



DISEASES THAT CAN BE PREVENTED BY VACCINES

Influenza

- Influenza virus changes frequently, requiring a new vaccine almost every year.
- Respiratory disease, spread by infectious droplets ending up on the inner surface of the nose or mouth of another, where it can enter the body, multiply and a few days or so later, cause illness.
- Usually sudden onset, fever, headache and muscle aches.
- Most people recover, but serious complications, including death can occur.
- The flu virus does not always grow well in the lab and so some years the vaccine is not as effective.
- Two pediatric death occurred in Michigan during the 2017-8 influenza season. Nationally, 180 children lost their lives to influenza between October 1, 2017 and 1 September 2018.

Chickenpox

- Chickenpox (varicella) can be a dangerous disease.
- Chickenpox is easily transmitted by inhaling respiratory secretions or by contact with fluid from the blisters.
- Infected lesions can affect bones, the brain, soft tissues.
- Chickenpox in pregnant women can lead to birth defects in the baby.
- Chickenpox virus can become dormant in the body and many years later re-activate and attack nerves causing shingles. There are now vaccines to protect adults, 60 years and older, from shingles.
- In 2016, there were 8,953 cases of chickenpox reported to CDC, with 3 deaths; 531 of the cases were from Michigan, but no deaths.

Hepatitis B disease

- Caused by the Hepatitis B virus (HBV).
- HBV can cause inflammation of the liver, leading to liver failure, liver cancer and death.
- The virus is found in blood, serum and semen.
- Spread by unprotected sex, sharing injection needles or syringes or vaginal birth,
- Most infections do not last long and when recovered, people have lifelong immunity.
- Some people continue to produce virus becoming carriers and can infect others.
- The hepatitis B vaccine was the first vaccine able to prevent a cancer (liver cancer).
- In 2016, there were 3,218 cases of acute hepatitis B reported to CDC and 45 of these cases were from Michigan. Nationally, 32 newborn cases were reported with no Michigan cases.

Human Papilloma Virus infections

- There are more than 120 types of Human Papilloma Viruses (HPV) and most cause skin warts.
- Some types can cause cancer.
- Most are cancers of the genital tract but some are cancers of the mouth and throat.
- HPV is transmitted by direct contact, usually sexual, with an infected person. Unfortunately most infectious people do not know that they are infected.
- Transmission can also occur during the birth process from mother to newborn.
- Human papilloma virus infections are not reportable to the CDC, so we do not have data on the number of cases that occur each year.

Pertussis

- Pertussis, (whooping cough) is a bacterial, respiratory infection.
- Pertussis is highly contagious and produces an uncontrollable violent cough and a deep throaty intake of air – the “whoop”.
- It is most serious for babies before they complete the full vaccine series.
- Recently it has been found that in some people the immunity from vaccines against pertussis fades over time. Adults are therefore recommended to get one additional dose of Tdap vaccine.
- In 2016, there were 17,972 cases of pertussis reported to CDC, of which 416 were from Michigan.

Meningococcal disease

- This bacterial disease results in inflammation of the brain (meningitis) and blood-borne septicemia.
- Meningococcal disease is a medical emergency with high mortality.
- Typical symptoms include fever, bad headache and a stiff neck.
- Transmission occurs when saliva and respiratory droplets are transferred such as by drinking out of the same glass or can.
- Close contacts should be treated right away to prevent disease developing.
- In 2016, 375 cases of meningococcal disease were reported to the CDC, of which 6 were from Michigan.

Tetanus

- Disease results from a toxin produced by the tetanus bacteria.
- Tetanus is uncontrolled muscle spasms and is often fatal.
- Spores of the tetanus bacteria reside in the soil and other contaminated places and get into the body through cuts and other wounds.
- Not contagious from person to person.
- In 2016, there were 34 cases of tetanus reported to CDC and 1 of these was from Michigan.

Mumps

- Mumps virus is transmitted through infected respiratory droplets or saliva.
- Symptoms can include swollen salivary glands around the neck and swelling of the testes in post-pubertal boys. Other tissues that can be affected include the brain, the pancreas and the ovaries.
- Death from mumps is rare in the US.
- In 2016, there were 6,369 cases of mumps reported to CDC, of which 20 were from Michigan.

Hepatitis A

- Hepatitis A is not related to Hepatitis B, although they are both infections of the liver.
- The hepatitis A virus (HAV) is transmitted through water and food that has been contaminated by HAV-containing feces.
- The virus makes its way to the liver where it multiplies and then is shed into the intestines and out through feces.
- Transmission can be prevented by good handwashing after using the bathroom and before preparing food.
- Symptoms are fever, feeling of unwell, loss of appetite, nausea, abdominal discomfort, dark urine and jaundice (yellowing of the skin and whites of the eyes).
- Michigan has been experiencing an outbreak of hepatitis A since August 2016. Other states have experienced similar outbreaks.
- In 2016, there were 2,007 cases of hepatitis A reported to CDC, of which 112 were from Michigan.

Diphtheria

- Diphtheria is also caused by a toxin
- The diphtheria toxin usually acts by destroying tissue in the tonsil and pharynx area of the throat.
- The toxin can also affect the heart muscle and nerves and if these are severely affected can result in death.
- Up to 20% of people under 5 years and older than 40 years will die from the disease

Rubella

- Rubella, also known as German measles, is characterized by a rash with fever, swollen lymph glands and upper respiratory symptoms.
- Complications are rare, and when they do occur are likely to be joint pain or encephalitis.
- The major complication of rubella is congenital rubella syndrome, which can occur when pregnant women are infected, primarily in the 1st trimester.
- Virtually all organs may be affected—eyes, heart, neurological system.
- In 2016, there was 1 case of rubella and 2 cases of rubella congenital syndrome reported to CDC, but none of these were from Michigan.

Rotavirus

- Rotavirus causes an acute diarrhea in babies and young children, resulting in dehydration, sometimes severe.
- In some cases, hospitalization and death occurs, especially with children with other medical problems.
- Transmission occurs through contaminated food or drink.

Poliomyelitis

- Polio is a disease caused by a virus which preferentially multiplies in nerves, particularly those of the spinal cord.
- This damages the spinal nerves leading to paralysis.
- Children are most vulnerable and the disease used to be known as infantile paralysis.
- The virus enters the body through contaminated water. Most children have few or no symptoms.
- The eradication of polio from the western hemisphere, and from most of the rest of the world is a clear example of the power of vaccines.

Measles

- Measles virus is transmitted through respiratory droplets
- Disease results in a fever, cough, runny nose, eye inflammation and then a dense skin rash.
- 30% of people get complications including pneumonia, ear infections, inflammation of the brain and death.
- A late developing complication is subacute sclerosing panencephalitis.
- In 2016, there were 85 cases of measles reported to CDC; 1 was from Michigan

Hib

- *Haemophilus influenzae* B is a bacterium that causes invasive diseases such as meningitis, pneumonia, arthritis and inflammation of the throat.
- It is most severe in children under the age of 12 months.
- 3% - 6% of patients die from the infection, even when appropriate antibiotics are administered.
- In 2016, there were 4,895 cases of Hib disease reported to CDC, of which 185 were from Michigan.

Pneumococcal disease

- Pneumococcal diseases are acute bacterial infections which result in pneumonia, septicemia and meningitis.
- All age groups are susceptible, although the impact is highest upon children, those with certain medical conditions and the very elderly.
- Pneumococcal disease is particularly serious when it follows influenza.
- In 2016, there were 17,626 cases of pneumococcal disease reported to CDC, of which 908 were from Michigan.

Other Vaccine-Preventable Diseases

- Rabies
- Yellow fever
- Anthrax
- Typhoid
- Japanese encephalitis
- Smallpox

Sources: Control of Communicable Disease Manual, Heymann, DL

Centers for Disease Control and Prevention. The Pink Book <https://www.cdc.gov/vaccines/pubs/pinkbook/index.html>

CDC Surveillance Data <https://wonder.cdc.gov/nndss/static/2016/annual/2016-table1.html>