Mumps Epidemiology and Public Health Response in Minnesota

Ruth Lynfield, MD
State Epidemiologist and Medical Director
Minnesota Department of Health

PHIL. Harrison and Murphy
Mumps

- RNA virus in *Paramyxoviridae* family
- Incubation period typically 16-18 days (12-25 days)
- Treatment is supportive
- Infectious 2 days before through 5 days after parotitis
- Transmission - respiratory droplets, contact with fomites
- Mumps vaccine and Ig not protective after exposure
Mumps (cont.)

- Mumps still endemic in U.S.
- Occurs year-round, but peaks late winter and spring
- Surveillance challenged by:
  - Nonspecific symptoms that mimic other diseases and conditions
    - Parotitis can be due to other viruses, infections, drug reactions, tumors, inflammatory disorders
  - Transmission can occur with subclinical infection
  - Issues with lab testing
  - Rapid spread among individuals living in close quarters
Clinical Presentation

• Prodrome: low-grade fever, malaise, headache, muscle aches, loss of appetite, fatigue
• Parotitis frequent manifestation, swelling is usually tender, unilateral or bilateral
• Nonspecific symptoms or no symptoms in up to 30% of cases
• Complications more common post-puberty, adults
Mumps Lab Testing

- PCR preferred
  - Specimens for PCR should be collected as soon as possible after swelling onset (maximum 9 days after onset)
  - Buccal swab is preferred
- Serology (IgM) for mumps
  - Do in conjunction with PCR
  - False positives are common
  - False negatives in previously vaccinated individuals may occur for both IgM and PCR
Mumps Vaccine

- MMR vaccine: 2 doses routinely recommended at 12-15 months and 4-6 years
- Adults not at high risk: 1 dose
- Adults at high risk: college students, international travelers, healthcare workers: 2 doses
- Mumps vaccine effectiveness:
  - 1 dose 78% (range 49%-91%)
  - 2 doses 88% (range 66%-95%)
Vaccine Effectiveness

Example of vaccine effectiveness of 90%

- Exposure among 1,000 people: 44 cases of mumps
- 95% vaccine coverage (950 received 2 doses of vaccine and 50 are unvaccinated)
- 30% attack rate among unvaccinated, 15 get mumps
- 3% attack rate among vaccinated, 29 get mumps
- If none of the 1,000 people had been vaccinated, the outbreak would have resulted in 300 cases
Epidemiology

- Pre-vaccine in US (<1967) 186,000 reported cases/year in US (many additional not reported)
  - Orchitis in 12-66% of cases, oophoritis 5%
  - CNS: aseptic meningitis (1-10%; however accounted for 10% of symptomatic aseptic meningitis cases), encephalitis (0.2%-0.3%)
  - Pancreatitis (3.5%), deafness (transient 4%, permanent unilateral 0.005%), death 0.02%
- Subsequently >99% decrease in cases
  - Orchitis 3-10%, oophoritis/mastitis ≤1%, pancreatitis, deafness, encephalitis very rare
Epidemiology (cont.)
Mumps in MN and the US, 2000-2016

Mumps cases in MN, 2000-2016

- Number of mumps cases: 180
- Year: 2006

Mumps cases in US, 2000-2016

- Number of mumps cases: 6584
- Year: 2006

- Number of mumps cases: 5311
- Year: 2016
Minnesota Mumps 2016 (n=25)

• Median age 35 years (16-53 years); 17 (68%) male
• 24 parotitis (15 bilateral, 9 unilateral)
• 3 orchitis
• 2 hospitalizations
• Vaccination status:
  • 2 doses (3)
  • 1 dose (1)
  • Undocumented/states vaccinated (18)
  • Unknown (3)
MN Mumps Cases (cont.)

- Exposure:
  - 1 international travel
  - 2 out of state
  - 3 epi links/household contacts
- Association with colleges/universities among MN cases:
  - 4 cases, 3 colleges
- 6 out of state college cases in MN residents (counted in state where attend college; not included in the 25):
  - 4 IA, 1 WI, 1 MO
Case Identification and Follow-up

- MN Dept. of Health tests 200-300 suspect cases/year
- Rule in/out typically takes 1-3 days
- Suspect case identification:
  - Lab result faxed/mailed; reported electronically
  - Health care provider submits report
  - Call from public about exposure to mumps
- Get information from health care provider, coordinate lab testing, communicate with multiple individuals (parents, school, providers, etc.)
- Interpretation of lab results
Case Investigation (cont.)

- Once a case is classified as probable or confirmed a case investigation occurs; typically 1-5 days/case
- Main objectives
  - Identify source and assess potential for spread (activity history for 25 days prior to symptom onset)
  - Identify susceptible close contacts or large gatherings in which transmission may have occurred
  - Provide/facilitate notification for activities in which there were exposures
  - May need to develop health advisory; work with media
Check Epi-X for an Urgent Report

Potential Exposure to Mumps at a Minnesota Wrestling Tournament -- Minnesota, 2016

A case of mumps has been reported in an individual who participated in "The Clash XV", a wrestling tournament in Rochester, MN on December 30-31, 2016. Teams from 16 states participated in the event, and wrestlers from four states had direct contact with the case and will be notified separately.

Acknowledgements

Emily Banerjee
Cynthia Kenyon
Kristin Ehresmann