

**THE PRESENTATION WILL
BEGIN SHORTLY.**



There will be no audio until then.

**LUNCH AND LEARN:
NAME THAT RASH AND
LABORATORY TESTING FOR
VACCINE PREVENTABLE
DISEASES**



**Name
That Rash**

QUESTION #1



A) Measles
B) Chickenpox
C) Scarlet Fever
D) Rubella

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D) Rubella

RUBELLA RASH

- Generalized erythematous, maculopapular rash.
- Rash starts on the face.
 - Becomes generalized in 24 hours.
- Lasts a median of 3 days.
- Lymphadenopathy and slight fever usually accompany rash.
 - Lymphadenopathy may precede rash and lasts between 5 and 8 days.
- Most children do not develop any other symptoms but adults may suffer a 1-5 day prodrome.
 - Prodrome may include low-grade fever, headache, malaise, mild coryza and conjunctivitis.
- Often misdiagnosed as scarlet fever or measles.

QUESTION #2



- A) Small Pox
- B) Chickenpox
- C) Swimmer's Itch
- D) Rubella

**C) Swimmer's Itch
(Cercarial dermatitis)**

SWIMMER'S ITCH RASH

- Appears after swimming in contaminated water.
 - Characterized by small reddish pimples which may develop into small blisters.
 - Symptoms include tingling, burning or itching of the skin.
- Caused by microscopic parasites that infect some birds and mammals.
 - The parasite burrows into the skin and causes an allergic reaction.

QUESTION #3



- A) Measles
- B) Chickenpox
- C) Impetigo
- D) Rubella

A) MEASLES

MEASLES RASH

- Erythematous maculopapular rash
 - Usually accompanied by pathognomonic enanthema or Koplik spots.
- The rash usually appears 14 days post-exposure.
 - Spread from head to trunk to lower extremities.
 - Rash usually lasts between 4-7 days.
- Measles symptoms usually include fever, cough, coryza, and conjunctivitis.



QUESTION #4



A) Measles

B) Chickenpox

C) Impetigo

D) Small Pox

B) Chickenpox

CHICKENPOX RASH

- Generalized, pruritic, vesicular rash.
 - Typically consists of 250-500 lesions in various stages of development and resolution.
 - Sometimes accompanied by a low grade fever.
- The rash is maculopapular for a few hours, vesicular for 3-4 days, then crusts leaving scabs.
 - Lesions are unilocular and collapse on puncture.
 - Usual arranged in a central distribution and are more abundant on covered areas of the body.
- Rash usually evolves into noninfectious dried crusts within 5-6 days.

QUESTION #5



- A) Small Pox
- B) Chickenpox
- C) Impetigo
- D) Rubella

C) Impetigo

IMPETIGO RASH

- Rash caused by a superficial skin infection.
 - Golden or honey colored skin crusting is caused by dried serum.
- Usually present on arms, legs, or face.
- Highly contagious and found commonly in children living in the tropics.
- Caused by Staphylococci bacteria.

QUESTION #6



- A) Measles
- B) Chickenpox
- C) Impetigo
- D) Small Pox

D) Small Pox

SMALL POX RASH

- Rash typically begins on the face and rapidly progresses to involve the forearms, trunk, and legs.
 - Most lesions will be on the face and distal extremities.
 - Most patients will have lesions on the palms and soles.
 - Lesions begin as macules that progress to papules followed by firm umbilicated vesicles which turn to hard deep seated pustules
 - Each stage lasts 1-2 days.
- The rash is usually preceded by a severe illness characterized by high fever as well as malaise, severe headache, backache, abdominal pain and prostration.
 - 24 hours before the rash, the patient will also develop lesions on mucosa of the mouth and pharynx.



QUESTION #7



- A) Measles
- B) Scarlet Fever
- C) Rubella
- D) Chickenpox

B) Scarlet Fever

SCARLET FEVER RASH

- Red rash which begins as small flat red blotches.
 - Gradually becomes fine bumps and feels like sandpaper.
- Appears about 1-2 days after initial symptoms.
 - First appears on the neck, underarm and groin, then spreads to the rest of the body.
 - Cheeks may appear flushed with paleness around the mouth.
 - Skin creases on the underarm, elbow and groin may appear brighter red than the rest of the rash.
- Rash lasts about 7 days with peeling lasting up to several weeks.
- Initial symptoms include fever and sore throat sometimes accompanied by chills, vomiting and abdominal pain.
- Also may have "strawberry tongue"
 - May have red and bumpy appearance.
 - Tongue may also have whitish coating and appear swollen.

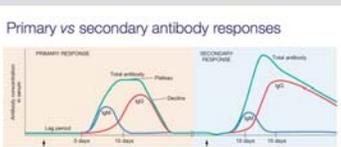
IMPORTANCE OF ORDERING CORRECT TEST

- Vaccine preventable diseases have many symptoms that are similar to other diseases.
 - Most illnesses start out with non-specific symptoms.
- Rash illness can be caused by several different etiologic agents.
 - Viral illness
 - Vaccine Preventable Diseases
 - Bacterial illness
 - Allergies
- Important to promptly order the correct tests.
 - Important to rule out differential diagnoses.



IgM VS. IgG

- One of the most common errors is ordering an IgG test instead of an IgM test.
- IgM detects recent infection or vaccination.
- IgG detects immunity.
 - Immunity could be due to prior vaccination.
- A rise in IgG can demonstrate recent infection as well.
 - One IgG result will not be confirmatory.



PERTUSSIS TESTING

- Acceptable methods of lab testing include PCR and Culture
 - Ideally two swabs should be collected, one for PCR and one for Culture
 - Swab for culture must be stored in a tube with Regan Lowe transport agar
- Culture is the gold standard but can be difficult
- PCR is most common method of laboratory diagnosis
 - Pertussis samples can be sent to the North Dakota Department of Health Laboratory
 - Currently the cost of a pertussis test is \$51
 - Samples should be sent with a Laboratory Test Request Form.



HEPATITIS A TESTING

- **Hepatitis A IgM should be ordered if Hepatitis A is suspected.**
 - Presence of Hepatitis A IgM indicates either recent infection or recent vaccination.
 - Hepatitis A IgM is the only confirmatory test.
- **Hepatitis IgG shows either past infection or vaccination.**
- **Total Hepatitis A antibody is positive if there is either IgG or IgM present.**
 - Cannot distinguish if IgM or IgG caused the positive result.

HEPATITIS A- DIFFERENTIAL DIAGNOSIS

- **Hepatitis A testing is usually done when a person is experiencing fever, fatigue, nausea, vomiting, abdominal pain, jaundice or elevated liver enzymes.**
 - Hepatitis A is contracted via the fecal/oral route.
 - Often contracted during overseas travel.
- **Persons experiencing Hepatitis A-like symptoms are often tested for**
 - Hepatitis B
 - Hepatitis C
 - Cytomegalovirus

VARICELLA TESTING

- **Skin lesions are the preferred specimen for laboratory confirmation of varicella disease.**
 - Blood specimens are preferred to test for varicella immunity.
- **PCR is the method of choice for rapid clinical diagnosis.**
- **DFA can also be used if PCR is not available.**
 - Less sensitive than PCR.
- **Culture can also be confirmatory but it is less sensitive than PCR.**
 - Requires up to a week for result.
- **Detection of IgM indicates recent infection and can be used to confirm diagnosis.**
 - Inconsistently detected and not a reliable method.
 - Requires serum.
- **IgG DOES NOT confirm recent varicella infection.**
 - It does confirm immunity. Indicates past vaccination or past disease.

MENINGOCOCCAL TESTING

- A gram stain should be performed as soon as Meningococcal disease is suspected.
 - Used to differentiate between different bacterial pathogens that cause meningitis.
- The only confirmatory test for meningococcal disease is isolation of *Neisseria meningitidis* bacteria from a sterile site.
- PCR or polysaccharide antigen in CSF can be used to fulfill a probable case definition in the absence of culture.
 - If antibiotics given before specimen collection, culture is often impossible.



MUMPS TESTING

- Acute mumps infection can be detected by presence of Mumps IgM.
 - IgG must be collected twice to confirm recent infection.
 - Must show that there is a rise in IgG
 - Easiest to collect IgM or both IgM and IgG.
- Virus specimens can also be collected.
 - Must collect fluid from parotid duct, other affected salivary gland ducts, the throat, urine or from cerebrospinal fluid.
 - Parotid duct swabs yield the best viral sample.
 - Urine samples are less like than oral specimens to contain enough virus for detection.
 - Must be obtained within 3 days of parotitis onset and no more than 8 days after onset.

MEASLES TESTING

- Acute measles infection can be detected by presence of Measles IgM.
- IgG must be collected twice to confirm recent infection.
 - Must show that there is a rise in IgG
 - Easiest to collect IgM or both IgM and IgG.
- Effort should also be made to collect a viral specimen as well.
 - PCR can be used to detect virus specific nucleic acid.
 - Virus can also be cultured and isolated from a clinical specimen.
- Appropriate specimens for viral isolation include throat or nasopharyngeal swabs. Urine may also contain virus.
 - Clinical specimens should be collected within three days of rash onset; however, collections up to ten days post onset may be successful.

RUBELLA TESTING

- Acute rubella infection can be detected by presence of rubella IgM.
 - Rubella IgM can be detected 4-30 days after onset of illness. Sera should be collected as early as possible but may not be detected until 5 days post rash onset.
- IgG must be collected twice to confirm recent infection.
 - Must show that there is a rise in IgG
 - Easiest to collect IgM or both IgM and IgG.
- Effort should also be made to collect a viral specimen as well.
 - PCR can be used to detect virus specific nucleic acid.
 - Virus can also be cultured and isolated from a clinical specimen.
- The best specimen for viral isolation is a throat swab. Other appropriate specimens include nasopharyngeal swabs, urine or blood. CSF should only be collected if Rubella encephalitis is suspected.
 - The best time to collect viral specimens is within four days of rash onset; however, virus may be detectable one week before to two weeks after rash onset.

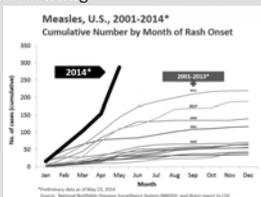
ORDERING MULTIPLE TESTS

- Difficult to differentiate between rash illnesses.
 - Rubella is often misdiagnosed as scarlet fever or Measles and vice versa.
- Important to order multiple tests.
 - Should always order rubella testing when suspecting measles and vice versa.
- Measles has been misdiagnosed as Kawasaki disease, dengue fever and scarlet fever among other diseases.
 - Several cases in Ohio initially were misdiagnosed as Dengue fever.

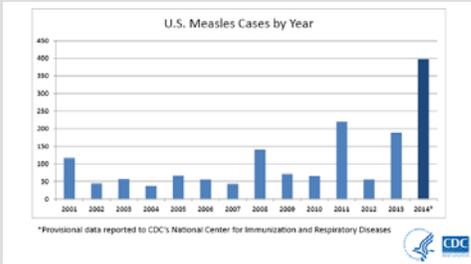


MEASLES IN THE US

- Large number of measles cases this year.
 - 20 year high for this point of the year.
 - 397 cases reported so far.
 - Cases in 20 states.
- Several outbreaks occurring.
 - New York
 - Ohio
 - California



MEASLES CASES IN THE US BY YEAR



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



VACCINATION RECOMMENDATIONS

- Recommended schedule is one dose of MMR at 12 through 15 months with a second dose at 4 through 6 years.
- Adults with no evidence of immunity should receive 1 dose of MMR.
 - If the adult is in a high risk group, he/she should receive 2 doses separated by at least 28 days.
 - High risk includes
 - Healthcare personnel
 - International travelers
 - Students at post-high school educational institutions
 - People exposed to measles in an outbreak setting
 - Those previously vaccinated with killed or unknown type vaccine during 1963-1967.



THE VACCINATION SITUATION

- Recommended coverage for MMR Vaccine is 95% to produce herd immunity.
- North Dakota's 2012-2013 Kindergarten vaccination rates for MMR vaccine were the 5th worst in the nation.
 - Our kindergarten coverage for the 2013-2014 school year was 89.97%.
- According to the 2012 National Immunization Survey (NIS)...
 - Only 89.7% of 24 month olds have received a dose of MMR in North Dakota.
 - Only 89.8% of 13-17 year olds have received 2 doses of MMR in North Dakota.



A MEASLES INVESTIGATION

- Measles is extremely contagious.
 - Contagious 4 days before rash appears to 4 days after.
- Must do contact investigation.
 - Check contacts' MMR vaccination status.
 - If unvaccinated, contacts will need to receive post exposure prophylaxis or be excluded from public activities.
 - MMR vaccine can prevent infection in exposed persons if given within 72 hours of exposure.
 - In some cases immunoglobulin may be indicated.
 - If case attends group setting, unvaccinated individuals may need to be excluded until 21 days after the onset of rash in the last case of measles.

PREVENTION AND CONTROL OF MEASLES IN MEDICAL SETTINGS

- A person in whom measles is suspected should be placed in a negative pressure air isolation room immediately.
- Airborne precautions should be observed along with respiratory etiquette and all other standard precautions.
 - N95 respirator
- Evidence of measles immunity for all potentially exposed staff should be reviewed.
 - Vaccinate staff who do not have evidence of measles immunity.

If suspected case is laboratory positive...

- Exclude all personnel with measles illness
- Staff without evidence of immunity should be vaccinated and excluded from work from day 5 to 21 following exposure.

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>

MANDATORY REPORTABLE VACCINE PREVENTABLE DISEASES

▪ Pertussis/Whooping Cough	▪ Tetanus
▪ Chickenpox	▪ Invasive <i>Streptococcus pneumoniae</i>
▪ Meningococcal disease	▪ Invasive <i>Haemophilus influenzae</i>
▪ Influenza	▪ Hepatitis A
▪ Measles	▪ Hepatitis B
▪ Mumps	▪ Polio
▪ Rubella	
▪ Diphtheria	

POLIO HAN

- 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.
 - 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.
 - Adults should receive a booster dose of IPV 4 weeks to 12 months prior to departure.

Type your question in the chat window to the right.

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

After the presentation, questions may be sent to:

- Molly Howell mahowell@nd.gov
- Abbi Pierce apierce@nd.gov
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▪For any immunization questions, call 701-328-2378 for the Immunization Program

POST-TEST

- Nurses interested in continuing education credit, visit www.ndhealth.gov/immunize/posttest/
- Successfully complete the five-question post-test to receive your certificate.
- Credit for this session available until Wednesday, June 25th.