

Overview

Useful For

Diagnosis of mumps virus infection

Determination of postimmunization immune response of individuals to the mumps vaccine

Documentation of previous infection with mumps virus in an individual with no previous record of immunization to mumps virus

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
MMPM	Mumps Ab, IgM, S	Yes	Yes
MPPG	Mumps Ab, IgG, S	Yes	Yes

Method Name

MMPM: Enzyme Immunoassay (EIA)  
MPPG: Multiplex Flow Immunoassay

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL

Collection Instructions: Centrifuge and aliquot serum into plastic vial.

Forms

If not ordering electronically, complete, print, and send [Infectious Disease Serology Test Request](#) (T916) with the specimen.

Specimen Minimum Volume

0.9 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Heat-inactivated specimen	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

The mumps virus is a member of the Paramyxoviridae family of viruses, which include parainfluenza virus serotypes 1-4, measles, respiratory syncytial virus, and metapneumovirus. Mumps is highly infectious among unvaccinated individuals and is typically transmitted through inhalation of infected respiratory droplets or secretions. Following an approximate 2-week incubation period, symptom onset is typically acute with a prodrome of low-grade fever, headache, and malaise.(1,2) Painful enlargement of the salivary glands, the hallmark of mumps, occurs in approximately 60% to 70% of infections and in 95% of patients with symptoms. Testicular pain (orchitis) occurs in approximately 15% to 30% of postpubertal men and abdominal pain (oophoritis) is found in 5% of postpubertal women.(1) Other complications include mumps-associated pancreatitis (<5% of cases) and central nervous system disease (meningitis <10% and encephalitis <1%).

Widespread routine immunization of infants with attenuated mumps virus has dramatically decreased the number of reported mumps cases in the United States. However, outbreaks continue to occur, indicating persistence of the virus in the general population.

Laboratory diagnosis of mumps is typically accomplished by detection of IgM- and IgG-class antibodies to the mumps virus. However, due to the widespread mumps vaccination program, in clinically suspected cases of acute mumps infection, serologic testing should be supplemented with virus isolation in culture or detection of viral nucleic acid by polymerase chain reaction testing in throat, saliva, or urine specimens.

Reference Values

IgM:  
Negative: Index value 0.00-0.79  
Reference value applies to all ages.

IgG:

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Vaccinated: Positive ( $>$  or  $=1.1$  AI)

Unvaccinated: Negative ( $<$  or  $=0.8$  AI)

Reference values apply to all ages.

**Interpretation**

A positive IgG result coupled with a positive IgM result suggests recent infection with mumps virus. This result should not be used alone to diagnose mumps infection and should be interpreted in the context of clinical presentation.

A positive IgG result coupled with a negative IgM result indicates previous vaccination to or infection with mumps virus. These individuals are considered to have protective immunity to reinfection.

A negative IgG result coupled with a negative IgM result indicates the absence of prior exposure to mumps virus and nonimmunity. However, a negative result does not rule-out mumps infection or response to vaccination. The specimen may have been collected before the appearance of detectable antibodies. Negative results in suspected early mumps infection or within a week following vaccination should be followed by testing a new serum specimen in 2 to 3 weeks.

Equivocal results should be followed up with testing of a new serum specimen within 10 to 14 days.

**Cautions**

Serum specimens obtained during the acute phase of infection or soon after vaccination may be negative for IgM- or IgG-class antibodies by serological tests.

All positive IgM results must be interpreted cautiously as some false-positive results or heterotypal responses of the IgM have been seen in the serum of pregnant women or in patients with an acute infection caused by cytomegalovirus, herpes simplex virus, measles, rubella, or parvovirus.

Testing for IgM-class antibodies to mumps virus should be limited to patients with a clinically compatible disease.

Mumps virus shares antigenic relationships with other viruses of the paramyxovirus group; therefore, serologic cross-reactions are possible, but uncommon, with this test procedure.

IgG-class antibodies to mumps virus may be present in serum specimens from individuals who have received blood products within the past several months but have not been immunized or experienced past infection with this virus.

**Supportive Data**

IgM:

The SeraQuest mumps IgM kit showed a sensitivity of 97.3% and a specificity of 96.6% when 160 specimens were tested in parallel with a reference method.(Package insert: SeraQuest)

IgG:

To evaluate the accuracy of the BioPlex Mumps IgG multiplex flow immunoassay (MFI), 500 prospective serum specimens were analyzed in a blinded fashion by the SeraQuest Mumps IgG enzyme immunoassay (EIA) and the BioPlex Mumps IgG assay. Specimens with discordant results after initial testing were repeated by both assays during the same freeze/thaw cycle. Further discrepancies were evaluated by the Mumps IgG VIDAS enzyme-linked fluorescent immunoassay (ELFA; bioMerieux, Inc). The results are summarized below:

BioPlex Mumps IgG	SeraQuest Mumps IgG EIA			
		Positive	Negative	Equivocal
	Positive	412	4(a)	8
	Negative	3(b)	48	3
	Equivocal	5	6	11

(a) All 4 of these samples tested positive by VIDAS Mumps IgG ELFA  
(b) One of these 3 samples tested negative by the VIDAS Mumps IgG ELFA  
Sensitivity: 98.1% (412/420); 95% Confidence Intervals (CI): 96.2%-99.1%  
Specificity: 82.8% (48/58); 95% CI: 70.9%-90.6%  
Overall Percent Agreement: 94.2% (471/500); 95% CI: 91.8%-96.0%

Clinical Reference

1. Hviid A, Rubin S, Muhlemann K. Mumps. Lancet. 2008;371(9616):932-944
2. Hodinka RL, Moshal KL.Childhood infections. In: Storch GA, ed. Essentials of Diagnostic Virology. Churchill Livingstone; 2000:168-178
3. Litman N, Baum SG. Mumps virus. In: Bennett JE, Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Elsevier; 2020:2087-2092

Performance

Method Description

IgM:  
The SeraQuest mumps IgM assay is an enzyme capture method. Diluted samples are incubated in wells coated with antihuman-IgM monoclonal antibodies. If present, IgM antibodies are captured in the wells. Wells are washed, removing excess sample. Conjugate-antigen complex (mumps antigen in complex with monoclonal antibodies conjugated to horseradish peroxidase) is added, and the wells are incubated. IgM antibodies specific for the antigen will bind the conjugate. Wells are washed, removing excess conjugate. Peroxidase substrate is added, and the wells are incubated. Stop solution is added converting the substrate to a yellow end product, which is read photometrically.(Package insert: Mumps IgM. Quest International; V 04/2018)

IgG:  
The BioPlex 2200 Mumps IgG assay uses multiplex flow immunoassay technology. Briefly, serum samples are mixed and incubated at 37 degrees C with sample diluent and dyed beads coated with mumps antigen. After a wash cycle, antihuman-IgG antibody conjugated to phycoerythrin (PE) is added to the mixture and incubated at 37 degrees C. Excess conjugate is removed in another wash cycle, and the beads are resuspended in wash buffer. The bead mixture then passes through a detector that identifies the bead based on dye fluorescence and determines the amount of antibody captured by the antigen by the fluorescence of the attached PE. Raw data is calculated in relative fluorescence intensity. Three additional dyed beads, an internal standard bead, a serum verification bead, and a reagent blank bead are present in each reaction mixture to verify detector response, the addition of serum to the reaction vessel, and the absence of significant nonspecific binding in serum.(Package insert: BioPlex 2200 System MMRV IgG. Bio-Rad Laboratories; 02/2019)

PDF Report

No

Day(s) Performed

MMPM: Tuesday

MPPG: Monday through Saturday

Report Available

1 to 7 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees & Codes

Fees

- Authorized users can sign in to [Test Prices](#) for detailed fee information.
- Clients without access to Test Prices can contact [Customer Service](#) 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact [Customer Service](#).

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

86735-Mumps, IgG

86735-Mumps, IgM

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
MMPGM	Mumps Ab, IgM and IgG, S	77250-9

Result ID	Test Result Name	Result LOINC® Value
MUMP1	Mumps Ab, IgM, S	6478-2
DEXM	Index Value	25419-3
DEXG5	Mumps IgG Antibody Index	25418-5
MUMG	Mumps Ab, IgG, S	6476-6