

Test Types Typically Available to Clinicians and Descriptions for Measles, Mumps, Rubella, and Varicella

	Test	Test Description
Measles	RT-PCR*	RT-PCR can be performed on respiratory (nasopharyngeal or throat) swabs and on urine. RT-PCR is most sensitive within 3 days of rash onset but can be positive up to 10 days after rash onset. Ideally, specimens should be collected at first patient contact once measles is suspected and should be paired with serology testing (IgM) for evaluation of all suspect measles cases. For many jurisdictions, RT-PCR is primarily available through the state/local health department.
	IgM*	Detection of measles IgM can confirm measles. IgM is most sensitive 3 or more days after rash onset, so a negative IgM within 3 days of rash onset should be interpreted with caution. False-positive IgM can occur due to cross-reactivity with other causes of febrile rashes (e.g., Parvovirus). Ideally, RT-PCR and serology should be performed together for all suspect measles cases. IgM is <u>not</u> an appropriate test when evaluating for immunity.
	IgG*	The presence of measles-specific IgG indicates a recent or prior exposure to measles virus or measles vaccine and is appropriate to test for evidence of immunity.
Mumps	RT-PCR*	A buccal swab specimen (after massaging the parotid (salivary) glands for 30 seconds) collected <3 days after parotitis onset is the preferred specimen and RT-PCR testing is the preferred method for laboratory confirmation of mumps disease. Specimen should be ideally collected 0-3 days after parotitis onset but can be collected up to 10 days. For many jurisdictions, RT-PCR is available through the state/local health department.
	IgM*	Detection of mumps IgM can aid in the diagnosis of mumps disease, although a positive IgM result is only supportive laboratory evidence. If it has been >3 days since symptom onset, collect a serum specimen for IgM detection in addition to a buccal swab specimen for RT-PCR. IgM is <u>not</u> an appropriate test when evaluating for immunity.
	IgG*	The presence of mumps-specific IgG indicates a recent or prior exposure to mumps virus or mumps vaccine and is appropriate to test for evidence of immunity.
Rubella	RT-PCR*	RT-PCR can be performed on respiratory (nasopharyngeal or throat) swabs and on urine. RT-PCR is most sensitive within 3 days of rash onset but can be positive up to 7 days after rash onset. Ideally, specimens should be collected at first patient contact once rubella is suspected and should be paired with serology testing (IgM) for evaluation of all suspect rubella cases. For many jurisdictions, RT-PCR is primarily available through the state/local health department.
	IgM*	Detection of rubella IgM can confirm rubella. IgM is most sensitive 4 or more days after rash onset, so a negative IgM within 3 days of rash onset should be interpreted with caution. False-positive IgM can occur due to cross-reactivity with other causes of febrile rashes (e.g., Parvovirus) or the presence of rheumatoid factor. Ideally, RT-PCR and serology should be performed for all suspect rubella cases. IgM is <u>not</u> an appropriate test when evaluating for immunity.
	IgG*	The presence of rubella-specific IgG indicates a recent or prior exposure to rubella virus or rubella vaccine and is appropriate to test for evidence of immunity.
Varicella	RT-PCR*	RT-PCR is the standard method for confirming varicella, being sensitive, specific, and widely available. Vesicular swabs and scabs from crusted lesions are the preferred specimens. In the absence of vesicles or scabs (likely for cases among vaccinated persons), scrapings of maculopapular lesions can be collected for testing. Adequate collection of specimens from maculopapular lesions can be challenging (needs abrading of the lesion) but cases can be laboratory confirmed with a high success rate by testing properly collected specimens. RT-PCR testing is available at many clinics and some state/local health departments. RT-PCR to differentiate between wild type and vaccine strain is available at designated reference centers.
	IgM	IgM is <u>not</u> recommended for laboratory confirmation of varicella.
	IgG*	A single serologic IgG test can be used for evidence of immunity, to determine if a person has antibodies to VZV from past varicella disease or vaccination. Of note, commercially available VZV IgG assays are not sensitive enough to detect all seroconversions after vaccination and may yield false negative results in varicella vaccinated persons. Routine testing for varicella immunity after vaccination is not recommended, documentation of receipt of two doses of varicella vaccine supersedes the results of subsequent serologic testing. Serum should be collected 3 or more weeks after rash onset.

* Tests should be available to clinicians

Measles – Recommendations for Testing for Clinicians

Measles is a mandatory, immediately notifiable disease. Please report confirmed and probable cases of measles to your local health department.

	Preference	Test	Specimen	Indication	Timing	Notes
ACUTE DISEASE	Preferred Test	RT-PCR	<p>Nasopharyngeal (NP) or throat (OP) swab (preferred)</p> <p>Urine can be collected in addition to an NP/OP swab</p>	Acute Disease	<ul style="list-style-type: none"> A specimen for detection of virus should be collected as soon as possible upon suspicion of measles. Specimen should be ideally collected within 3 days after rash onset but can be collected up to 10 days. If >10 days since rash onset, PCR testing is generally not recommended. 	<ul style="list-style-type: none"> NP/OP swab collected <3 days after rash onset is the preferred specimen. Ideally, RT-PCR should be performed for all suspect measles cases identified within 10 days of rash onset. Collecting a urine specimen along with an NP/OP swab may improve test sensitivity, especially if at the end of the RT-PCR detection window. Contact your health department regarding where to send specimens for testing and genotyping, if appropriate.
	Preferred Test	IgM (with IgG)	Serum	Acute Disease	<ul style="list-style-type: none"> Ideally, serology will be obtained for suspect measles cases, in addition to RT-PCR. IgM is most sensitive 3+ days after rash onset and may be negative days 0–3 after rash onset. IgM can be detected for 6–8 weeks after acute measles. 	<ul style="list-style-type: none"> Detection of measles IgM can aid in the diagnosis of measles and can increase the detection window for acute cases. Testing IgG for acute cases can provide evidence of pre-existing immunity, which can be helpful to differentiate rare instances of vaccine failure. People with a history of measles vaccination may not have detectable IgM during an acute measles illness.
IMMUNITY	Only test for immunity	IgG only	Serum	Evidence of Immunity	<ul style="list-style-type: none"> IgG can be detected approximately 2 weeks after measles vaccination. 	<ul style="list-style-type: none"> The presence of measles-specific IgG indicates a recent or prior exposure to measles virus or measles vaccine. IgM is <u>not</u> an appropriate test for immunity.

* Viral culture is a valid way to confirm cases of acute measles disease; however, is not generally recommended as it takes longer to receive results than RT-PCR, which is widely available. Specimen collection and timing is similar to that for RT-PCR.





** Acute and convalescent phase serum specimen collection (separated by at least 2 weeks) to demonstrate a 4-fold increase in IgG titer can confirm measles infection but is generally not required to confirm measles infection.

Useful References:

- CDC Vaccine Preventable Disease Surveillance Manual: [Chapter 7: Measles | VPD Manual | CDC](#)
- CDC Measles page for Healthcare Providers: [Clinical Overview of Measles | CDC](#)
- CDC Measles Serology Webpage: [Measles Serology Testing | CDC](#)
- CDC Measles Laboratory Information: [Laboratory Testing for Measles | CDC](#)

Measles Tests

When to Collect?

Acute Disease	PCR	Nasopharyngeal (NP) or Throat (OP) Swab 	As soon as possible upon suspicion of measles: ideally 0-3 days after rash onset, up to 10 days after rash onset.
	PCR	Urine 	Within 10 days of rash onset <i>*Collecting a urine specimen along with an NP/OP swab may improve test sensitivity, especially if at the end of the PCR detection window.</i>
	IgM	Serum 	Collect with specimen for PCR. Can be negative up to 3 days after rash onset. IgM can be detected for 6-8 weeks after acute measles.
Immunity	IgG	Serum 	When assessing evidence of immunity, can be detected ~2 weeks after MMR vaccination

Mumps – Recommendations for Testing for Clinicians

Mumps is a routinely notifiable disease. Please report confirmed and probable cases of mumps to your local health department.

	Preference	Test	Specimen	Indication	Timing	Notes
ACUTE DISEASE	Preferred Test	RT-PCR	Buccal swab (<i>preferred</i>) Urine specimen (<i>if individual has orchitis and not parotitis</i>)	Acute Disease (confirmatory)	<ul style="list-style-type: none"> A specimen for detection of virus should be collected as soon as possible upon suspicion of mumps. Specimen should be ideally collected 0-3 days after parotitis onset but can be collected up to 10 days. If >10 days since parotitis onset, PCR testing no longer recommended. 	<ul style="list-style-type: none"> A buccal swab specimen collected <3 days after parotitis onset is the preferred specimen and RT-PCR testing is the preferred method for laboratory confirmation of mumps. A urine specimen collected ≤10 days after symptom onset can be helpful in patients <i>without</i> parotitis and with orchitis or other reproductive complications of mumps. Contact your health department regarding where to send specimens for genotyping, if appropriate.
	Not Preferred	IgM	Serum	Acute Disease (supportive)	<ul style="list-style-type: none"> If >3 days since parotitis onset, collect a serum specimen for IgM in addition to a buccal swab for RT-PCR. IgM is most sensitive within 3-14 days of parotitis onset, but can persist for up to 30 days or more, in some cases. 	<ul style="list-style-type: none"> Detection of mumps IgM can aid in the diagnosis of mumps, although a positive IgM result is only supportive laboratory evidence. People with a history of mumps vaccination may not have detectable mumps IgM antibody regardless of timing of specimen collection.
IMMUNITY	Only test for Immunity	IgG	Serum	Evidence of Immunity	<ul style="list-style-type: none"> IgG can be detected approximately 2 weeks after MMR vaccination. 	<ul style="list-style-type: none"> The presence of mumps-specific IgG indicates a recent or prior exposure to mumps virus or mumps vaccine. Single IgG cannot be used to confirm acute disease. The presence of mumps-specific IgG does not necessarily predict the presence of neutralizing antibodies or protection from mumps disease. IgM is <u>not</u> an appropriate test for immunity.

* Viral culture is a valid way to confirm cases of acute mumps disease; however, is not recommended because it is insensitive and takes longer to obtain results. Specimen collection and timing is similar to that for RT-PCR.





** Acute and convalescent phase serum specimen collection (separated by at least 2 weeks) to demonstrate a 4-fold increase in IgG titer is not recommended in vaccinated persons but can be used in unvaccinated persons if the timeline for collecting a buccal swab for PCR is missed.

Useful References:

- CDC Provider Testing Job Aid: [Mumps Clinical Testing | CDC](#)
- CDC Mumps page for Healthcare Providers: [Clinical Overview of Mumps | CDC](#)
- CDC Mumps Clinical Factsheet: [Mumps](#)
- CDC Mumps Serology page: [Serology to Diagnose Mumps | CDC](#)

Mumps Tests

When to Collect?

Acute Disease	PCR	Buccal Swab (Requires Parotid Massage)		As soon as possible upon suspicion of mumps: ideally 0-3 days after parotitis onset, up to 10 days after parotitis onset.
	PCR	Urine		Within 10 days of symptom onset <i>*Appropriate when patients have orchitis and not parotitis</i>
	IgM	Serum		Most sensitive within 3-14 days of parotitis onset
Immunity	IgG	Serum		When assessing evidence of immunity, can be detected ~2 weeks after MMR vaccination

Rubella – Recommendations for Testing for Clinicians

Rubella is a mandatory, immediately notifiable disease. Please report confirmed and probable cases of rubella to your local health department.

	Preference	Test	Specimen	Indication	Timing	Notes
ACUTE DISEASE	Preferred Test	RT-PCR	Nasopharyngeal (NP) or throat (OP) swab (preferred) Urine can be collected in addition to an NP/OP swab	Acute Disease	<ul style="list-style-type: none"> A specimen for detection of virus should be collected as soon as possible upon suspicion of rubella. Specimen should be ideally collected within 3 days after rash onset but can be collected up to 7 days. If >7 days since rash onset, PCR testing is generally not recommended. 	<ul style="list-style-type: none"> NP/OP swab collected <3 days after rash onset is the preferred specimen. Ideally, RT-PCR should be performed for all suspect rubella cases identified within 7 days of rash onset. Collecting a urine specimen along with an NP/OP swab may improve test sensitivity. Contact your health department regarding where to send specimens for testing and genotyping, if appropriate.
	Preferred Test	IgM (with IgG)	Serum	Acute Disease	<ul style="list-style-type: none"> Ideally, serology will be obtained for suspect rubella cases, in addition to RT-PCR. IgM is most sensitive 4+ days after rash onset and may be negative days 0–3 after rash onset. IgM can be detected for 30 days after acute rubella. 	<ul style="list-style-type: none"> Detection of rubella IgM can aid in the diagnosis of rubella and can increase the detection window for acute cases. Testing IgG for acute cases can provide evidence of pre-existing immunity, which can be helpful to differentiate rare instances of vaccine failure. Rubella IgM testing in asymptomatic, unexposed pregnant women is inappropriate.
IMMUNITY	Only test for immunity	IgG only	Serum	Evidence of Immunity	<ul style="list-style-type: none"> IgG can be detected approximately 2 weeks after rubella vaccination. 	<ul style="list-style-type: none"> The presence of rubella-specific IgG indicates a recent or prior exposure to rubella virus or rubella vaccine. IgM is <u>not</u> an appropriate test for immunity.

* Viral culture is a valid way to confirm cases of acute rubella disease; however, is not generally recommended as it takes longer to receive results than RT-PCR, which is widely available. Specimen collection and timing is similar to that for RT-PCR.

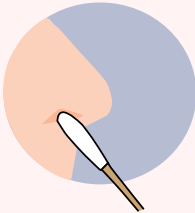
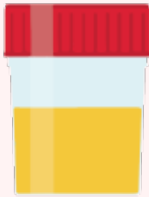


** Acute and convalescent phase serum specimen collection (separated by at least 2 weeks) to demonstrate a 4-fold increase in IgG titer can confirm rubella infection but is generally not required.

Useful References:

- CDC Vaccine Preventable Disease Surveillance: [Chapter 14: Rubella | VPD Manual | CDC](#)
- CDC Rubella page for Healthcare Providers: [Clinical Overview of Rubella | CDC](#)
- CDC Rubella Serology Webpage: [Serology Testing for Rubella | CDC](#)
- CDC Rubella Laboratory Information: [Laboratory Testing for Rubella | CDC](#)

Rubella Tests

When to Collect?

Acute Disease	PCR	Nasopharyngeal (NP) or Throat (OP) Swab		As soon as possible upon suspicion of rubella. Specimen should be ideally collected 0-3 days after rash onset, up to 7 days after rash onset.
	PCR	Urine		Within 7 days of rash onset <i>*Collecting a urine specimen along with an NP/OP swab may improve test sensitivity, especially if at the end of the RT-PCR detection window.</i>
	IgM	Serum		Most sensitive 4+ days after rash onset. IgM can be detected for 30 days after acute rubella.
Immunity	IgG	Serum		When assessing evidence of immunity, can be detected ~ 2 weeks after MMR vaccination

Varicella – Recommendations for Testing for Clinicians

Varicella is a routinely notifiable disease. Please report confirmed and probable cases of varicella to your local health department.

	Preference	Test	Specimen	Indication	Timing	Notes
ACUTE DISEASE	Preferred test for acute disease	PCR	Material from skin lesion specimen (vesicles or scabs [<i>preferred</i>], scrapings of maculopapular lesions if vesicles or scabs are not present)	Acute Disease (confirmatory)	<ul style="list-style-type: none"> During acute illness when the rash is present. If rash has resolved, scabs from crusted lesions are also excellent samples for PCR detection of VZV DNA. 	<ul style="list-style-type: none"> In vaccinated persons who do not have vesicles or scabs, adequate collection of specimens from maculopapular lesions can be challenging. Scrapings of maculopapular lesions can be collected by abrading the lesions. Rashes within 42 days after vaccination have been reported; only genotyping can confirm if rash is vaccine-strain or wild-type virus. Contact your health department regarding where to send specimens for genotyping, if appropriate. A positive VZV PCR alone cannot distinguish between varicella and herpes zoster as both are caused by VZV; additional clinical and epidemiologic information is needed.
IMMUNITY	Only test for immunity	IgG	Serum	Evidence of Immunity	<ul style="list-style-type: none"> After acute illness (3 or more weeks after rash onset). 	<ul style="list-style-type: none"> A single serologic IgG test can be used to determine if a person has antibodies to VZV from past varicella disease or vaccination but cannot be used to confirm acute disease. Commercially available VZV IgG assays are not sensitive enough to detect all seroconversions after vaccination and may yield false negative results in varicella vaccinated persons. Routine testing for varicella immunity following vaccination is not recommended, documentation of receipt of two doses of varicella vaccine supersedes the results of subsequent serologic testing.

Other diagnostic techniques are available commercially to confirm cases of varicella however, they are not recommended because they have substantial performance limitations compared with PCR.

- Viral culture is a valid way to confirm cases of varicella; however, it is not recommended because it is less sensitive than PCR and takes longer to obtain results.
- IgM serology has limited diagnosing value for varicella and it is not recommended for laboratory confirmation of varicella. IgM has poor specificity, and IgM antibodies are transiently produced during primary infection (varicella), reinfection, or reactivation from latency (herpes zoster). Additionally, false-positive IgM results are especially common in the presence of high levels of IgG antibodies. An IgM positive result in the presence of varicella-like symptoms can indicate likely acute VZV infection; however, a positive IgM result in the absence of clinical disease is not considered indicative of active varicella.
- A significant rise (i.e., at least a 4-fold rise in IgG titer or seroconversion) of acute and convalescent phase serum specimens (separated by at least 2 weeks) could also confirm cases of varicella but it is not recommended since it is not practical for immediate management and in vaccinated persons, a 4-fold rise may not occur.

Useful References:

- CDC Varicella page for Healthcare Providers: [Clinical Overview of Chickenpox \(Varicella\) | CDC](#)
- CDC Varicella Clinical Factsheet: [Varicella Diagnosis Fact Sheet | CDC](#)
- CDC Varicella Breakthrough Infographic: [Breakthrough Varicella Fact Sheet | CDC](#)
- CDC Laboratory Support for Surveillance of Vaccine-Preventable Diseases: [Chapter 22: Laboratory Support | VPD Manual | CDC](#)

Varicella Tests

When to Collect?

Acute Disease

PCR

- 1. Material from vesicles or scabs
- 2. Scrapings of maculopapular lesions



Rash present: Vesicular swabs or scrapings if vesicles are present. If no vesicles, scrapings of maculopapular lesions obtained by abrading the lesion with a slide.

Rash has resolved: Scabs from crusted lesions, are also excellent samples for PCR detection of VZV DNA.

Immunity

IgG

Serum



After acute illness (3 or more weeks after rash onset)