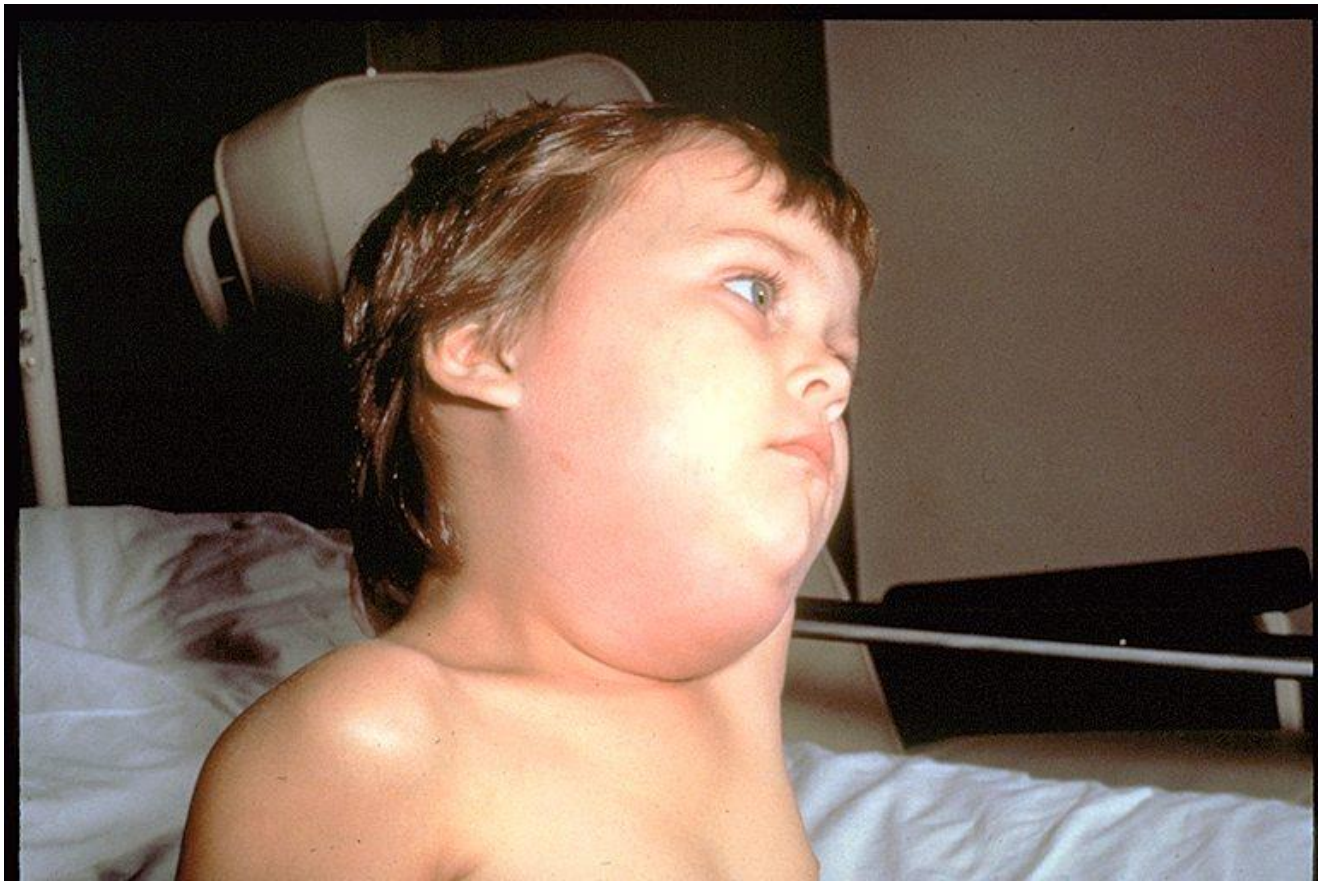
January 2015

Mumps

A Quick Guide for Practitioners

Signs and symptoms

The classic symptom of mumps is parotitis or inflammation of other salivary glands, which may be unilateral, or more commonly bilateral. Approximately one third of infections do not cause clinically apparent salivary gland swelling and may manifest primarily as respiratory tract infection. Parotitis may be preceded by several days of fever, headache, malaise, myalgias and anorexia. Fever lasts 1-6 days, but parotid enlargement may persist for 10 days or longer.



Child with mumps sialadenitis involving parotid and submandibular glands, courtesy of the Centers for Disease Control and Prevention

Mumps in vaccinated persons

Measles, mumps and rubella (MMR) vaccine offers 80% protection after 1 dose and 90% protection after two doses. In recent years, the age distribution of mumps cases reported to

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

Mumps

A Quick Guide for Practitioners

CDC has shifted towards older age groups (≥ 15 years), as many teenagers or young adults may have had only one or no doses of vaccine and had not been exposed to naturally occurring disease.

Complications and unusual presentations

Patients with or without parotitis may develop complications of mumps. The major complications are orchitis in post-pubertal males and CNS complications including aseptic meningitis and encephalitis. Data on these complications are summarized in the table below.

Complication	Frequency of Occurrence[1]	Timing of occurrence[2]	Details[1]
Orchitis	20% of post-pubertal males	Onset usually 2-4 days after onset of parotitis; reported range 0 days to 2 weeks	o Fever is common; diffusely tender, edematous testicle on physical exam; bilateral involvement in up to 40%. o Abdominal pain and headache may also occur. o Resolution within 4-10 days; o 30-50 percent of affected testes develop some degree of atrophy; impaired fertility in some men.
Aseptic meningitis	15%	Onset usually within a few days of parotitis with recovery in 3-4 days; onset may precede parotitis	o Lymphocytic CSF with normal or mildly abnormal protein. Glucose is sometimes low. o Asymptomatic CSF pleocytosis has been reported in up to 50% of individuals with mumps. o Recovery is the norm.
Encephalitis	0.2 to 0.3%	Onset 0-3 weeks after onset of parotitis; average 1 week	o Drowsiness, convulsions, headache, psychoses, ataxia, hemiplegia. o Older data suggest that death occurs in 20% of cases and 33% of survivors have major sequelae (paralysis, seizures, cranial nerve palsies, aqueductal stenosis, hydrocephalus and death)

[1] Much of the data on frequency of occurrence and outcome is based on older case series and may not be fully generalizable to the current mumps outbreak because of: changes in age and underlying disease of susceptible populations; changes in the circulating strain; diagnostic criteria; and medical care.
[2] Complications can also occur in patients without parotitis. Some of these patients may present with symptoms of non-specific viral illness. Diagnosis of acute mumps can be made with laboratory testing.

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

January 2015

Mumps

A Quick Guide for Practitioners

Mumps has also been associated with arthritis, mastitis, thyroiditis, neuritis, pancreatitis, hepatitis and first trimester miscarriage. Lower abdominal pain in some women with mumps has been attributed to mumps oophoritis.

Infectious Period: from 2 days before until 5 days after onset of parotitis

Incubation period: 12-25 days; average 16 to 18 days

Reporting to public health:
Report to your local health department as soon as possible using the West Virginia Electronic Disease Surveillance System (WVEDSS) form available at: http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/Mumps_Case_Investigation_Form.pdf Attach a copy of the laboratory report.

Your local health department will follow up with the patient to determine
1) Source of infection, and
2) Close Contacts of patient to determine who might be at risk for acquiring mumps.

Diagnosis
Specific laboratory diagnosis should be sought in all cases of suspected mumps. Viral parotitis can also be caused by Epstein –Barr virus, coxsackievirus and other enteroviruses, lymphocytic choriomeningitis virus and influenza A and parainfluenza viruses. Acute suppurative parotitis can be caused by *Staphylococcus aureus*, *Streptococcus* species, anaerobes and gram negative rods. The gold standard for mumps diagnosis is viral culture isolation from buccal swabs. Acute serum for IgM antibody is also useful in persons without a history of immunization or disease. However; interpretation of serology can sometimes be difficult, especially in persons with a history of immunization (See: 'Interpretation of laboratory results').

Specimen collection:
Collect a nasopharyngeal swab, a buccal swab and serum on patients. The specimen that will be positive will depend on the stage of infection.

Buccal Swab and/or Throat Swab (oropharyngeal or nasopharyngeal swab) specimens:

1. Confirmatory testing available through Wisconsin State Laboratory of Hygiene. Please coordinate testing with your local health department.
2. Specimens should be collected as soon as mumps is suspected for RT-PCR detection or isolation (i.e. viral culture) of mumps virus.

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

Mumps

A Quick Guide for Practitioners

3. The preferred viral specimen is a parotid (or the other salivary gland) duct swab, following massage of the salivary glands for 30 seconds. Use a synthetic swab commercial product designed for collection of throat cultures or a plain Dacron swab (do not use cotton swab because it may contain substances that are inhibitory to enzymes used in RT-PCR). This is between the cheek area opposite the molars or where the molars should be. Place swab in a tube containing 2-3 mls of viral transport medium or cell culture medium (MEM or Hanks Balanced Salt Solution) or other sterile isotonic solution (phosphate buffered saline).
4. A buccal specimen should be collected as close to symptom onset as possible, preferably within 1-4 days of onset of parotitis.

- Serum specimens:

1. Collect acute serum sample within 5 days after symptom onset (at the time of clinical diagnosis). Collect 7-10 ml of blood in a red top or serum separator tube (SST).
2. If the acute IgM is positive, a convalescent specimen is not necessary. If the acute IgM is negative, a second specimen should be collected approximately 2-3 weeks later. The convalescent specimen should be tested for IgM, as well as IgG paired with the acute specimen.
3. In the absence of recent vaccination, a four-fold increase in IgG titer as measured by quantitative assays, or a seroconversion from negative to positive using a standard serologic assay on acute to convalescent serum specimens is considered a positive diagnostic result for mumps.

Specimen transport of buccal or nasopharyngeal swab

For confirmatory testing through the Wisconsin State Laboratory of Hygiene, please complete a specimen collection form, available at:
http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/Documents/mumps/wv-mump-req.pdf

- Coordinate the shipping of specimens through your local health department and the WV Office of Laboratory Services.
- If specimen can be received at Wisconsin State Laboratory *within 24 hours*: ship specimens together on cold packs.
- If specimen *cannot be received within 24 hours*: Freeze specimens for viral culture at -70°C and ship on dry ice.

Interpretation of laboratory results

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

Mumps

A Quick Guide for Practitioners

WEST VIRGINIA Department of Health & Human Resources
BUREAU FOR PUBLIC HEALTH

- A positive viral culture and RT-PCR from any site confirms the diagnosis of mumps.

- Interpretation of serological results is problematic in the patient with a history of immunization or disease because IgM antibody may be absent or decreased, and the rise in IgG antibody may occur too rapidly for detection. Positive IgM antibody or a four-fold rise in IgG antibody is considered diagnostic of recent infection.

- Presence of mumps IgM antibody is also useful in persons without a history of immunization or disease. If the acute IgM is positive, a convalescent specimen is not necessary. If the acute IgM is negative, a second serum specimen should be collected approximately 2-3 weeks later. The convalescent specimen should be tested for IgM, as well as IgG paired with the acute specimen.

- In the absence of recent vaccination, a four-fold increase in IgG titer as measured by quantitative assays, or a seroconversion from negative to positive using a standard serologic assay on acute to convalescent serum specimens is considered a positive diagnostic result for mumps.

Occupational health in healthcare settings

Be certain all healthcare workers are immune to mumps. Acceptable evidence of immunity in the non-outbreak setting includes:

1. Documentation of two doses of MMR vaccine one month apart on or after the first birthday
2. A positive IgG antibody test for mumps
3. Birth before 1957.

In the outbreak setting, birth before 1957 is NOT considered acceptable evidence of immunity. Accept only:

1. Documentation of two doses of MMR vaccine one month apart on or after the first birthday
2. A positive IgG antibody test for mumps

Serologic testing (IgG antibody) is NOT helpful in persons who have been vaccinated. Antibody levels may be low or negative and do not correlate with protection against disease. Serologic testing (IgG antibody) is most useful in persons *without* a history of vaccination.

Management of healthcare workers exposed to mumps

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

January 2015

Mumps

A Quick Guide for Practitioners

Exposure is defined as any exposure within 3 feet of a patient with mumps.

All exposed healthcare workers (regardless of immune status):
- Monitor for symptoms (parotitis) during the 12 to 25 days after exposure.
- If symptoms develop, exclude from work until 5 days after development of parotitis.

Exposed susceptible healthcare workers:
- Vaccination history:
  - One dose of MMR prior to exposure: May continue to work, but should receive a second dose as soon as possible and at least 28 days after the first dose.
  - No documentation of MMR vaccine prior to exposure: Furlough from the 12th day after the first exposure through the 25th day after the last exposure or, if symptoms develop, until 5 days after the onset of parotitis. These workers may subsequently return to work after one dose of MMR but should receive a second dose 28 days after the first dose.
- Also consider the diagnosis of mumps if non-specific respiratory symptoms develop during 12 to 25 days after exposure.

Infection control

Mumps is spread by airborne and droplet spread and direct contact with saliva. Persons with suspect or confirmed mumps should be placed in droplet precautions through 5 days after onset of parotid swelling.

Immunization recommendations

Counties without an outbreak
Absent contraindications, all persons should be immunized with the first dose of MMR on or after the first birthday. A second dose may be given at any time $\geq$ 4 weeks after the first dose.

A second dose of MMR should be given to:
- School children
- Persons in college or other training after high school
- Health care workers (birth before 1957 may be used as presumptive evidence of immunity)
- International travelers

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

Mumps

A Quick Guide for Practitioners

Other adults should have one dose (birth before 1957 may be used as presumptive evidence of immunity).

Counties with an outbreak (2 or more cases or one case in a congregate setting)
Absent contraindications, all persons should be immunized with the first dose of MMR on or after the first birthday. A second dose may be given at any time ≥ 4 weeks after the first dose.

A second dose of MMR should be given to:
- School children
- Persons in college or other training after high school
- Health care workers (birth before 1957 is NOT considered evidence of immunity during an outbreak)
- International travelers

Other adults should have one dose (birth before 1957 is NOT considered evidence of immunity).

Others should be offered a second dose as indicated by outbreak epidemiology, e.g.:
1. Children age 1-4 years; or
2. Adults

Note: These guidelines are intended to assist with clinical management but are not a substitute for clinical judgment in caring for the individual patient.

Division of Infectious Disease Epidemiology
350 Capitol Street, Room 125, Charleston, WV 25301-3715
Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org

Mumps

A Quick Guide for Practitioners

References

1. Brook I. "Diagnosis and management of parotitis." Arch Otolaryngol Head Neck Surg, 1992; 118:469-71.
2. Caranasos GJ, Felker JR. "Mumps arthritis." Arch Intern Med, 1967; 119: 394-8.
3. CDC. "Mumps epidemic – United Kingdom, 2004-2005." MMWR, 2006; 55:173-5.
4. CDC. "Mumps outbreak at a summer camp – New York, 2005." MMWR, 2006; 55:175-7.
5. Cohen HA, Ashkenazi A, Nussinovitch M, et.al. "Mumps-associated acute cerebellar ataxia." Am J Dis Child, 1992; 146:
6. Endo A, Izumi H Miyashita, et.al. "Facial palsy associated with mumps parotitis." Pediat Infect Dis J, 2001; 20:815-6.
7. Erpenbach KHJ. "Systemic treatment with interferon-alpha2B: an effective method to prevent sterility after bilateral mumps orchitis." J Urol, 1991; 146:54-6.
8. Graham DY, Brown CH, Benrey J, Butel JS. "Thrombocytopenia: a complication of mumps." JAMA, 1974; 227:1162-4.
9. Gupta RK, Best J, MacMahon E. "Mumps and the UK epidemic 2005." BMJ, 2005; 330:1132-5.
10. Johnstone JA, Ross CAC, Dunn M. "Meningitis and encephalitis associated with mumps infection." Arch Dis Childhood, 1972; 47:647-51.
11. Khubchandani R, Rane T, Agarwal P, et.al. "Bilateral neuroretinitis associated with mumps" Arch Neurol, 2002; 59:1633-6.
12. McQuone SJ. "Acute viral and bacterial infections of the salivary glands." Otolaryngol Clin North Am, 1999; 32:793-811.
13. Munson AL. "Mumps orchitis." Urology, 1990; 36:355-8.
14. Oran B, Ceri A, Yilmaz H, et.al. "Hydrocephalus in mumps meningoencephalitis: case report" Pediatr Infect Dis J, 1995; 14:724-5.
15. Plotkin SA. "Mumps vaccine" In: Plotkin SA and Orenstein WA, Ed. *Vaccines*, 4th Ed. Saunders: Philadelphia, PA: Saunders, 2004: pp 441-69.
16. Reed D, Brown G, Merrick R, et.al. "A mumps epidemic on St. George Island, Alaska." JAMA, 1967; 199:113-7.
17. Russell, RR, Donald JC. "The neurological complications of mumps." BMJ, 1958; 2:27-30.
18. Savage E, Ramsay M, White J, et.al. "Mumps outbreaks across England and Wales in 2004: observational study." BMJ, 2005; 330:119-20.
19. ACIP Provisional Recommendations for Measles-Mumps-Rubella (MMR) 'Evidence of Immunity' Requirements for Healthcare Personnel: http://www.cdc.gov/vaccines/recs/provisional/downloads/mmr-evidence-immunity-Aug2009-508.pdf
20. CDC "Updated recommendations for isolation for persons with mumps." MMWR, 2008;57(40):1103-1105.

Website

http://www.cdc.gov/vaccines/vpd-vac/mumps/default.html

Division of Infectious Disease Epidemiology

350 Capitol Street, Room 125, Charleston, WV 25301-3715

Phone: 304.558.5358 Fax: 304.558.6335 www.wvidep.org