Introduction to Mumps Case Investigation and Follow-Up for LBOHs

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Agenda

- What is Mumps?
- Morbidity
- Testing for Mumps
- Control Measures
- The 10 Steps in a Mumps Investigation
- Common Issues
- MAVEN
- Completing an investigation
- Resources
Mumps
What is Mumps?

- **Cause:** paramyxovirus (Mumps Virus)
- **Transmission:** droplet transmission
- **Symptoms:** Primary Symptom is swollen salivary glands (parotitis)
  - **Prodromal Symptoms:** fever, headache, fatigue, myalgia, anorexia, earache, sore throat, nasal congestion, stiff neck
  - **Asymptomatic!** (20% unvaccinated)
- **Incubation period:** 16-18 d post-exposure (range 12-25 d)
- **Infectious Period:** 2 days before swelling onset through 5 days after onset.

- **Recovery:** about 2 weeks

https://www.cdc.gov/mumps/about/signs-symptoms.html
Mumps in Massachusetts

MA Confirmed and Probable Mumps Cases

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</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>6</td>
<td>71</td>
<td>5</td>
<td>6</td>
<td>258</td>
<td>191</td>
<td>46</td>
<td>64</td>
<td>19</td>
<td>2</td>
<td>5</td>
</tr>
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</table>

**2016**: Largest Mumps outbreak in MA in 30+ years: out of 789 total investigations 258 confirmed and probable.

**2021**: Lowest number of mumps cases in MA in over a decade.

* 2022 data is preliminary (as of 9/22).
Testing for Mumps
Challenges of Mumps Testing

Negative Mumps Test ≠ No Mumps

Reasons
• Mumps virus sheds intermittently, so PCR testing may miss it
• Very difficult for a person who has been vaccinated (MMR vaccine) to mount an IgM response

Recommendation
• Recommend cases stay in isolation through their potential infectious period even if their results are negative.

Exception
• The only time a mumps case will be revoked is if an alternate diagnosis is given by the provider, or if the case does not meet clinical case definition (i.e. did not have at least 48 hours of swelling)
Specimens for Mumps Testing

**Buccal Swab: Preferred Specimen**

- *Should* be collected as soon as possible after onset
- *Needs* to be collected within 5 days of swelling onset

**Serum**

- Acute serum should be collected at same time as swab
- Second serum may be requested five days after onset of swelling in *unvaccinated* patients

Specimen coordination is typically handled by MDPH Epis (Goal is for PCR specimen to be sent to State Lab.)
Mumps Key Terms

• Symptoms
  • Parotitis: Swelling of the parotid glands (salivary glands between ear and jaw).
  • Orchitis inflammation of the testicles
  • Oophoritis inflammation of the ovaries
  • Unilateral (one side) or Bilateral (both sides): Swelling description
• Buccal Swab: Swab of the “buccal glands” which are the preferred salivary gland location for mumps PCR testing.
• MMR Vaccine: The Measles, Mumps, Rubella vaccine which is routinely recommended in a two-dose series for the prevention of mumps.
Measles, Mumps, and Rubella (MMR) Vaccination

• There are now TWO MMR vaccines available for use in US!
  • **KEY UPDATE:** Both vaccines are fully interchangeable for all indications for which MMR vaccination is recommended:
    • **M-M-R II** manufactured by Merck (Previous only US option available since 1978)
    • **PRIORIX** manufactured by GSK (Licensed June 2022)

• **MMRV Combination Vaccine:** Children may also get MMRV (measles, mumps, rubella, & varicella) licensed for use 12 months through 12 years of age.
  • **ProQuad** manufactured by Merck (MMRV licensed 2005)

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**CDC MMWR: MMR Vaccine (PRIORIX) ACIP Recommendations Nov. 18, 2022.**
Mumps Control Measures
Control Measures

• Control measures are the responsibility of LBOHs.
• **Confirmed and probable cases of mumps require control measures.**
  
  • If a suspect case is NOT lab confirmed, there are no formal control measures for contacts from public health, **however**,
    
    • Providers can use clinical judgment for household contacts, etc.
    
    • It is always a good time to get Up-to-Date with MMR Vaccine if needed! Patients should remain in isolation
Control Measures

• Key Prevention: Isolation and physical distancing (esp. dense setting).

• Remember “Negative Mumps Test ≠ No Mumps,” therefore even if patients with clinical symptoms have negative results, they should still be isolated.

• MMR Vaccination (88% effective preventing mumps): Ensure all contacts are up to date with their MMRs.

• Exposed unvaccinated individuals should be excluded (Day 12-25 following exposure Day 0)
# Mumps Infection Timeline

**Swelling Onset**
*(Day Zero)*

<table>
<thead>
<tr>
<th>Incubation Period:</th>
<th>Average is 16-18 days (range 12-25 days) to swelling onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prodrome:</td>
<td>3-5 days myalgia, anorexia, malaise, headache, and low-grade fever</td>
</tr>
<tr>
<td>Swelling:</td>
<td>Lasts an average of 7-10 days; Parotid swelling may be noted as an earache or pain on palpitation at the angle of the jaw either unilaterally or bilaterally. May also present as orchitis or oophoritis</td>
</tr>
<tr>
<td>Infectious Period:</td>
<td>2 days before to 5 days after swelling onset</td>
</tr>
<tr>
<td>Isolate Case:</td>
<td>through 5 days after swelling onset</td>
</tr>
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25 d
Mumps Investigations for LBOH
LBOH Main Responsibilities During Mumps Investigations

• **PART 1: Investigating the Case (completing question packages in MAVEN)**
  • Interviewing Patient (while waiting for test results).
  • Gathering Contact Information (getting ready for additional control measures)

• **PART 2: Instituting Control Measures**
  • Making sure patient is isolated.
  • Planning next steps for contacts.
The 10 Steps in a Mumps Case Investigation

**Step 1:** Review and acknowledge event in MAVEN.
**Step 2:** Call case to collect important info for Case Report Form (CRF).
**Step 3:** Identify all contacts who have been exposed.
**Step 4:** Identifying susceptibles (High Risk individuals)
**Step 5:** Recommend immunization
**Step 6:** Isolation dates and notifying contacts
**Step 7:** Follow-up
**Step 8:** Control Measures
**Step 9:** Update all notes and fields in MAVEN
**Step 10:** Sign off in Admin QP
Step 1: Review and acknowledge event in MAVEN.

- Typically, a suspect mumps event will be entered into MAVEN by an Epi at MDPH after receiving a phone call from a provider.

- To see which MDPH Epi is assigned to the case, open the Tasks Tab and look under “Assigned To”.

![Tasks Tab in MAVEN](Mumps%20Investigation%20Steps.png)
Step 2: Call case to collect important information for Case Report Form.

Questions to ask the Patient

- **Symptom History** (Review the symptoms experienced, swelling onset date and duration is critical) (QP #3)
- **MMR Vaccination History** (if not already known from ordering provider)? (QP #4)
- **Occupation/school** (if so, where and did they work/attend school while infectious)? (QP #2)
- **Race/ethnicity** (if not known by provider)?

- **Risk History**
  - **Contact with another case of mumps, or someone with similar symptoms?** (QP #5)
  - **Travel History** (including where and dates), **or recent out of town visitors** (from where and dates)? (QP #5)
  - **Any recent dental work?** (No QP, but put in Notes)
  - **Transmission setting** (childcare, school, healthcare setting)? (QP #5)

Risk History Time Period is generally one month (up to 25 days) prior to onset so we can hopefully determine where they may have been exposed to mumps (risk history).
Step 3: Identify all contacts who have been exposed.

- Think about people in the following groups who were in close contact (within 6-feet) with the case during their infectious period or had direct contact with case’s respiratory secretions:
  - Household members
  - School/daycare
  - Co-workers
  - Staff and patients at medical facility where case was seen
  - Religious/social groups
  - Sports teams/other extra-curricular groups
  - Bus/carpool mates
  - Close friends
Step 4: Identify Susceptibles

- **Susceptible to Mumps:** People who do not have evidence of immunity, including those with vaccine exemptions.

- **Sufficient Evidence of Immunity to Mumps:**
  - Birth in the US before 1957 (unless a healthcare worker)
  - Documentation of 2 doses of mumps containing vaccine
  - Serologic evidence of immunity or laboratory evidence of disease

Verbal past history of disease is NOT acceptable evidence of immunity.
Step 4: Identify Susceptibles

- Prioritize unvaccinated High-Risk Contacts and refer to healthcare providers.
  - Pregnant women
  - Immunosuppressed individuals
  - Infants <12 months of age
Step 5: Recommend immunization for all susceptibles >12 months of age for which MMR is not contraindicated

- Vaccinating an exposed individual who may be incubating mumps is not harmful
  - The same applies to an individual who MAY have been vaccinated in the past but does not have a record of that vaccination.
- Reminder: As a LBOH, you can give MMR to exposed contacts (MDPH vaccine unit has doses of MMR available to LBOHs)
Step 6: Discuss isolation dates and notifying contacts with case.

- Calculate infectious period with case and discuss how long they need to stay out of public activities.
  - **Infectious Period** = 2 Days before Onset through 5 Days After.
    - **Swelling Onset** = Day 0

- Develop a plan of action for household & other contacts
  - You can work in tandem with them to notify exposed contacts as applicable.
Step 7: Follow up with school/workplaces and/or additional contacts if applicable.

- Mumps letter/advisory templates are available.
- Contact MDPH epidemiologists for assistance. Epi Program: 617-983-6800
Step 8: Final Control Measures

- **Case**: Exclude through 5 days after onset of swelling
  - Swelling onset is Day 0

- **Contacts**: Individuals without evidence of immunity should be excluded from Day 12-Day 25 after exposure.
  - Exposure = Day 0.
  - Post-exposure vaccination is not expected to prevent illness or development of disease in someone recently exposed to mumps. Rather, exposed individuals should be vaccinated to protect against subsequent exposures.
  - *In most low-risk settings, asymptomatic contacts can typically avoid exclusion if they receive a dose of MMR.*
Step 9: Update all notes and fields in MAVEN

- **Most important variables to complete are:**
  - Race/Hispanic Status (QP #2)
  - Onset of swelling (QP #3)
  - Duration of swelling (QP #3)
  - Vaccination history (QP #4)
  - Remember to ADD NEW for adding a second dose of vaccine.
Step 10: Sign off in Admin Question Package (QP)

- Once investigation is concluded and all data has been entered in the question packages, complete Steps 4 and 5 in the Administrative Question Package to sign off on the MAVEN event.
  - Case Report Form = Complete for both confirmed and ruled out mumps cases if LBOH is able to enter required variables.
  - Lost to Follow-up should only be utilized if no contact was made with the case.
- This signals for MDPH Epi that the case is ready for final review.
Mumps Talking Point Reminders

• **Duration of Swelling**
  • Need to have more than 48 hours to be clinically compatible
  • Additional follow-up call with patient may be needed to confirm duration.

• **Many Causes of Parotitis**
  • Lots of low suspect investigations
  • Be sure to ask about other potential reasons for swelling (dental work, recent accidents, etc.)

• **MMR Effectiveness**
  • 2 doses ~ 88% effective at preventing mumps
  • Mumps is still possible in vaccinated individuals, so isolation remains important while potentially infectious.

• **More than one Jurisdiction May Be Involved**
  • Exposures at school or workplace are common.
  • May need to work with other BOHs for control measures (Share Event and Coordinate follow-up)

• **Your Residents Remain Your Responsibility and Local Follow-up is Expected.**
  • Telephone language services are available for all infectious disease case investigations.
  • Consult with MDPH Epis for strategies or assistance when needed.
Completing an Investigation

Test Result

Positive

- Full Isolation required
- Full control measures
- Follow-up on potential exposures

1 scenario

Negative

- Not a Mumps Case:
  1: Doesn’t meet clinical definition
  2: Alternative diagnosis

2 scenarios

Depending on info you gathered during interview

Negative Mumps test ≠ No Mumps
Are we still thinking mumps?

<table>
<thead>
<tr>
<th>Epidemiological Indicators of <strong>Highly</strong> Suspect Mumps</th>
<th>Epidemiological Indicators of <strong>Low</strong> Suspect Mumps</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Known contact with a confirmed Mumps Case</td>
<td>• No known risk (no travel, no sick contacts)</td>
</tr>
<tr>
<td>• Recent travel</td>
<td>• Fully vaccinated</td>
</tr>
<tr>
<td>• Sick contacts</td>
<td>• Alternative diagnosis in differential</td>
</tr>
<tr>
<td>• College student or active contact with the college community</td>
<td>• Recent dental work/facial injury</td>
</tr>
<tr>
<td>• Dense communal living (dorm environment)</td>
<td>• Young vaccinated child/older adult (not typical risk group)</td>
</tr>
<tr>
<td>• Unvaccinated community</td>
<td>• No contact with college students</td>
</tr>
<tr>
<td>• Age range (late teens – 20s) where we see most cases.</td>
<td></td>
</tr>
<tr>
<td>• Classic symptoms (swelling $\geq$ 48 hours)</td>
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Conclusion

• **When is a mumps event Not Mumps?** Had less than 48 hours of swelling (not meeting clinical case definition) or Alternative Diagnosis
  • These cases can be ruled out and REVOKED for their case classification status.

• **What to do with suspect cases?** All suspect cases (even with negative test results) should stay in isolation the full 5 days *unless* they have an alternative diagnosis or their swelling stopped before 48 hours.

• **NOTE:** LBOH do not classify cases (that is MDPH’s role), however the data LBOH collect will inform the ultimate case classification and are critical to the investigation.
Resources

• MDPH Division of Epidemiology and Immunization: 617-983-6800
  • Questions/Guidance for follow-up
  • Sample Letters/Alerts
  • Reporting

• MAVEN Help Desk: 617-983-6801

• MDPH Reference Materials
  • MDPH Guide to Surveillance, Reporting, and Control: Disease-Specific Chapters:
    • https://www.mass.gov/handbook/guide-to-surveillance-reporting-and-control
  • The Massachusetts Immunization Information System (MIIS) Onboarding and Resources:
    • https://www.miisresourcecenter.com/
  • 105 CMR 300.00: Reportable diseases, surveillance, and isolation and quarantine requirements:
Your Questions?