Meningococcal Infections

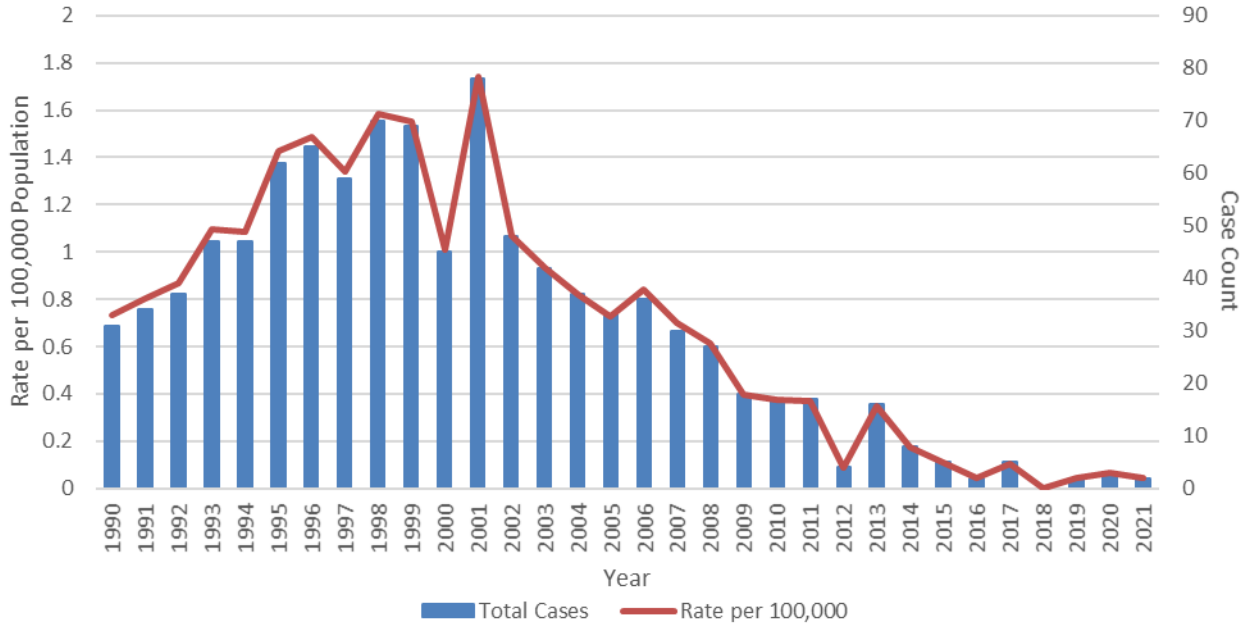
Neisseria meningitidis invasive disease is a Class A Disease and must be reported to the state within 24 hours by phone.

Neisseria meningitidis is a major cause of bacterial meningitis and sepsis in the United States. Meningococcal invasive disease includes meningococcal meningitis, septicemia, bacteriologically confirmed pneumonia and any other disease with isolation of *N. meningitidis* in internal fluids or organs. *N. meningitidis* is also a common colonizer of the upper respiratory tract. The proportion of healthy carriers is 5% of the population. Carriage is not reportable. Meningococcal meningitis, the most common form of the disease, is characterized by sudden fever onset, with intense headache, nausea and often vomiting, stiff neck and sometimes a petechial rash. Rates of meningococcal disease are at historic lows in the U.S., but meningococcal disease continues to cause substantial morbidity and mortality in persons of all ages.

Incidence and Trends

Incidence of meningococcal invasive disease in Louisiana increased during the 90s, from a low of 31 cases in 1990 to a high of 78 cases in 2001. Since then, cases have decreased and over the last decade they have occurred sporadically with 5 or fewer cases identified most years.

Figure 1: Meningococcal Meningitis Trends - Louisiana, 1990-2021



Serogroups

Neisseria meningitidis is a Gram-negative diplococcus and can be classified into 12 serogroups based on its capsular polysaccharide. Six serogroups, A, B, C, W, X, and Y are the primary causes of meningococcal disease worldwide. These groups are important to consider because of their epidemiologic, clinical and preventive implications. The three main serogroups observed in Louisiana in the last 10 years are B, W and Y. Groups A, C, and X have been uncommon in Louisiana in the last decade. This is important because the quadrivalent vaccine available in the U.S. which is recommended as part of the routine vaccination schedule is only effective against A, C, Y and W. It is ineffective against B, which represents about one-quarter of the cases in Louisiana. *N. meningitidis* isolated by hospitals should be sent to the Office of Public Health (OPH) Laboratory for serogroup testing.

Figure 2A: 10 Year Distribution of Serogroups for Those Known - Louisiana, 2012-2021

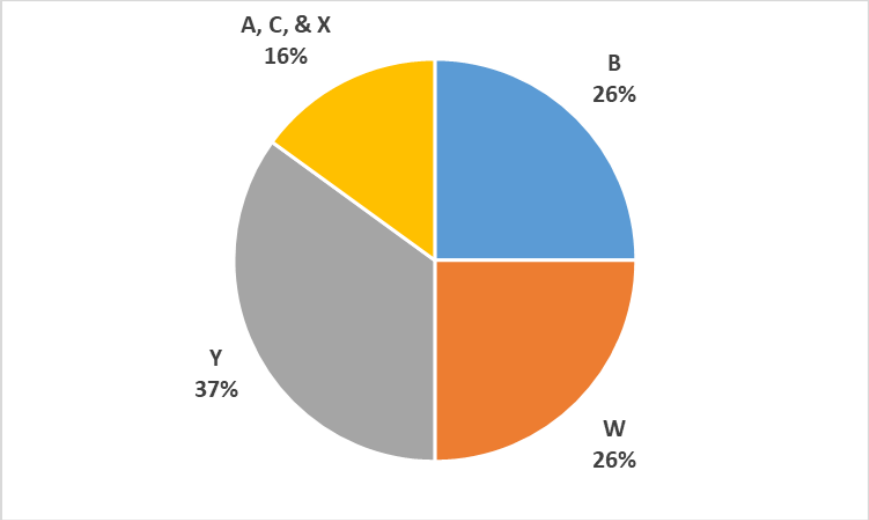
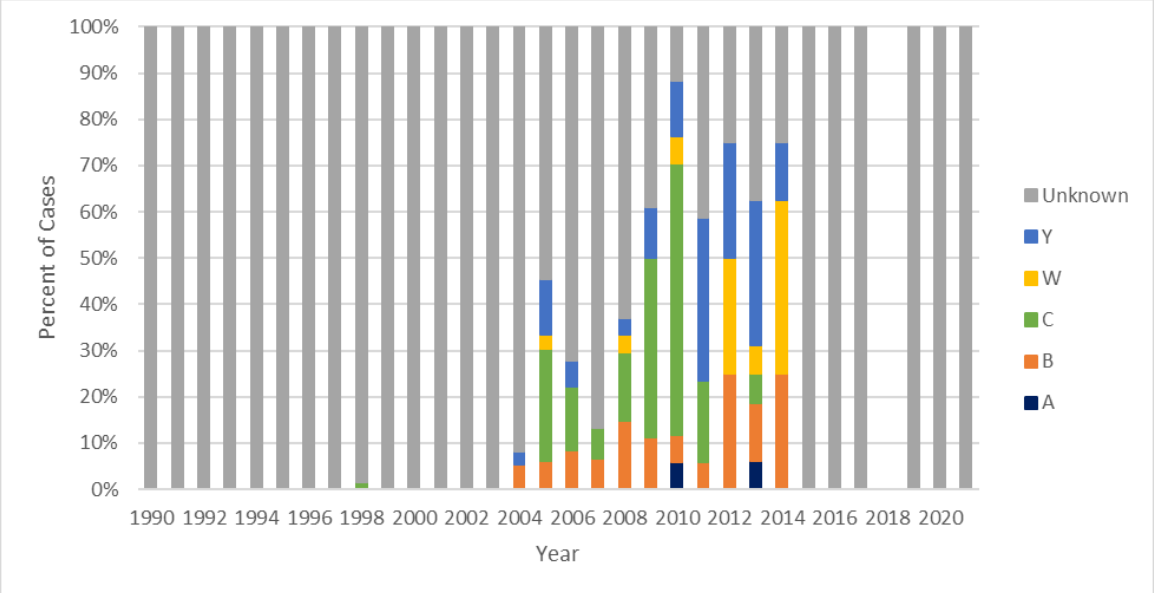


Figure 2B: Distribution of Serogroups by Year – Louisiana, 1990-2021



Vaccines

There are currently 2 types of meningococcal vaccines available in the United States. Quadrivalent meningococcal conjugate, or MenACWY vaccines, protect against disease caused by serogroup A, C, W, and Y. There are also monovalent serogroup B, or MenB vaccines, that only protect against disease caused by serogroup B. Beginning in 2005, CDC recommended routine MenACWY vaccination for all preteens and teens at 11 to 12 years old with a booster dose at 16 years old and children and adults at increased risk for meningococcal disease. They recommend MenB vaccination for people 10 years or older at increased risk for meningococcal disease.
Current meningococcal vaccine recommendations, including information about which individuals are at higher risk for disease, can be found here: https://www.cdc.gov/vaccines/vpd/mening/public/index.html.

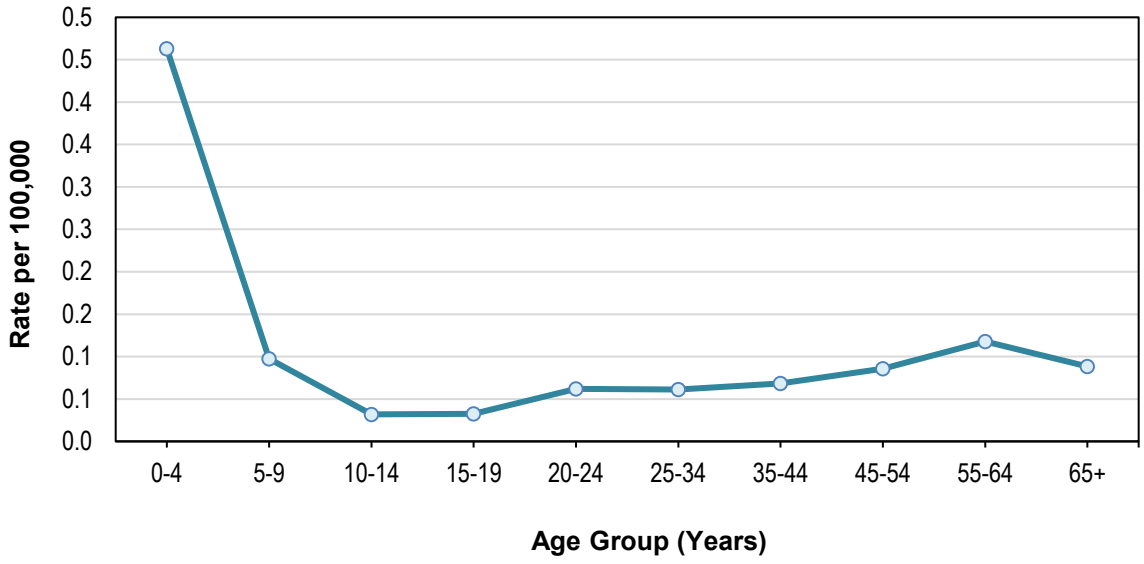
Antibiotic Resistance

Meningococcal disease is life-threatening and must be quickly treated with antibiotics. Close contacts to individuals diagnosed with meningococcal disease must also take antibiotics as post-exposure prophylaxis. While most *Neisseria meningitidis* isolates in the United States have been susceptible to treatment and PEP antibiotics, an increase in isolates with mutations associated with antibiotic resistance has been documented. Antibiotic resistance has primarily been associated with serogroup Y disease.

Gender and Age Group Distribution

There is no difference in rates by sex. The age group distribution shows the highest incidence in infancy and early childhood. Rates decrease dramatically in childhood and adolescence. Rates slightly increase with the 20-24 year age group until they peak in the 55-64 year age group then slightly decline in later ages.

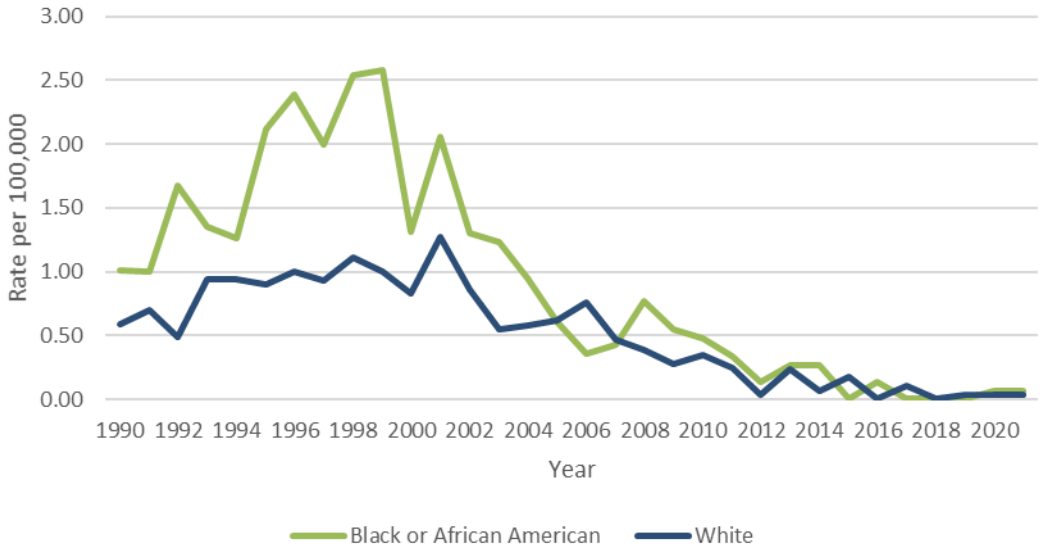
Figure 3: 10 Year Incidence Rate by Age Group – Louisiana, 2012-2021



Race

Prior to CDC's recommendation that all preteens and teens receive a MenACWY vaccine in 2005, rates of meningococcal disease were almost twice as high among Black or African American people (1.65/100,000 population) than they were for White people (0.85/100,000 population). After 2005, rates between both races have decreased and are now about the same in Louisiana.

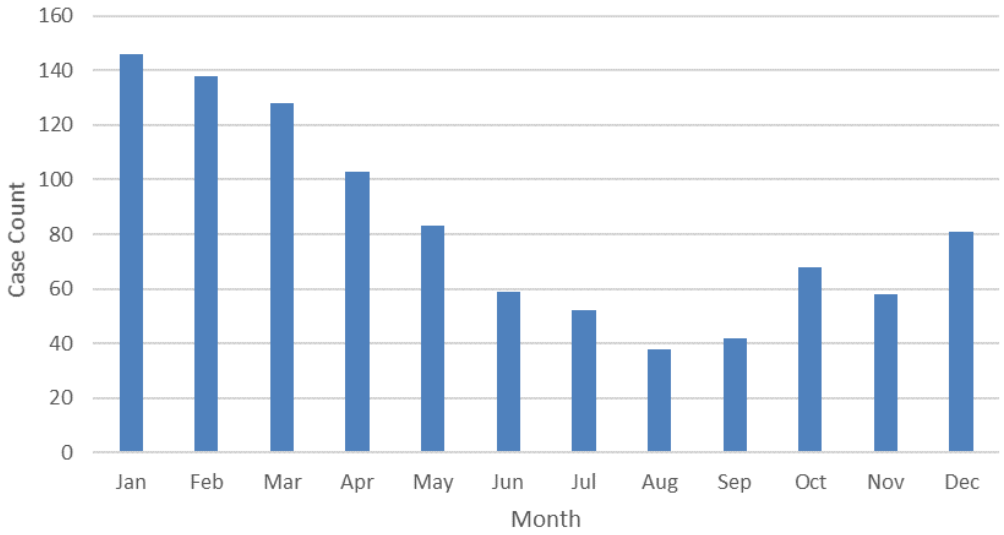
Figure 4: Meningococcal Disease – All Ages – Rates by Race, Louisiana, 1990-2021



Seasonality

Most cases (52%) occur between January and April. This pattern has been consistent every year.

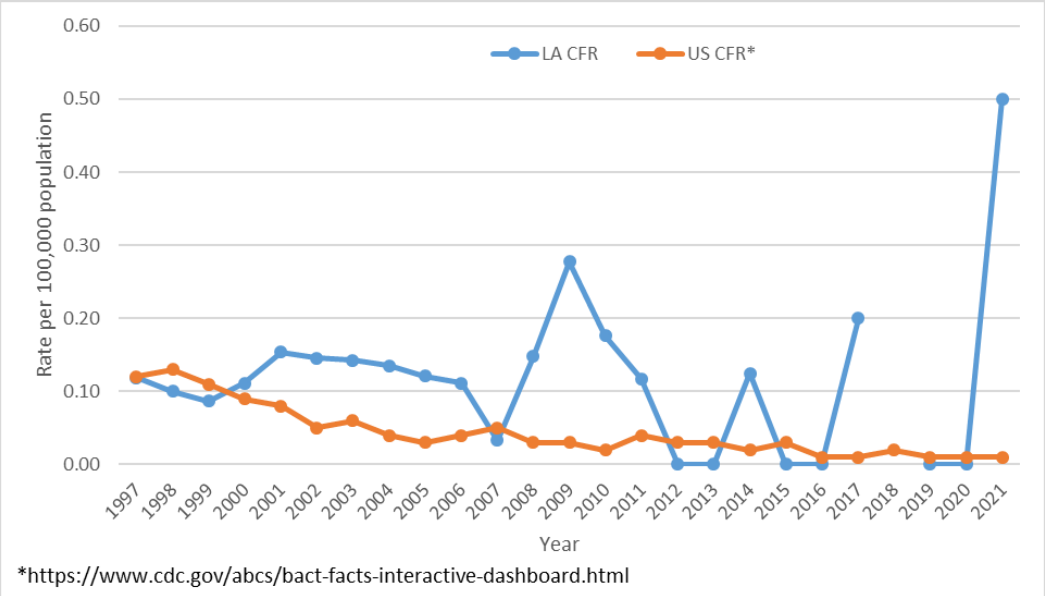
Figure 5: Meningococcal Meningitis Cases by Month – Louisiana, 1990-2021



Mortality

While the case fatality rate has dramatically decreased in the United States, it continues to be high in Louisiana despite the availability of effective antibiotics. The case fatality rate in Louisiana varies widely from 0% to 50. There were no cases of meningococcal disease in Louisiana in 2018.

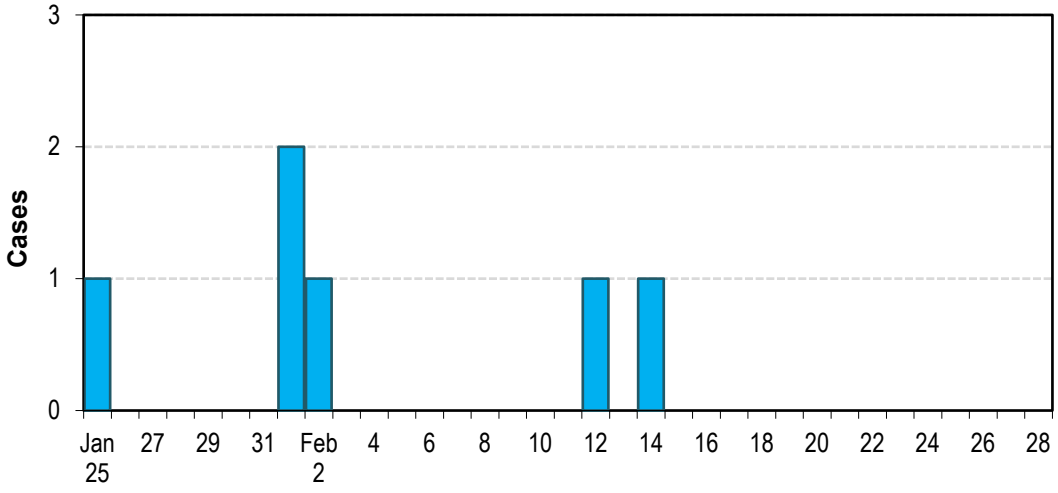
Figure 6: Meningococcal Disease Case Fatality Rates-Louisiana versus U.S., 1997-2021



The University of Louisiana at Lafayette (ULL) Outbreak

Between January 26, 2006 and February 14, 2006 a total of six cases of meningococcal disease, caused by *Neisseria meningitidis* serogroup C, were reported to OPH.

Figure 7: Epidemic Curve – ULL Outbreak – Louisiana, 2006



The case investigation identified an organizational outbreak linked to the local university. The population at risk was approximately 17,000 people. Additionally, the attack rate was 29.4 cases per 100,000 population at risk [(5 cases/17,000 population at risk)*100,000 = 29.4/100,000]. Only five of the six cases were directly linked to the university. Close personal contacts to the infected individuals were identified as persons who may have been in close prolonged contact such as house-hold members. Antibiotic prophylaxis was recommended only for this high-risk group.

In an effort to prevent the continuation of the outbreak, recommendations were issued for three groups of individuals to get vaccinated with a meningococcal vaccine. The groups identified were members of social organizations including fraternities and sororities, all persons who lived on campus at the university, students, faculty and staff at the university through 20 years of age. As vaccine became available, groups deemed at lower risk were offered vaccinations. Upon completion of the vaccination campaign, 5,000 students received vaccinations through the OPH vaccination clinics. Private providers also provided vaccine for their patients.

This outbreak linked cases through the local university; however, the spread of disease can occur only when individuals are in close personal contact with each other. In some instances this includes sharing items that will facilitate droplet transmission from person-to-person. Casual contact, such as being in the same classroom, does not put a person at elevated risk or warrant prophylaxis. The recommendation for mass vaccination is not generally considered necessary, but the specifics of the outbreak at this university, required it.