

# LOCAL HEALTH DEPARTMENT DISEASE INVESTIGATION STEPS

N.C. REPORTABLE DISEASE/CONDITION	N.C. DISEASE CODE	INFECTIOUS AGENT(S)
<b>MUMPS</b>	<b>28</b>	<b>Mumps virus</b>

## PREPARING FOR INVESTIGATION

KNOW THE DISEASE/CONDITION	
	<p><b>Disease Information</b></p> <ul style="list-style-type: none"> <li>• Viral illness with acute onset of parotitis (unilateral or bilateral tender swelling of parotid glands). Parotitis is self-limited; lasts at least two days, but may persist longer than ten days. Mumps usually starts with a few days of fever, headache, muscle aches, tiredness, and loss of appetite, followed by swelling of salivary glands.</li> <li>• Incubation period- ranges from 12–25 days; parotitis typically develops 16 to 18 days after exposure.</li> <li>• Infectious period- 2 days before through 5 days after parotitis onset.</li> <li>• Mode of transmission- person to person via droplets of saliva or mucus from the mouth, nose, or throat of an infected person; may also be spread indirectly from contaminated surfaces.</li> <li>• Mumps cases continue to be imported since mumps is endemic globally.</li> <li>• N.C. Case Definition: <a href="http://epi.publichealth.nc.gov/cd/lhds/manuals/cd/casedefs/MUMPS_CD.pdf">http://epi.publichealth.nc.gov/cd/lhds/manuals/cd/casedefs/MUMPS_CD.pdf</a></li> <li>• CDC Pink Book: <a href="http://www.cdc.gov/vaccines/pubs/pinkbook/mumps.html">http://www.cdc.gov/vaccines/pubs/pinkbook/mumps.html</a></li> <li>• APHA <i>Control of Communicable Diseases Manual</i>, 19<sup>th</sup> ed., pp 431 - 434.</li> <li>• Red Book, 2012 Report of the Committee on Infectious Diseases, 29<sup>th</sup> edition; pp 514 – 518, if applicable.</li> </ul> <p><b>Testing Information</b></p> <ul style="list-style-type: none"> <li>• Refer to CDC Mumps Homepage: <a href="http://www.cdc.gov/mumps/lab/index.html">http://www.cdc.gov/mumps/lab/index.html</a> Contact the CD Branch if SLPH will be receiving specimen.</li> </ul> <p><b>Surveillance and Control</b></p> <ul style="list-style-type: none"> <li>• Refer to <a href="#">CDC VPD Surveillance Manual 5<sup>th</sup> ed., 2012, Chapter 9.</a></li> <li>• Review <a href="#">Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013.</a> <a href="http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm">http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm</a></li> </ul> <p>Print and review reporting forms: Part 1: <i>Confidential Disease Report (DHHS 2124)</i> Part 2: <a href="#">(DHHS/EPI #28)</a></p>

## CONDUCTING INVESTIGATION

COLLECT CLINICAL INFORMATION	
	<ul style="list-style-type: none"> <li>• Use the Part 2 form to organize the relevant information.</li> <li>• Obtain and review clinical documentation/medical records.</li> <li>• If patient was hospitalized for this disease, obtain medical record (admission note, progress note, lab report(s) and discharge summary.</li> <li>• Look for evidence in the medical record that supports clinical findings described in the case definition.</li> </ul>

	<ul style="list-style-type: none"> <li>• One of the best questions to ask the provider is, “Why was this patient tested for mumps?”</li> <li>• When contacting the patient is necessary, discuss with the healthcare provider what the patient has been told about the disease evaluation.</li> <li>• Interview the case regarding contact with others during the infectious period (2 days before to 5 days after parotitis onset).</li> <li>• Obtain history of immunization, travel, and contact with travelers or others with similar symptoms.</li> </ul>
<p><b>REVIEW LABORATORY INFORMATION</b></p>	<ul style="list-style-type: none"> <li>• Obtain a copy of any related lab results. Be aware that sporadic cases of acute parotitis are often caused by other viruses, including EBV and HHV-6.</li> <li>• Acceptable diagnostic tests for surveillance and reporting purposes are PCR, culture or mumps IgM serology. Sensitivity of these tests depends on timing of collection, technique and vaccination status. Interpreting lab results can be challenging. If needed, refer to CDC <a href="#">Q and A Mumps Lab Testing</a>. Contact the CD Branch for additional guidance.</li> <li>• Mumps cases should not be ruled out based on negative laboratory results.</li> <li>• From patients with clinical features compatible with mumps, collect a buccal or oral swab for PCR and viral culture and a blood specimen for serological testing. <ul style="list-style-type: none"> <li>• PCR and virus culture: <ul style="list-style-type: none"> <li>○ Available at SLPH; use DHHS form #3431.</li> <li>○ Collect oral or buccal swab samples as soon as disease is suspected, ideally within 3 days, but in general not more than 8 days after parotitis onset. Contact CD Branch to discuss testing beyond 8 days.</li> </ul> </li> <li>• IgM serological testing: <ul style="list-style-type: none"> <li>○ Not available at SLPH. May be useful in unvaccinated persons. Available through commercial labs.</li> <li>○ For unvaccinated persons or persons with unknown vaccination history, acute-phase serum sample should be collected ≤3 days after parotitis onset. If acute-phase sample is negative for IgM, collect another sample 5–7 days after symptom onset, since the IgM response may require more time to develop.</li> <li>○ Vaccinated persons may not have an IgM response or response may be transient and not detected.</li> </ul> </li> <li>• IgG serological testing: <ul style="list-style-type: none"> <li>• Available at SLPH; use DHHS form #3445</li> <li>• Collect acute-phase serum as soon as possible. Collect convalescent-phase serum 2–3 weeks after acute-phase serum.</li> <li>○ In unvaccinated persons, IgG antibody rises rapidly after symptom onset and is long lasting.</li> <li>○ In vaccinated persons, paired serum samples, even if appropriately timed, may not show a rise in IgG titer. IgG may already be quite elevated.</li> </ul> </li> </ul> </li> </ul>
<p><b>APPLY THE CASE DEFINITION</b></p>	<ul style="list-style-type: none"> <li>• Use the case definition for mumps to determine if the clinical and laboratory findings meet the case definition criteria.</li> </ul>

IMPLEMENTING CONTROL MEASURES	
<p><b>ATTEMPT TO IDENTIFY SOURCE OF EXPOSURE</b></p>	<ul style="list-style-type: none"> <li>• Interview case regarding travel history during the exposure period (12–25 days prior to onset).</li> <li>• Ask about contact to other individuals with similar signs and symptoms during exposure period.</li> <li>• Interview contacts to gather necessary information including: <ul style="list-style-type: none"> <li>○ Symptoms of mumps</li> <li>○ Vaccination history/immunity status</li> <li>○ Date of last exposure to case</li> </ul> </li> <li>• Efforts should be made to identify the source of infection for every confirmed case of mumps. However, this is not always possible, especially with sporadic cases, and this should not occur at the expense of higher public health priorities. If it can be determined when and where transmission likely occurred, investigative efforts should be directed to these locations.</li> </ul>
<p><b>MANAGEMENT OF SPORADIC CASE(S) AND SYMPTOMATIC CONTACTS</b></p>	<ul style="list-style-type: none"> <li>• Sporadic cases of acute parotitis are rarely caused by mumps. Before initiating a public health response, consider factors such as travel to highly-endemic areas, vaccination status, and laboratory testing for other etiologies.</li> <li>• In settings such as households, schools, and camps, consider conducting case investigations and assessing immune status of close contacts before laboratory results are known or before additional cases are identified. Consult the CD Branch if there are questions about the appropriate public health response.</li> <li>• Determine infectious period, 2 days before through 5 days after parotitis onset (initial day of parotitis is day 0).</li> <li>• Verify the case has been appropriately tested and isolated through 5 days after onset of parotitis. Refer symptomatic contacts for appropriate testing and assure that appropriate control measures and PPE are used to prevent transmission in healthcare settings.</li> </ul>
<p><b>MANAGEMENT OF EXPOSED AND SUSCEPTIBLE CONTACTS</b></p>	<ul style="list-style-type: none"> <li>• Identify contacts that may have been exposed during the case's infectious period. <ul style="list-style-type: none"> <li>• A contact is anyone in close proximity (3 feet) to the case or reasonably suspected of having contact with oral or respiratory secretions of the case during the infectious period.</li> <li>• Consider household members, school/daycare contacts (staff and students), teammates, social groups, car pool etc.</li> <li>• Identify high risk susceptible contacts (pregnant women, immunocompromised persons, infants less than 12 months). These persons should be referred to their healthcare provider.</li> </ul> </li> <li>• Assess immune status of contacts <ul style="list-style-type: none"> <li>○ Proof of immunity is generally defined as: <ol style="list-style-type: none"> <li>(1) Documentation of vaccination with 2 doses of live mumps virus-containing vaccine, or</li> <li>(2) Laboratory evidence of immunity, or</li> <li>(3) Laboratory confirmation of disease, or</li> <li>(4) Born before 1957 (MMWR, June 14, 2013)</li> </ol> </li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Offer vaccine as appropriate to susceptible contacts.</li> <li>• Educate contacts about signs and symptoms.</li> </ul>
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REPORTING INVESTIGATION	
REPORT TO THE N.C. COMMUNICABLE DISEASE BRANCH	<ul style="list-style-type: none"> <li>• Enter Part 1 and Part 2 Communicable Disease Reports into N.C. EDSS as a new event, or update existing event if already entered.</li> <li>• Report cases that meet the suspect and probable case definitions even if they are low likelihood based on vaccination status and lack of recognized risk factors.</li> <li>• Assign event to State Disease Registrar when case investigation complete.</li> <li>• Do an "Event_Print" in N.C. EDSS after assigning to the state. Keep for one year along with any additional notes. Maintain as a surveillance file, not a medical record.</li> </ul>
SPECIAL CONSIDERATIONS	
INFECTION CONTROL	<ul style="list-style-type: none"> <li>• Symptomatic persons should be excluded for 5 days after parotitis onset. If hospitalized, the patient should be isolated on standard and respiratory droplet precautions for 5 days after onset of parotitis. (<a href="#">MMWR, Immunization of HealthCare Personnel, Nov. 25, 2011, Vol. 60, No. 7</a>).</li> <li>• Unprotected exposure is defined as being within 3 ft. of a mumps case without the use of personal protective equipment (PPE).</li> <li>• For non-immune persons exposed to the case patient during the infectious period, some form of exclusion is needed to prevent ongoing transmission.</li> </ul>
SPECIAL SETTINGS	<ul style="list-style-type: none"> <li>• In a healthcare setting: exclude a susceptible contact from the 12th day after the first unprotected exposure through the 25th day after the last unprotected exposure. Post exposure vaccination does not alter exclusion criteria in healthcare settings. Assure employee health is notified.</li> <li>• In a school setting: exclude the susceptible contact until the 26th day after onset in the last case in the affected school. Once vaccinated, students can immediately be readmitted. The Regional School Health Nurse Consultant should be notified.</li> </ul>
OUTBREAK	<ul style="list-style-type: none"> <li>• A mumps outbreak is defined by CDC as three or more cases linked by time and place. Initial preparation for control activities may need to be started before laboratory results are known, but are unlikely to be implemented until either the laboratory results are back or until at least two infected persons have a confirmed epi link.</li> <li>• Outbreaks have occurred in highly vaccinated populations in high transmission settings, including school settings (e.g., elementary school, middle school, high school, and colleges).</li> <li>• Active surveillance should be maintained for at least two incubation</li> </ul>

	<p>periods (50 days) following parotitis onset in last case.</p> <ul style="list-style-type: none"> <li>• If indicated, submit Outbreak Summary Report within 30 days.</li> </ul>
<p><b>RISK COMMUNICATION</b></p>	<ul style="list-style-type: none"> <li>• Outbreaks in child care or schools may generate concern among parents, health professionals, and the media. Be prepared to answer questions and offer preventative measures.</li> <li>• Outbreaks may need N.C. HAN alerts, EPI-X reports, MD alerts, or press release. N.C. DHHS Public Information Office (919-855-4840) is available to assist local health departments as needed.</li> </ul>