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 [*preferred*], scrapings of maculopapular lesions if vesicles or scabs are not present)	Acute Disease (confirmatory)	• 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.	• 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	• After acute illness (3 or more weeks after rash onset).	• 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: Chickenpox (Varicella) for Healthcare Professionals | CDC
- CDC Varicella Clinical Factsheet: English | Spanish
- CDC Varicella Breakthrough Infographic: Do You Know What Breakthrough Varicella (Chickenpox) Looks Like?
- CDC Laboratory Support for Surveillance of Vaccine-Preventable Diseases: Laboratory Support for Surveillance of Vaccine-Preventable Diseases | 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)

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*

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