

The presentation will begin shortly. There will be no audio until then.



ALL ABOUT VACCINE PREVENTABLE DISEASES

Lunch and Learn



POLIO



POLIO

- Highly contagious disease caused by poliovirus.
- Most infections are asymptomatic or result in nonspecific febrile illness.
 - A small portion of patients will experience meningitis and/or paralytic disease.
 - The proportion of individuals who experience paralytic disease ranges from 100:1 to 1000:1 or more.
- Viral replication occurs in the oropharynx and the intestinal tract.
- Can be transmitted via the respiratory route or fecal contamination.



POLIO IN THE US AND NORTH DAKOTA

- The last imported case of wild type polio in the US was in 1993.
 - Prior to that case the last case was in 1986.
- The last cases of naturally occurring paralytic polio in the US occurred in 1979 among an Amish community.
- The last case of paralytic polio in North Dakota was in 1977.



POLIO IN THE WORLD

- Polio virus has been eradicated from most of the world.
- Two countries currently have ongoing transmission or Wild Type Polio Virus:
 - Afghanistan reported 19 cases of Wild Type Polio in 2015
 - Pakistan reported 53 cases of Wild Type Polio in 2015
- There have also been cases of circulating vaccine derived polio as a result of low vaccination coverage rates in 2015
 - This has occurred in Pakistan, Guinea, Lao PDR, Madagascar, Myanmar, Nigeria, and Ukraine
- Countries that remain vulnerable to polio include Cameroon, Equatorial Guinea, Ethiopia, Iraq, Nigeria, Somalia, South Sudan, and the Syrian Arab Republic



VACCINATION RECOMMENDATIONS

- IPV or Inactivated polio vaccine is the only polio vaccine available in the United States.
- Routinely recommended at age 2 months, 4 months, 6 through 18 months, and one dose after age 4.
- Unvaccinated individuals traveling to high risk areas should be vaccinated before leaving.
 - 3 doses
 - First two doses given 1-2 months apart.
 - Third dose 6-12 months after the second.



NEWER POLIO VACCINATION RECOMMENDATIONS

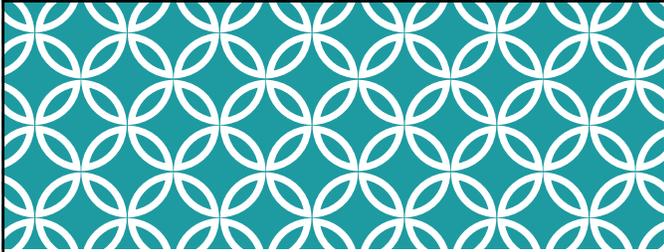
- On May 5, 2014 the World Health Organization declared the international spread of polio to be a public health emergency of international concern.
- This declaration has led to some new vaccine requirements for residents and long term visitors to countries with active polio transmission.
- CDC released a Health Alert on June 2, 2014.
 - Alerted clinicians of possible vaccination requirements for patients planning to travel to countries with ongoing polio transmission for more than 4 weeks.
 - Adults should receive a booster dose of IPV 4 weeks to 12 months prior to departure.
 - U.S. citizens who plan to travel to any of the polio infected countries should have documentation of a polio booster in their yellow International Certificate of Vaccination.



POLIO TRIVIA

- According to the National Toy Hall of Fame®, the game Candyland was invented to help entertain children recuperating from polio disease





MEASLES



MEASLES

- Respiratory disease caused by a virus
 - Usually grows in cells at the back of the throat and lungs
- Symptoms typically begin with fever, runny nose, cough and red watery eyes
 - 3 C's: Cough, Coryza and Conjunctivitis
 - Koplik Spots may appear two or three days after symptoms begin
- Rash that covers the body will develop three to five days after symptoms begin
 - Usually starts on the face at the hairline as flat red spots
 - Spreads downward to trunk, arms and legs and feet



KOPLIK SPOTS



MEASLES RASH



MEASLES TRANSMISSION

- Spread through the air by breathing, coughing or sneezing
 - Extremely contagious
 - Can live for up to 2 hours outside the body
 - Cases can spread the disease 4 days before rash appears
- Can result in other complications.
 - 1/10 children get an ear infection
 - 1/20 children get pneumonia
 - 1/1000 children get encephalitis
 - 1-2/1000 children die



MEASLES IN NORTH DAKOTA

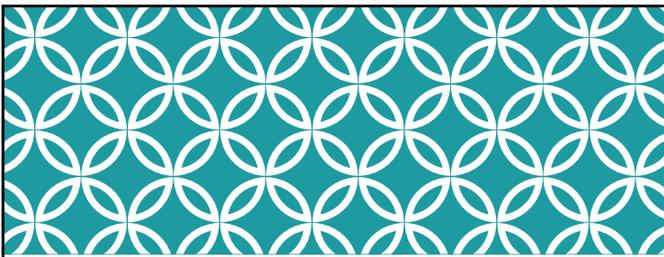
- The last case of measles in North Dakota was in 2011
 - Our first case of measles in over 23 years!
- Adult male in Cass County
- Was exposed to measles while traveling on an airplane
- Spent his infectious period in South Dakota
- His sister later developed measles from their time together in South Dakota
- No other known cases associated



MEASLES TRIVIA

- Roald Dahl, author of Charlie and the Chocolate Factory, Matilda, and James and the Giant Peach had a daughter who died from measles.
- She contracted the disease the year before a vaccine was discovered.
- Both James and the Giant Peach and The BFG were dedicated to her.





MUMPS



MUMPS

- Disease caused by the mumps virus
- Symptoms include fever, headache, muscle aches, tiredness, loss of appetite and swelling of salivary glands
- Disease is spread by droplets of saliva or mucus
- Occasionally, complications can occur
 - The most common complication is orchitis (inflammation of the testicles).
 - Other more rare complications include:
 - Encephalitis or meningitis
 - Oophoritis (inflammation of the ovaries) and/or mastitis
 - Deafness



MUMPS IN NORTH DAKOTA

- The last confirmed cases of mumps in North Dakota was in 2011
 - Three cases linked to an outbreak occurring in the UK
- One probable case in 2013 and 2015
- A few suspect cases each year



MUMPS IN THE US

- 38 cases reported so far this year
- 1,010 cases in the US in 2015
- Outbreaks in 2015 on college campuses
 - University of Illinois at Urbana-Champaign
 - 69 cases of mumps
 - University of Iowa
 - Over 100 cases since beginning of school year
 - School holding mass vaccination clinics for students

Two cases of mumps reported at University of Wisconsin-Whitewater

To slow mumps spread, UI offers students free vaccination

Penn State working to prevent spread of mumps after three possible cases were reported

Mumps spreading on college campuses in Illinois

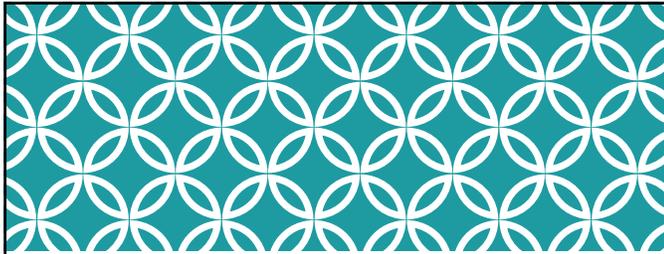
Mumps outbreak at University of Illinois leads to call for re-vaccination



MUMPS TRIVIA

Actress Holly Hunter is deaf in one ear from a childhood mumps infection





RUBELLA



RUBELLA

- A viral illness caused by a togavirus of the genus rubivirus.
- Spread by contact with respiratory secretions of an infected person
- Symptoms include a mild, maculopapular rash, fever, general ill feeling and swelling behind ears or back of neck
- Complications result when a pregnant woman becomes infected
 - These complications can include deafness, cataracts, heart defects, mental retardation, liver damage, and spleen damage
 - 20% likelihood of a birth defect if the woman is infected in early pregnancy



RUBELLA IN THE US AND NORTH DAKOTA

- So far this year, there have been no cases of rubella in the US
 - 5 total cases in 2015
- North Dakota had a rubella case in 2008.
 - Associated with travel to India
 - Before that, hadn't had a case since 1991



RUBELLA TRIVIA

- Rubella means "little red" in Latin
- Was initially thought to be a variant of measles or scarlet fever
 - First described as a separate disease in 1814 in German medical literature, hence its other name "German Measles"
 - During World War I, was also known as "Liberty Measles"





MENINGOCOCCAL DISEASE



MENINGOCOCCAL DISEASE

- Caused by the bacteria *Neisseria meningitidis*
- The bacteria can result in meningitis, blood stream infection or other invasive infections
 - Should be reported as soon as gram negative diplococcal bacteria are identified
- Bacteria can be transmitted via respiratory and throat secretions
 - Secondary cases are rare
 - Antibiotics may be recommended for close contacts of case to prevent secondary cases
 - If chemoprophylaxis is indicated, should be administered as soon as possible, ideally within 24 hours of case identification
 - Health department follows up to identify close contacts



MENINGOCOCCAL DISEASE

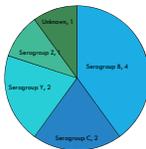
- Symptoms may include fever, headache, nausea, vomiting, stiff neck, petechial rash, photophobia, mental confusion
- Even with antibiotic treatment, 10 to 15 out of 100 people infected with meningococcal disease will die.
- About 11 to 19 out of every 100 survivors will have long-term disabilities, such as loss of limb(s), deafness, nervous system problems, or brain damage.



MENINGOCOCCAL DISEASE IN NORTH DAKOTA

- 0 cases in 2016
- 0 cases in 2015

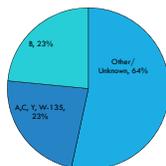
North Dakota Meningococcal Disease Serogroups 2009-2014



MENINGOCOCCAL DISEASE IN THE U.S.

- 10 cases in 2016 so far
- 341 cases in 2015

2015 Distribution of Meningococcal Serogroups n=304



SEROGROUP B OUTBREAKS

- From 2008-2010, a prolonged outbreak of serogroup B on a university campus in Ohio led to 13 cases and one death.
- In 2013, two universities in New Jersey and California experienced serogroup B outbreaks with a combined 13 cases and one death reported.
- In 2015, the University of Oregon experienced a serogroup B outbreak with 7 cases.
- In 2016, Santa Clara University is currently experiencing an outbreak with two cases reported so far.



VACCINATION RECOMMENDATIONS

- Meningococcal conjugate vaccination (MCV4) is routinely recommended at age 11 through 12 with a booster dose at age 16.
 - Protects against serogroups A,C, Y and W-135
- One dose required for Middle School Entry.
- Also required for students under 21 in order to reside in campus housing at North Dakota Universities.
 - Two doses at age 10 or older at least 8 weeks apart or one dose within the last 5 years.



NEW VACCINE APPROVED

- Two serogroup B vaccines have been licensed by the FDA
 - Bexsero® is given as 2 doses, at least 1 month apart.
 - or
 - Trumenba® is given as 3 doses, with the second dose 2 months after the first and the third dose 6 months after the first.
- Routinely recommended for 10 and older who are at increased risk for serogroup B meningococcal infections
 - Includes People at risk because of a serogroup B meningococcal disease outbreak, anyone whose spleen is damaged or has been removed, anyone with a rare immune system condition called "persistent complement component deficiency", anyone taking a drug called eculizumab (also called Soliris®), microbiologists who routinely work with N. meningitidis isolates
 - Can be given to anyone 16 to 23 years old
 - At physician's discretion



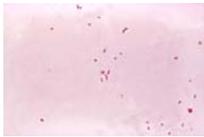
THE VACCINATION SITUATION

- According to the 2014 National Immunization Survey:
 - North Dakota's coverage rate for adolescents aged 13-17 years for 1 or more doses of MenACWY was 91.8(±3.3)%
 - The United States' coverage rate for adolescents aged 13-17 years for 1 or more doses of MenACWY was 79.3(±1.1)%



MENINGOCOCCAL TRIVIA

- As many as 10% of adolescents and adults are asymptomatic transient carriers of *N. meningitidis*, most strains of which are not pathogenic.



STREPTOCOCCUS PNEUMONIAE



STREPTOCOCCUS PNEUMONIAE

- A bacteria that is commonly found in the human respiratory tract.
 - May be isolated from the nasopharynx of 5-90% of healthy persons.
 - Rates of asymptomatic carriage vary with age, environment and the presence of upper respiratory infections
- Can sometimes cause severe invasive pneumococcal disease.
 - Bacteremia
 - Meningitis
 - Pneumonia
- Spread through airborne droplets
- Approximately 10% of all patients with invasive pneumococcal disease die of their illness



PNEUMOCOCCAL DISEASE IN NORTH DAKOTA

- All cases of invasive pneumococcal disease in children under 5 are investigated.
 - No cases so far this year in children under 5.
 - In 2015, North Dakota has had 5 cases of invasive pneumococcal disease in children under 5.
 - Nationally, the United States had 1,065 cases of invasive pneumococcal disease in children under 5 in 2015.

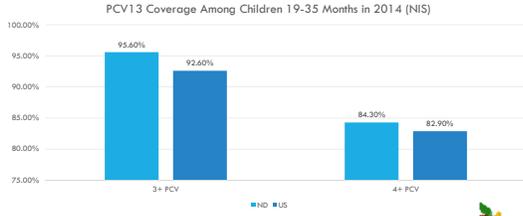


PNEUMOCOCCAL VACCINATION

- PCV13 (Pneumovax®) vaccine is routinely recommended for children between the ages of 2 months and 5 years
 - Depending on the type of vaccine, children should receive four doses at 2, 4, and 6 months. A booster dose should be given at 12 to 15 months of age
 - PCV13 vaccine is required for childcare attendance
- Certain individuals with high risk conditions may be recommended to receive PCV13 or PPSV23 (Pneumovax®).
- Adults 65 and older are routinely recommended to receive PCV13 and PPSV23 spaced apart by 12 months.

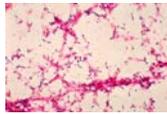


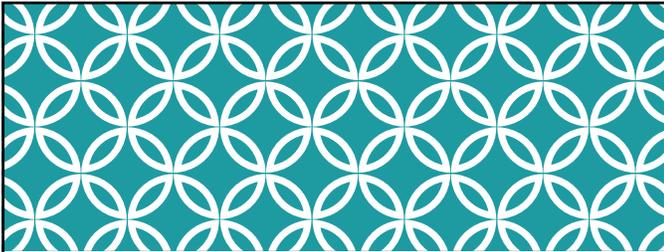
PNEUMOCOCCAL VACCINATION RATES



STREPTOCOCCUS PNEUMONIAE TRIVIA

- So far 92 serotypes have been documented as of 2011
- 10 most common serotypes account for about 62% of invasive disease world wide





PERTUSSIS



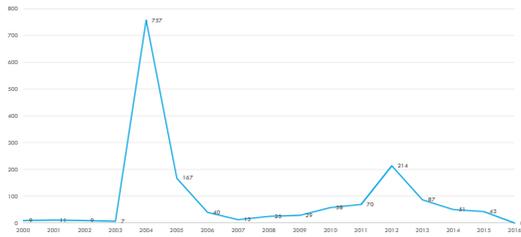
PERTUSSIS/WHOOPING COUGH

- Coughing illness caused by bacteria *Bordetella pertussis*
- Symptoms can include cold-like symptoms, coughing fits, posttussive vomiting, whoop, apnea.
 - Most severe in infants
- Cough will persist for at least 14 days.
- May result in certain complications
 - The most common complication is pneumonia.
 - Infants may also suffer from seizures and encephalopathy.
 - Death is rare but does occur. Most deaths are in unvaccinated infants.



PERTUSSIS IN NORTH DAKOTA

Pertussis Cases in North Dakota 2000-2016



PERTUSSIS IN NORTH DAKOTA

- The number of pertussis cases peak every few years
 - Some peak years in North Dakota were 2012 (214 cases) and 2004 (757 cases)
- No cases so far in 2016
- In 2015 there were 43 total cases
 - 40 confirmed
 - 3 probable
 - Ages range from under 1 year to 60 and over



THE VACCINATION SITUATION

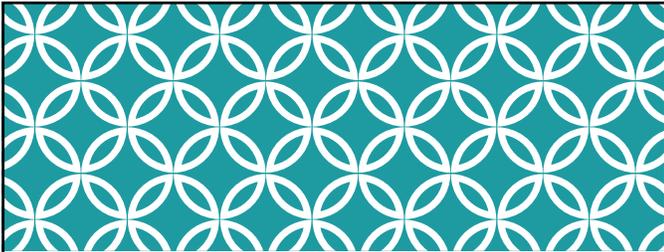
- According to the 2014 NIS, 92.1% of adolescents received at least one dose of Tdap in North Dakota
- National coverage rate was 87.6%
- Adult Tdap vaccination coverage was collected in 2012 via the National Health Interview Survey (NHIS)
 - 14.2% of adults over 19 years were vaccinated with Tdap
 - 25.9% Adults living with a child under 1 year were vaccinated with Tdap
 - 8.0% of adults over age 65 were vaccinated with Tdap



PERTUSSIS TRIVIA

- Thomas Jefferson's daughter, Lucy, died of pertussis when she was two and a half





CHICKENPOX



CHICKENPOX

- Very contagious disease caused by the varicella-zoster virus (VZV)
 - Causes a blister-like rash, itching, tiredness and fever
 - Can be serious, especially in babies, adults, and people with weakened immune systems
 - Before the chickenpox vaccine, about 4 million people would get chickenpox each year in the United States, 10,600 people were hospitalized and 100 to 150 died each year
- Spreads easily through the air through coughing or sneezing
 - Can also be spread by touching or breathing in the virus particles that come from chickenpox blisters
 - A person is contagious 1-2 days before the rash develops until all lesions have formed scabs



CHICKENPOX CASES

- All suspected cases of chickenpox should be confirmed by laboratory testing
 - PCR or culture of skin specimen
- Cases diagnosed without laboratory testing should still be reported to the health department
- Schools and child care facilities are also required to report



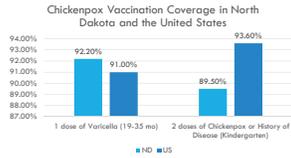
CHICKENPOX VACCINATION

- Two doses of chickenpox vaccine are routinely recommended for children at 12 months of age and 4-6 years of age
 - Two doses are required for school attendance in North Dakota for grades kindergarten through seventh.
 - Grades eighth through eleventh are required to have one dose.
 - Children who have had chickenpox disease previously are exempt from the requirement.
- Less than 5% of individuals will develop a localized or generalized varicella-like rash 5 to 26 days after vaccination
 - Transmission of varicella vaccine virus is extremely rare
 - However, the rash could also be caused by varicella virus; it is difficult to tell the difference
 - If this occurs, the child should not attend school until all of the lesions crust.
 - The child should also avoid close contact with people who do not have evidence of varicella immunity and who are at high risk of complications of varicella, such as immunocompromised people, until the rash has resolved.



CHICKENPOX VACCINATION RATES

- Data taken from the 2014 NIS and the National School Immunization Assessment
- North Dakota had the 6th worst rates for kindergarten chickenpox coverage according to the 2014-2015 school immunization survey



CHICKENPOX TRIVIA

• In the movie, The Goonies, the actor who played "Chunk" came down with chickenpox. He showed up to work without informing anyone of his illness. Chunk was famous for performing the "truffle shuffle", if you look closely you can see his rash.





DIPHTHERIA



DIPHTHERIA

- Caused by the bacteria *Corynebacterium diphtheriae*
- Bacteria can infect the respiratory mucosa, the skin, and other sites of the body (rare)
- Transmitted from person to person via respiratory droplets or direct contact with respiratory secretions
- Can also be transmitted via discharge from skin lesions or fomites



DIPHTHERIA

- Respiratory diphtheria is characterized by a dense, grayish-white pseudomembrane
 - The membrane adheres to the local tissue of the tonsils, pharynx or larynx.
- Initial symptoms usually include a sore throat, difficulty swallowing, malaise and a low grade fever.
- Some people may also develop “bull-neck” caused by inflammation of the cervical lymph nodes and surrounding tissue
- Case fatality of respiratory diphtheria is about 10%
- Antitoxin should be administered upon clinical diagnosis



DIPHTHERIA IN NORTH DAKOTA AND THE UNITED STATES

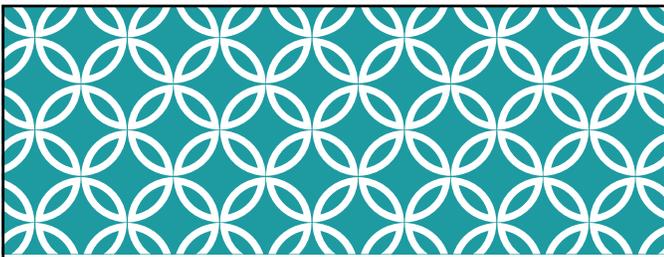
- 0 cases in the U.S. in 2015 and 2016
- 0 cases in North Dakota for a very long time
 - The last cases of diphtheria in North Dakota were reported in 1975; six cases were reported that year.



DIPHTHERIA TRIVIA

- In 1925, an outbreak of diphtheria broke out in Nome, Alaska and threatened to kill most of the region's population
- Fresh antitoxin was necessary but had to be sent from Seattle, Washington
- The only way to get the antitoxin to Nome was via sled dogs.
 - The trip involved 150 dogs along a 674 mile trail. The trail usually took 15 to 20 days but the dogs were able to complete the trip in 5 days and 7 hours.
- The annual Iditarod Trail Sled Dog Race is held annually to commemorate this run





HEPATITIS A



HEPATITIS A

- Viral disease transmitted via the Fecal-Oral Route
 - Cases in children under 6 years are often asymptomatic (70%)
- Symptoms usually include nausea, vomiting, abdominal discomfort, pale stools, dark urine, jaundice and elevated serum ALT or AST levels.
 - The average incubation period is 25-30 days with a range of 15-50 days.
- Often contracted during international travel.
- Exposed individuals may be recommended to receive prophylaxis.
 - Individuals between 12 months and 40 years should receive Hepatitis A vaccine.
 - Individuals younger than 12 months and older than 40 years should receive Hepatitis A immune globulin.



HEPATITIS A IN THE US AND NORTH DAKOTA

- No cases reported so far this year
- 6 confirmed cases in 2015.
 - 3 cases reported travel outside of the US.
- 55 cases reported in the US so far this year.
- 1273 cases reported in the US in 2015.

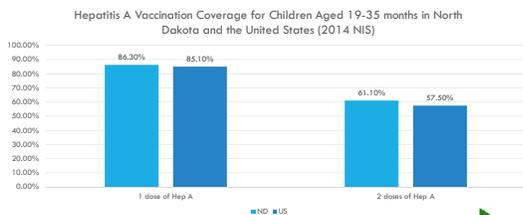


VACCINATION RECOMMENDATIONS

- Hepatitis A vaccine is routinely recommended for children at 12 months of age.
 - Two doses separated by 6 months.
 - Unvaccinated children can be caught up at any time.
- Also recommended for people at high risk:
 - 12 years or older who are traveling to high risk areas.
 - Men who have sex with men.
 - Users of illegal drugs.
 - Previously unvaccinated individuals who anticipate having close contact with an international adoptee from a country where hepatitis A is prevalent.
 - People who have blood clotting disorders.
 - People who may have occupational exposure (i.e. lab setting, working with infected primates)
 - People with chronic liver disease.
 - People who wish to be immune to hepatitis A.



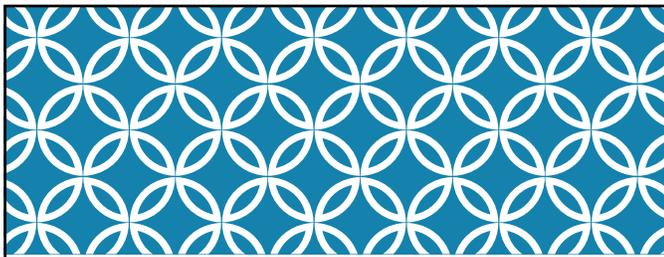
HEPATITIS A VACCINATION RATES



HEPATITIS A TRIVIA

- In 2008, several celebrities were notified of possible exposure to Hepatitis A when a bartender at a popular nightclub became ill with the virus after vacationing.
- Ashton Kutcher had his 30th birthday party at the bar on one of the nights the infected bartender was working.
- The list of exposed patrons included Demi Moore, Madonna, Kate Hudson, Liv Tyler, Salma Hayek and Bruce Willis.





HEPATITIS B



HEPATITIS B

- Viral disease caused by the hepatitis B virus
 - Transmitted several different ways
 - Sexual Transmission
 - Injection Drug Use
 - Infected mother to baby at birth
- Symptoms can include jaundice, nausea, vomiting, dark urine, abdominal pain, fever, headache and skin rashes.
 - At least 50% of infections are asymptomatic



HEPATITIS B

- Infections can be acute or chronic
 - People who develop chronic infection as infants or young children are usually asymptomatic
 - However, chronic liver disease develops in 2/3rd of these individuals and approximately 15-25% die prematurely from cirrhosis or liver cancer
- In 2013, an estimated 19,764 persons in the US were newly infected with HBV
- An estimated 700,000-1.4 million persons in the United States have chronic hepatitis B virus infection



PERINATAL HEPATITIS B PROGRAM

- Hepatitis B infection in a pregnant woman poses a serious risk to her infant at birth
 - Without postexposure immunoprophylaxis, approximately 40% of infants born to Hepatitis B positive women will develop chronic Hepatitis B infection
- Infections can be prevented by identifying these women beforehand and ensuring that the infant receives a Hepatitis B vaccine and Hepatitis B Immune Globulin (HBIG) within 12 hours of birth
- The North Dakota Department of Health does this through the Perinatal Hepatitis B Program
 - Also, follow up with the infant to make sure that he/she completes the hepatitis series and is tested to determine disease status and immunity status

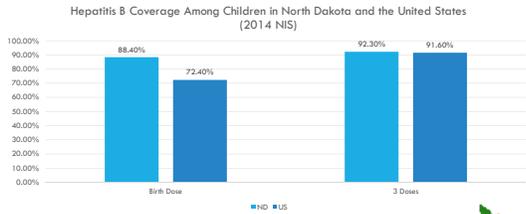


HEPATITIS B VACCINATION RECOMMENDATIONS

- Hepatitis B vaccine is routinely recommended at birth, 1-2 months and 6-18 months.
- All children 0 through 18 years are recommended to be vaccinated against Hepatitis B if they were not previously vaccinated.
- Adults who are at risk for contracting Hepatitis B or who wish to be protected from HBV infection should also be vaccinated with Hepatitis B vaccine.
 - Adults who are considered high risk include sex partners with Hepatitis B positive people, sexually active people not in long term monogamous relationships, men who have sex with men, injection drug users, household contacts of Hep B positive people, health care workers, people with chronic liver disease, people with HIV, unvaccinated adults with diabetes



HEPATITIS B VACCINATION RATES



HEPATITIS B TRIVIA

•The Hepatitis B Surface Antigen was previously called the "Australia Antigen" because it was first isolated from the serum of an Australian Aborigine.



MANDATORY REPORTABLE VACCINE PREVENTABLE DISEASES

- All mandatory reportable diseases should be reported to Disease Control within 7 days
- Certain diseases should be reported immediately
- Reporting can be done by:
 - Calling 1(800)472-2180 or (701)328-2378
 - Reporting online: <https://www.ndhealth.gov/disease/reportcard>
 - Faxing



MANDATORY REPORTABLE VACCINE PREVENTABLE DISEASES

- Pertussis/Whooping Cough***
- Chickenpox
- Meningococcal disease***
- Influenza
- Measles***
- Mumps***
- Rubella***
- Diphtheria***

- Tetanus
- Invasive *Streptococcus pneumoniae*
- Invasive *Haemophilus influenzae*
- Hepatitis A
- Hepatitis B
- Polio***

*Report Immediately



TYPE YOUR QUESTION IN THE CHAT WINDOW TO THE RIGHT

After the presentation, questions may be sent to:

- | | |
|----------------------|-------------------------|
| Molly Howell | mahowell@nd.gov |
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Immunization Program : 701.328.3386 or toll-free 800.472.2180



POST-TEST

Post-test

- * Nurses interested in continuing education credit, visit: <http://www.ndhealth.gov/immunize/posttest>
- * Successfully complete the five-question post-test to receive your certificate.

Credit for this session is available until Tuesday, March 8, 2016.

This presentation will be posted to our website: www.ndhealth.gov/immunize