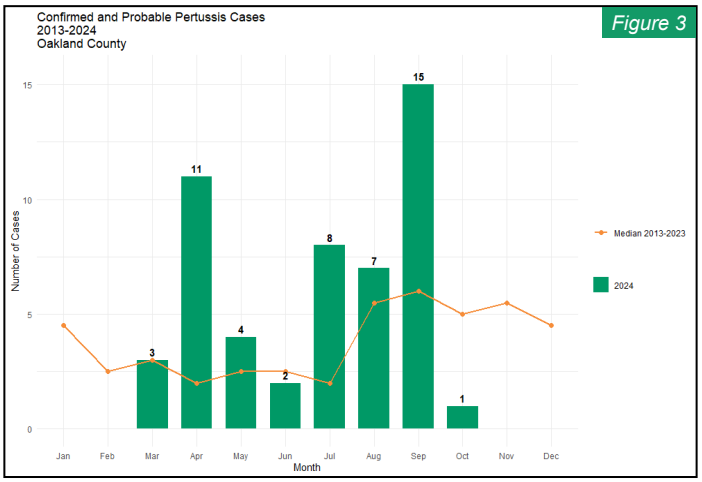
Figure 1 shows the historical trend of pertussis cases in Oakland County from January 1, 2013, through October 17, 2024, and Figure 2 shows the percent change in cases over the same timeframe. The significant decrease in yearly cases from 2020 through 2023 should be noted as an artifact of the SARS-CoV-2 pandemic. Although the percentage of cases has already increased 219%, we are still below levels experienced prior to the pandemic.

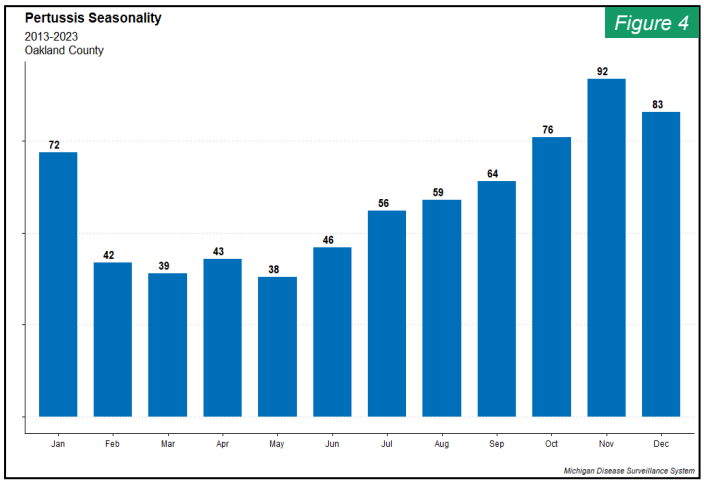
Further stratification comparing monthly cases in 2024 (January through October 17), to the median of cases from 2013 to 2023 (Figure 3), shows April and September of this year had more than double the median number of cases from the previous 10 years. The median was chosen in this figure in lieu of the mean because of its resistance to the effects of extreme values often seen in outbreaks (large increases in cases) or during the pandemic (large decreases in cases). This allows for a better historical benchmark to assess whether an outbreak may be occurring.

As late fall and winter approach, Figure 4 suggests an expected increase in cases with the highest probability of a peak in November.



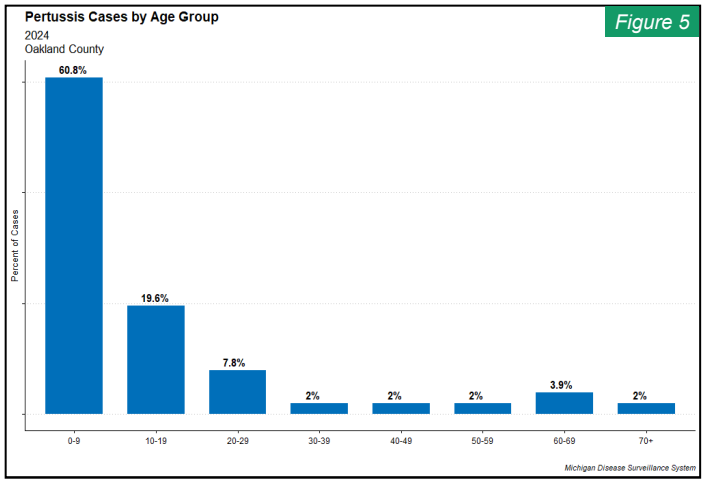


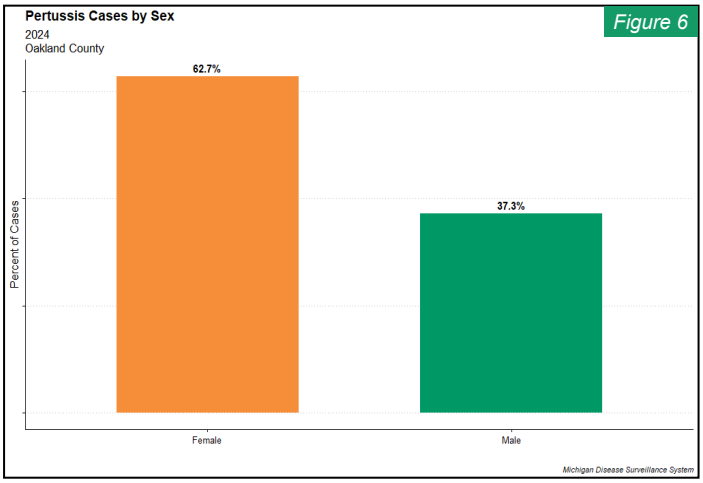


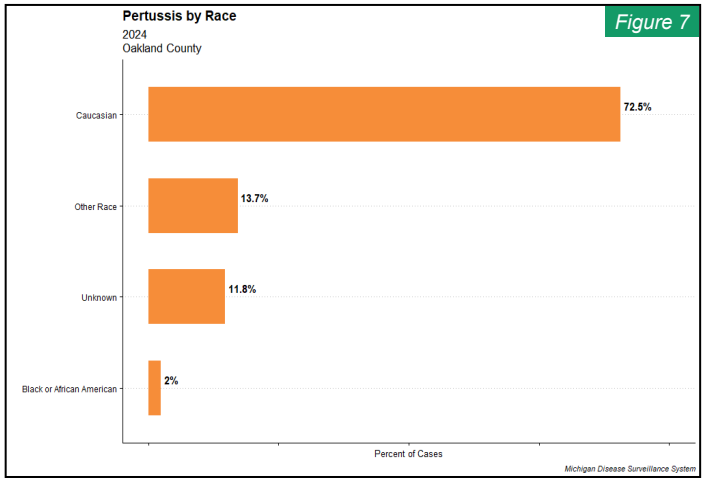


Demographics

Figures 5, 6, and 7 show the age, sex, and race distribution of pertussis cases as of October 17, 2024. As expected, pediatrics account for the majority of cases. There is a disparity when cases are broken down by sex as females account for 62.7% of cases. This difference has been detailed in larger analysis in the journal, Clinical Infectious Diseases. In their article, Skoff et al (2019) found that females accounted for a higher percent of reported cases (54.7%) and a higher average annual incidence (6.9 cases per 100,000 people) compared to males (45.3%; 5.9 cases per 100,000 people) (Tami H Skoff, 2019). Following county population trends, 72.8% of cases are white. It should be noted that 25.5% of cases had race as either “unknown” or “other”, therefore conclusions should not be made about the true impact of pertussis by race for this year.







Recommendations

Medical professionals should be aware of the increase in pertussis cases in their differential diagnosis. Testing is done with a Dacron or polyester nasopharyngeal swab placed in a dry transport tube for culture or PCR testing. Serology is not recommended at this time. For testing, treatment, and post exposure prophylaxis recommendations, clinicians can view the Michigan Department of Health and Human Services (MDHHS) Pertussis Investigation Guidelines at https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/Adult-and-Childrens-Services/Children-and-Families/Immunization-Information/Pertussis.pdf?rev=04c0f6961f3149818888e49b5d6cfef9&hash=63647C0F4372BDBEA505A1C85194A48B.

Parents should review their family's vaccination status for pertussis and speak with their healthcare provider if their children or themselves are not up to date. Pregnant mothers should get a Tdap vaccine between 27 and 36 weeks gestation to help protect their newborn and themselves.

References

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