

LOCAL HEALTH DEPARTMENT DISEASE INVESTIGATION STEPS

NC REPORTABLE DISEASE/CONDITION	NC DISEASE CODE	INFECTIOUS AGENT(S)
MEASLES (<i>Rubeola</i>)	22	<i>Measles virus</i>

PREPARING FOR INVESTIGATION

KNOW THE DISEASE/CONDITION	Disease Information
	<ul style="list-style-type: none"> Acute viral illness characterized by prodrome of fever $\geq 101^{\circ}\text{F}$, malaise, cough, coryza and conjunctivitis followed by a maculopapular rash that spreads from head to trunk to lower extremities Incubation period – 14 days to rash; range 7-21 days Infectious period – 4 days before until 4 days after rash onset Mode of transmission – airborne or droplet (airborne virus can remain infectious up to 2 hours after case occupied room) Measles cases continue to be imported since measles is endemic globally. Measles is a public health emergency and reportable to local health departments within 24 hours. <p>Resources</p> <ul style="list-style-type: none"> NC Case Definition: http://epi.publichealth.nc.gov/cd/lhds/manuals/cd/casedefs/MEASLES_CD.pdf CDC Pink Book: http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html APHA <i>Control of Communicable Diseases Manual</i>, 19th ed., pp 402-408. Red Book, 2012 Report of the Committee on Infectious Diseases, 29th edition; pp 489–499 <p>Surveillance and Control</p> <ul style="list-style-type: none"> Refer to CDC VPD Surveillance Manual 6th ed., 2013, Chapter 7. Review Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013. Print and review reporting forms: <i>Part 1: Confidential Disease Report (DHHS 2124)</i> <i>Part 2: Measles (DHHS/EPI #22)</i>

CONDUCTING INVESTIGATION

COLLECT CLINICAL INFORMATION	Investigation Steps
	<ul style="list-style-type: none"> Use the Part 2 form to organize the relevant information. Obtain and review clinical documentation and medical records. If the patient was hospitalized for this disease, obtain medical record (admission note, progress note, lab report(s) and discharge summary). Look for evidence in the medical record that supports clinical findings described in the case definition. One of the best questions to ask the provider is, “Why was this patient tested for measles?” Interview the case regarding his or her contact with others during his or her infectious period (4 days before to 4 days after rash onset). If the case travelled out of state or travelled using mass transit (e.g., by plane) during his/her infectious period, call CD Branch at (919) 733-3419 immediately so that persons in other jurisdictions may be contacted. Obtain history of immunization, travel and exposure to travelers or others with similar symptoms.

<p>REVIEW LABORATORY INFORMATION OR ARRANGE FOR TESTING</p>	<ul style="list-style-type: none"> • Obtain a copy of any related lab results. CDC recommends that testing be limited to patients most likely to have measles (unvaccinated persons, recent travel history, clinically compatible illness in the absence of a more likely diagnosis, contact with lab confirmed cases, etc.). • Contact the healthcare provider if further testing is necessary. Consider need for testing based on clinical and epidemiological evaluation. • If warranted, collect appropriate specimen(s): <ul style="list-style-type: none"> • Virus culture and PCR (CDC Reference Lab): <ul style="list-style-type: none"> • Collect on 1st day of rash through 3 days following rash onset; consult CDB if beyond 3 days. • Throat and nasopharyngeal swabs are preferred specimens; urine is acceptable. • Use DHHS# 3431; prior CDB approval required. • Negative test results do not rule out measles; the timing, quality and handling of clinical specimens affect the outcome, as well as presence of other infections such as parvovirus. • Genotyping is available through CDC reference lab to differentiate wild versus vaccine virus in persons recently vaccinated, meaning (6-45 days). • IgM serological testing (SLPH): <ul style="list-style-type: none"> • Optimal collection timing is ≥3 days post rash onset. • Use DHHS# 3445; prior CDB approval required. • IgG testing is available and may be of use in some circumstances. Call the CDB if considering.
<p>APPLY THE CASE DEFINITION</p>	<ul style="list-style-type: none"> • Use the case definition for measles to determine if both the clinical and laboratory findings meet the case definition criteria.
<p>IMPLEMENTING CONTROL MEASURES</p>	
<p>ATTEMPT TO IDENTIFY SOURCE OF EXPOSURE</p>	<ul style="list-style-type: none"> • Interview the case about potential exposures in the 21 days prior to onset, including the following situations: <ul style="list-style-type: none"> ○ Travel history, both international and domestic ○ Contact to other individuals with similar signs and symptoms • Efforts should be made to identify the source of infection for every confirmed case of measles. When no history of contact with known cases can be identified, ask about opportunities for exposure to unknown cases in foreign travelers or visitors in schools, resorts, theme parks, healthcare settings, churches and other public gatherings.
<p>IDENTIFY & EVALUATE CONTACTS</p>	<ul style="list-style-type: none"> • A measles contact is any person sharing air space with a case during his or her infectious period for up to 2 hours after a case has occupied that air space. • Contacts should provide presumptive evidence of measles immunity. Persons who are unable to provide written documentation should be offered post-exposure prophylaxis (see “Management of Asymptomatic Contacts” section). Quarantine or exclusion from certain settings until 21 days after exposure may be needed in some cases.

<p>MANAGEMENT OF CASE(S) AND SYMPTOMATIC CONTACTS</p>	<ul style="list-style-type: none"> • Focus the case investigation and laboratory tests on patients most likely to have measles such as symptomatic contacts and others who meet the clinical case definition, especially if they have risk factors for measles, i.e., being unvaccinated, recent history of travel to affected areas, or those with fever and generalized maculopapular rash with strong suspicion of measles without alternative explanation for symptoms. • Obtain specimens from suspected case at 1st contact (oropharyngeal and NP swabs, serology). • Case patients should be isolated for 4 days after rash onset. In healthcare settings, standard and airborne precautions are indicated.
<p>MANAGEMENT OF ASYMPTOMATIC CONTACTS</p>	<ul style="list-style-type: none"> • Post-exposure prophylaxis for MMR-eligible contacts: <ul style="list-style-type: none"> ○ Offer MMR to eligible contacts without presumptive evidence of immunity (ideally within 72 hours of initial exposure). Except for healthcare personnel, persons receiving MMR vaccine within 72 hours of their first exposure may return to work, school or childcare. ○ Monitor for signs and symptoms of fever and rash for 21 days. ○ Susceptible contacts who do not receive MMR within 72 hours of exposure may be excluded from the 5th through the 21st day after the exposure. • Post-exposure prophylaxis for contacts not eligible for MMR: <ul style="list-style-type: none"> ○ Individuals who are at risk for severe disease and complications from measles (e.g., infants aged <12 months, pregnant women without evidence of measles immunity, and severely immunocompromised persons) should receive immune globulin, which is (IG). ○ Intramuscular IG (IGIM) can be given to other persons who do not have evidence of measles immunity, but priority should be given to persons exposed in settings with intense, prolonged, close contact (e.g., household, daycare and classroom). The quarantine period for IG recipients is the same as other susceptible contacts (from 5 days after the 1st exposure through 21 days after last exposure). • Interview contacts to gather necessary information including: <ul style="list-style-type: none"> ○ Symptoms of measles ○ Vaccination history or immunity status ○ Date of last exposure to case
<p>REPORTING INVESTIGATION</p>	
<p>REPORT TO THE COMMUNICABLE DISEASE BRANCH (CD)</p>	<ul style="list-style-type: none"> • All reports of suspected measles should be investigated immediately. • Enter Part 1 and Part 2 Communicable Disease Reports into NC EDSS as a new event, or update the existing event if already entered. • Assign event to State Disease Registrar when case investigation complete. • Do an “Event_Print” in NC EDSS after assigning to the state. Keep for one year along with any additional notes. Maintain as a surveillance file, not a medical record.
<p>CASE FINDING</p>	<ul style="list-style-type: none"> • During the course of the investigation, look for symptoms of the disease in other exposed individuals. • Refer symptomatic individuals to healthcare provider for evaluation.

SPECIAL CONSIDERATIONS	
INFECTION CONTROL	<ul style="list-style-type: none"> • Measles is transmitted by direct contact with airborne droplets. Airborne precautions should be instituted in healthcare facilities. • Symptomatic persons must be isolated and susceptible exposed persons should be excluded to prevent disease spread. • Suspect patients should be masked and immediately placed in a negative pressure room if available, or a private room with the door closed. Transmission has been documented in rooms occupied by a measles case up to 2 hours after the case left the room. • Healthcare providers caring for measles patients should have documented evidence of immunity to measles and should be wearing an N95 respirator. • All persons who work in healthcare facilities should have presumptive evidence of immunity to measles. • Susceptible healthcare personnel (HCP) should not enter the room if immune care providers are available. • HCP without documentation of presumptive immunity who do not receive their 2nd dose of MMR within 72 hours are subject to exclusion from the healthcare setting for the same period. • Personal protective equipment (PPE) must still be used regardless of vaccination status.
OUTBREAK SITUATIONS	<ul style="list-style-type: none"> • Be aware that pockets of unvaccinated, susceptible individuals can fuel a measles outbreak as long as importation of measles occurs. • Implement a primary control strategy to achieve a high level of immunity in the affected population through vaccination. • Initiate and maintain a line list with CDB assistance as needed. • Submit Outbreak Summary Report within 30 days from close of outbreak.
RISK COMMUNICATION	<ul style="list-style-type: none"> • Outbreaks of this disease will generate concern among parents, health professionals, and the media. Be prepared to answer questions and offer preventative measures. • Outbreaks may need HAN or EPI-X alerts, MD alerts, and press releases. • NC DHHS Office of Communications (919) 855-4840 is available to assist local health departments as needed.