

Measles and Meningococcal Disease: You Can't Sugarcoat These M&Ms

Susan E. Hannagan, MS, MPH
New Jersey Department of Health
Vaccine Preventable Disease Program

Noelle Bessette, MPH
New Jersey Department of Health
Vaccine Preventable Disease Program



Meningococcal Disease



Meningococcal Disease

- **Caused by the bacteria *Neisseria meningitidis***
- **Presentations**
 - Meningitis
 - Septicemia
- **12 serogroups**
 - A, B, C, W, X, and Y primarily cause disease worldwide
 - B, C, and Y cause most disease in United States

<https://www.cdc.gov/meningococcal/about/causes-transmission.html>



Meningococcal Disease Case Investigation

- **Notification to local health department immediately upon suspicion or identification**
 - *Neisseria meningitidis* identified in a normally sterile site
- **Identification of close contacts and refer for chemoprophylaxis**
 - Infectious period: 7 days before illness onset through 24 hours after initiation of appropriate antibiotics
 - Spread via respiratory or oral secretions
 - Household members, overnight guest, sharing food, etc.
- **Patient interview**
 - Challenges: if patient is unable to communicate
 - Roommates, parents, etc.



Meningococcal Disease in the US and NJ



Meningococcal Disease Outbreaks

- < 5% of meningococcal disease cases in the U.S.
- Case-patients share common affiliation or area of residence but not direct close contact
 - Transmission within population via asymptomatic carriage
- Most outbreak cases in U.S. occur in persons < 25 years of age
- CDC recently updated outbreak definitions and guidelines available at <https://www.cdc.gov/meningococcal/outbreaks/index.html>



Serogroup B Meningococcal Disease

- **Meningococcal conjugate vaccine (MenACWY) does not protect against serogroup B**
- **Most common cause of meningococcal disease in persons aged 16 to 21 years**
- **Cause of recent of university-based outbreaks**
 - 10 university-based outbreaks occurred in 7 states during 2013 – 2018
 - 2-9 cases per outbreak
 - Total of 39 cases and 2 deaths

Soters HM, McNamara LA, Blain AE, et al. University-Based Outbreaks of Meningococcal Disease Caused by Serogroup B, United States, 2013–2018. *Emerging Infectious Diseases*. 2019;25(3):434-440. doi:10.3201/cid2503.181574



Rutgers University – New Brunswick Cases

- **2 undergraduates**
 - Sophomore and Junior
 - On-campus & off-campus housing
 - Involved with Greek life
- **Case 1**
 - Onset 2/3/2019; hospitalized 2/4
 - Headache, malaise, stiff neck, fever (102°F)
 - Infectious period 1/27 – 2/4
- **Case 2**
 - Onset 2/19/2019; hospitalized 2/23
 - Headache, malaise, altered mental status, stiff neck, fever (103.7°F), vomiting, diarrhea
 - Infectious period 2/12 – 2/24



Laboratory Data

- **Identification by PCR - bacterial isolates not available**
- **Specimens sent to Centers for Disease Control and Prevention (CDC) for molecular testing**
- **Both specimens serogroup B**
- **Genetic similarities**
 - Caused by strains from the same clonal complex
 - Clonal complex is uncommon among cases of invasive meningococcal disease
 - Typing genes were identical between the two organisms
- **Organisms not closely related to the organisms involved in the 2016 outbreak associated with Rutgers University – New Brunswick**



Rutgers University-New Brunswick Summary

- **2 cases in population**
 - Onsets within 16 days
 - No epidemiologic link identified
 - Organisms genetically indistinguishable and not common among cases of invasive disease
- **Suggests asymptomatic transmission among Rutgers University-New Brunswick population**
 - Meningococcal bacteria are spread from person-to-person via respiratory secretion during close contact
 - Most transmission is from people who carry meningococcal bacteria, without symptoms
 - Only rarely do cases of disease occur



What is considered a meningococcal disease outbreak?

- **An outbreak occurs when multiple cases of the same serogroup happen in a population over a short time period**
 - Consultation with CDC
 - University = organization-based
 - 2-3 cases within a 3-month period
- **The NJDOH, in consultation with the CDC, is considering there to be an outbreak of serogroup B meningococcal disease associated with Rutgers University – New Brunswick**

<https://www.cdc.gov/meningococcal/downloads/meningococcal-outbreak-guidance.pdf>



Outbreak Response



Vaccination Recommendations

- **Serogroup B meningococcal (MenB) vaccination recommended for the following groups:**
 - Undergraduate students, including transfers
 - Graduate students living in undergraduate housing/dormitories
 - Graduate students, faculty, and staff with a medical condition placing them at increased risk for meningococcal disease or microbiologists routinely exposed to *N. meningitidis**
- **While all undergraduates are recommended to receive MenB vaccination, extra effort is recommended to achieve high vaccination coverage among the following target populations:**
 - Student who are active in Greek life
 - Student living in on-campus housing/dormitories
 - Individuals with high-risk conditions as indicated above

*These populations are already routinely recommended to receive MenB vaccination per the Advisory Committee on Immunization Practices (ACIP)



MenB Vaccines

- **2 MenB vaccines currently licensed in U.S.:**
 - Trumenba® (Pfizer)
 - 3 doses (0, 1-2, 6 months)
 - Bexsero® (GlaxoSmithKline)
 - 2 doses (≥1 month apart)
- **Current ACIP recommendation:** may be administered to adolescents and young adults aged 16–23 years
- **Same vaccine product must be used for all doses – not interchangeable**
- **While one or two doses of Bexsero® or Trumenba® will provide some short-term protection, the best protection is expected to require completion of the full series**

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6411a3.htm>



Vaccination Recommendations

- **Students are recommended to receive primary series with either Bexsero® or Trumenba®**
 - Bexsero® (MenB-4C) – administered as a 2-dose series with the doses administered at least 1 month apart
 - Trumenba® (MenB-FHbp) – administered as a 3-dose series, with doses administered 1 – 2 and 6 months following the first dose
- **Students who completed a primary series ≥1 year prior are recommended to receive a booster dose with the same product used to complete the primary series**



Rationale for Booster Dose

- **Immunity following receipt of MenB is short-lived**
 - Evidence presented to ACIP suggests that vaccine recipients who completed a previous MenB vaccine series \geq 1 year prior may no longer be protected against serogroup B meningococcal disease.
- **A booster dose may be needed for protection during the outbreak**
 - If given, booster should be the same product used to complete the primary series.
- **No official ACIP recommendation on MenB booster doses at this time**
 - As insurance coverage is based on ACIP recommendations, insurance might not cover a booster dose.



Why Vaccination?

- **Meningococcal disease is a very serious illness**
 - 10–15% of cases are fatal
 - 11–19% of survivors have permanent sequelae: e.g. hearing loss, brain damage, amputations
 - Deaths can occur in as little as a few hours
- **Outbreak indicates meningococcal bacteria are circulating among the student population**
 - Potential for additional cases
 - Previous serogroup B meningococcal disease outbreaks have continued to cause cases over summer and during next school year
- **Vaccination is the best measure to help protect individuals against meningococcal disease**



General Public Health Recommendations

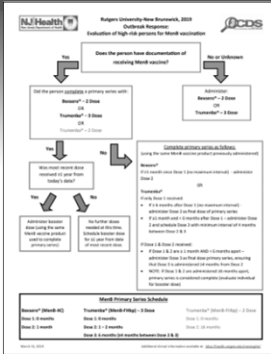
- **Education efforts**
 - Emphasize need to seek care early for compatible illnesses
 - Heighten awareness for clinically compatible cases among providers
- **Reinforce basic respiratory hygiene**
- **No recommendation to:**
 - cancel or curtail activities on campus
 - exclude unvaccinated individuals
 - mass antimicrobial prophylaxis



Communications

- **Rutgers messaging**
 - Specific messages for undergraduates, faculty/staff/graduate students, general RU community
- **NJLINC messages**
- **Updated website and additional resources**
 - FAQs for the public
 - Clinician guidance and FAQs
 - MenB Vaccination algorithm
- **Epi-X message**

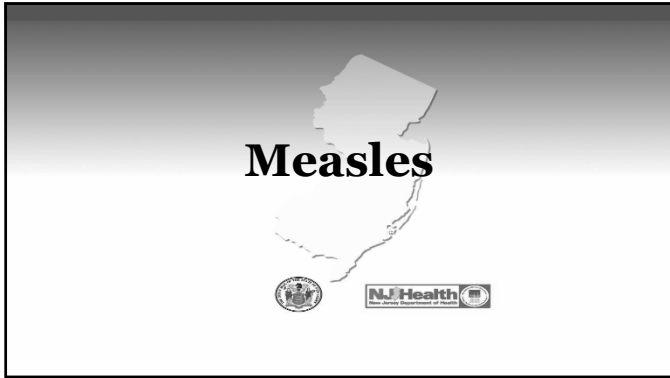




Summary


- College students at increased risk for meningococcal disease
- Asymptomatic carriage - circulation in the population
- Vaccination is the best protection
- To date, no new cases of invasive meningococcal disease have been identified as associated with Rutgers University.
- **Resources:**
 - NUDOH: <https://www.nj.gov/health/ed/topics/meningo.shtml>
 - CDC: <https://www.cdc.gov/meningococcal/index.html>






Measles Case Investigation

- **Isolation of case**
- **Collection of appropriate specimens for laboratory testing**
 - Viral specimens (NP swab & urine)
 - Not tested at commercial laboratories, need NJDOH approval prior to testing @ CDC/CDC Reference Lab
 - Serology (for measles IgM & IgG)
- **Notification to LHD/NJDOH**
- **Contact investigations and other response efforts**



Contact Investigation

- **Collect timeline for case**
 - Patient should begin compiling timeline upon first LHD contact
 - Will need minute-by-minute breakdown of the 9 days of infectiousness
 - Important details to request: time arrived, time left, name of location, address, transportation method to/from
- **Identify persons exposed during infectious period**
 - Includes individuals in exposure location through 2 hours after case left
- **Establish presumptive evidence of immunity for contacts**
- **Consider post-exposure prophylaxis (PEP)**
 - Vaccine (within 72 hours from 1st exposure) or Immune globulin (IG -within 6 days from 1st exposure)
 - Note: health care workers who receive PEP can NOT return to health care setting
- **Quarantine contacts without presumptive evidence of immunity**
 - Starting day 5 from 1st exposure through 21 days after last exposure
 - Includes exposed health care workers, household contacts, other close contacts
 - Consult with NJDOH before recommending quarantine
- **Educate contacts on symptoms/ what to do if they become symptomatic**



Measles Around the World

- Measles Incidence Rate per Million (12 month period), WHO

Top 10**		
Country	Cases	Rate
Madagascar	84804	3406.53
Ukraine	78659	1770.06
India	63170	40.15
Pakistan	22693	117.46
Philippines	16898	163.55
Yemen	13639	494.45
Nigeria	12745	69.53
Brazil	10316	49.68
Thailand	6914	100.4
Kazakhstan	6908	329.45

- **United States measles cases, 2019**
 - Greatest number of cases reporting in the US since 1994 and since measles was declared eliminated in 2000
- **Recent United States measles outbreaks**
 - Rockland County, NY
 - New York City
 - Washington
 - Michigan
 - New Jersey
 - Georgia
 - California (Butte, LA, Sacramento counties)
 - Maryland
 - Pennsylvania



Measles in New Jersey

- Because of ongoing measles outbreaks in other countries and surrounding communities, New Jersey is faced with:
 - Measles outbreaks
 - NJ residents exposed to measles
 - On airplanes
 - In other states
 - Medical facilities
 - Private events
 - Hotels
 - In other NJ jurisdictions



2018 and 2019 Ocean County Measles Outbreaks



What is considered an outbreak of measles?

- An outbreak is defined as a chain of transmission including 3 or more cases linked in time and space



When is an outbreak of measles declared over?

- Declared over once 2 full incubation periods (42 days) have passed from the last day the last known case would have been infectious



Outbreak Response



Vaccination

- **Adult vaccination recommendations have not changed from ACIP recommendations (2013)**
- **Outbreak vaccination recommendations**
 - HCP treating patients who live in/travel to outbreak communities should:
 - Consider offering MMR vaccine to all infants 6-11 months of age without contraindications
 - Offer MMR vaccine at the earliest opportunity to all unvaccinated eligible patients ≥ 1 year of age
 - Offer a second dose of MMR vaccine to eligible patients ≥ 1 year who have previously received one dose of vaccine, separated by at least 28 days
 - Offer teenagers and adults without documented evidence of immunity against measles two doses of MMR vaccine separated by at least 28 days. Extra doses of MMR are not harmful
- **Same as recommendations for international travel**



Why Vaccination?

- **Measles isn't "just a little rash"**
 - About 1 of 4 people who get measles will be hospitalized
 - 1 out of every 1,000 people will develop encephalitis, which often results in brain damage
 - 1-2 out of every 1,000 people will die, even with the best care
- **Measles is very infectious**
 - Up to 9 out of 10 susceptible persons with close contact to a measles patient will develop measles
- **The vaccine is very safe and effective**
 - 2 doses are about 97% effective at preventing measles, 1 dose is about 93% effective
- **Proof of vaccination prevents quarantine**
 - If identified as exposed to measles, documented vaccine serves as proof of immunity
- **Vaccination is the best measure to help protect individuals against measles**



Communications

- **Press releases**
 - Public exposure locations
- **NJLINC messages**
- **Additional resources**
 - Measles Outbreak Clinical Quick Guide
 - Guidance for First Responders
 - Measles Travel Flyer
 - Outbreak information for both the public and clinicians



Public Health Recommendations: Medical Facilities

- Ensure all health care workers have documented proof of immunity before an exposure happens
- Call ahead before sending patient to another medical facility so arrangements can be made to prevent additional exposures
- Mask (if tolerated) and place all patients with suspected measles in airborne isolation immediately
 - All staff should wear a fit-tested respirator (e.g. N95) when caring for patients with suspected/confirmed measles
- Inquire about all symptoms/symptom progression/travel/known exposure/risk factors/vaccination status
 - Helps determine likelihood of measles, needed for NJDOH testing approval
- Collect appropriate specimens
- Report suspect cases upon suspicion; don't wait for lab confirmation
 - Speak to a human- leaving a message or sending a fax is not sufficient if measles is being suspected
- Infants aged 6-11 months should receive 1 dose of MMR vaccine before traveling abroad
 - Will still need MMR/MMRV vaccine at 12-15 months (≥28 days after the initial dose) and 4-6 years



Public Health Recommendations: Local Health

- Inquire about all symptoms/symptom progression/travel/known exposure/risk factors/vaccination status
 - Helps with determining level of suspicion, needed for specimen approval
- Ask for a picture of the rash (no eyes, no genitals)
- Ensure appropriate specimens are collected
 - Measles viral testing cannot be done at commercial labs, must be tested at CDC/CDC Reference Labs
 - NJDOH approval needed
- Importance of collecting and confirming timeline up front in preparation for a timely response
 - This is often the step that delays public health response and public notification



Additional Resources

- NJDOH Measles webinar, June 6th from 12-1pm
 - To register: <https://register.gotowebinar.com/register/5076211388164436493>
- New LHD measles investigation toolkit available on the NJDOH website: <https://www.state.nj.us/health/cd/topics/measles.shtml>
- CSTE CDC National Measles Update Webinar: <https://www.cste.org/general/custom.asp?page=WebinarLibrary>



Questions?

New Jersey Department of Health
Vaccine Preventable Disease Program
(609) 826-5964

Susan.Hannagan@doh.nj.gov
Noelle.Besette@doh.nj.gov