
Overview**Useful For**

Rapid (qualitative) detection of varicella-zoster virus DNA in clinical specimens for laboratory diagnosis of disease due to this virus

Method Name

Real-Time Polymerase Chain Reaction (PCR)/DNA Probe Hybridization

NY State Available

Yes

Specimen**Specimen Type**

Varies

Necessary Information

Specimen source is required.

Specimen Required

Submit only 1 of the following specimens:

Supplies: Aliquot Tube, 5 mL (T465)

Specimen Type: Fluid

Sources: Spinal, pleural, peritoneal, ascites, pericardial, amniotic, or ocular

Container/Tube: Sterile container

Specimen Volume: 0.5 mL

Collection Instructions: Do not centrifuge.

Supplies:

-Culturette (BBL Culture Swab) (T092)

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

Specimen Type: Swab

Sources: Miscellaneous; dermal, eye, nasal, or throat

Container/Tube: Multimicrobe media (M4-RT) (T605) and ESwabs

Collection Instructions: Place swab back into multimicrobe media (M4-RT [T605], M4, or M5).

Supplies:

-Culturette (BBL Culture Swab) (T092)

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

Specimen Type: Swab

Sources: Genital; cervix, vagina, urethra, anal/rectal, or other genital sources

Container/Tube: Multimicrobe media (M4-RT) (T605) and ESwabs

Collection Instructions: Place swab back into multimicrobe media (M4-RT [T605], M4, or M5).

Specimen Type: Fluid

Sources: Respiratory; bronchial washing, bronchoalveolar lavage, nasopharyngeal aspirate or washing, sputum, or tracheal aspirate

Container/Tube: Sterile container

Specimen Volume: 1.5 mL

Supplies:

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

Specimen Type: Tissue

Sources: Brain, colon, kidney, liver, lung, etc.

Container/Tube:

Preferred: Multimicrobe media (M4-RT) (T605)

Acceptable: Sterile container with 1 to 2 mL of sterile saline

Specimen Volume: Entire collection

Collection Instructions: Submit only fresh tissue in a sterile container containing 1 mL to 2 mL of sterile saline or multimicrobe medium (M4-RT [T605], M4, or M5)

Forms

If not ordering electronically, complete, print, and send a [Microbiology Test Request](#) (T244) with the specimen.

Reject Due To

Swab/Tissue Calcium alginate-tipped swab, wood swab, or transport swab containing gel Formalin-fixed and/or
 paraffin-embedded tissues

Specimen Minimum Volume

Body Fluid, Ocular Fluid, or Spinal Fluid: 0.3 mL

Respiratory Specimens: 1 mL

Tissue: 2 x 2-mm biopsy

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Varies	Refrigerated (preferred)	7 days	
	Frozen	7 days	

Clinical & Interpretive**Clinical Information**

Varicella-zoster virus (VZV) causes both varicella (chickenpox) and herpes zoster (shingles). VZV produces a generalized vesicular rash on the dermis (chickenpox) in normal children, usually before 10 years of age. After primary infection with VZV, the virus persists in latent form and may emerge clinically (usually in adults 50 years of age and older) to cause a unilateral vesicular eruption, generally in a dermatomal distribution (shingles).

Reference Values

Negative

Interpretation

Detection of varicella-zoster virus (VZV) DNA in clinical specimens supports the clinical diagnosis of infection due to this virus.

VZV DNA is not detected in cerebrospinal fluid from patients without central nervous system disease caused by this virus.

This LightCycler PCR assay does not yield positive results with other herpesvirus gene targets (herpes simplex virus, cytomegalovirus, Epstein-Barr virus).

Cautions

A negative result does not exclude the possibility of varicella-zoster virus (VZV) infection.

The reference range is typically "negative" for this assay. This assay is only to be used for patients with a clinical history and symptoms consistent with VZV infection, and must be interpreted in the context of the clinical picture. This test is not used to screen asymptomatic patients.

Supportive Data

The following validation data supports the use of this assay for clinical testing.

Accuracy/Diagnostic Sensitivity and Specificity:

LightCycler PCR (primers, directed to varicella-zoster virus [VZV], gene 29) was compared with shell vial cell cultures for

the detection of VZV from 253 dermal specimens. Twenty-three specimens (9.1%) were positive for VZV by LightCycler PCR and by the shell vial cell culture assay. An additional 21 specimens exclusively yielded VZV DNA. These discrepant specimens were resolved as true-positive results by confirmation of results by PCR using primers directed to another gene of VZV. Importantly, there were no instances in which VZV was recovered by the shell vial assay and not detected by LightCycler PCR (specificity, 100%). Of 100 cerebrospinal fluid specimens tested by both conventional PCR and LightCycler PCR, VZV DNA was detected in 49 specimens by both methods; 1 specimen was positive only by the conventional PCR assay. Fifty specimens were found to be negative for VZV DNA by both techniques.

Supplemental Data (Spiking Studies):

To supplement the above data, 30 negative specimens each of various types were spiked with VZV plasmid at the limit of detection (10-20 targets/microliter). The spiked specimens were run in a blinded fashion along with approximately 30 negative (nonspiked) specimens each of various specimen types; 90% to 100% of the spiked specimens were positive and 100% of the nonspiked specimens were negative

Analytical Sensitivity/Limit of Detection (LoD):

The LoD of this assay is 10 to 20 DNA target copies per microliter in specimen matrix.

Analytical Specificity:

No PCR signal was obtained from extracts of 27 bacterial, viral, and fungal isolates that could be found as normal flora in sites normally tested for this organism or that could cause similar symptoms.

Precision:

Interassay precision was 100% and intraassay precision was 97%.

Reportable Range:

This test is a qualitative assay and results are reported as negative or positive for targeted VZV DNA.

Clinical Reference

1. Cinque P, Bossolasco S, Vago L, et al: Varicella-zoster virus (VZV) DNA in cerebrospinal fluid of patients infected with human immunodeficiency virus: VZV disease of the central nervous system or subclinical reactivation of VZV infection? Clin Infect Dis 1997;25(3):634-639

2. Brown M, Scarborough M, Brink N, et al: Varicella zoster virus-associated neurological disease in HIV-infected patients. *Int J STD AIDS* 2001;12(2):79-83
3. Studahl M, Hagberg L, Rekabdar E, Bergstrom T: Herpesvirus DNA detection in cerebrospinal fluid: differences in clinical presentation between alpha-, beta-, and gamma-herpesviruses. *Scand J Infect Dis* 2000;32(3):237-248
4. Iten A, Chatelard P, Vuadens P, et al: Impact of cerebrospinal fluid PCR on the management of HIV-infected patients with varicella-zoster virus infection of the central nervous system. *J Neurovirol* 1999;5(2):172-180
5. Sauerbrei A: Varicella-zoster virus infections - antiviral therapy and diagnosis. *GMS Infect Dis* 2016 Feb 17;4:Doc01 doi: 10.3205/id000019
6. Sauerbrei A: Diagnosis, antiviral therapy, and prophylaxis of varicella-zoster virus infections. *Eur J Clin Microbiol Infect Dis* 2016 May;35(5):723-734 doi: 10.1007/s10096-016-2605-0

Performance

Method Description

Viral nucleic acid is extracted by the MagNA Pure automated instrument (Roche Applied Science) from clinical specimens. Primers directed to target DNA (ss DNA binding proteins: gene 29) produce a 202-bp amplicon. The LightCycler instrument amplifies and monitors by fluorescence the development of target nucleic acid sequences after the annealing step during PCR cycling. This is an automated PCR system that can rapidly detect (30-40 minutes) amplicon development through stringent air-controlled temperature cycling in capillary cuvettes. The detection of amplified products is based on the fluorescence resonance energy transfer (FRET) hybridization probe with a donor fluorophore, fluorescein, on the 3' end is excited by an external light source and emits light that is absorbed by a second hybridization probe with an acceptor fluorophore, LC-Red 640, at the 5' end. The acceptor fluorophore then emits a light of a different wavelength that can be measured with a signal that is proportional to the amount of specific PCR product. Melting curve analysis is performed following PCR amplification. Starting at 45 degrees C, the temperature in the thermal chamber is slowly raised to 80 degrees C, and the fluorescence is measured at frequent intervals. Analysis of the PCR amplification and probe melting curves is accomplished through the use of LightCycler software. (Dhiman N, Wright PA, Espy MJ, et al: [Concurrent detection of herpes simplex and varicella-zoster viruses by polymerase chain reaction from the same anatomic location](#). *Diagn Microbiol Infect Dis* 2011 Aug;70(4):538-540 doi: 10.1016/j.diagmicrobio.2011.03.014; Espy MJ, Teo R, Ross TK, et al: Diagnosis of varicella-zoster virus infections in the clinical laboratory by LightCycler PCR. *J Clin Microbiol* 2000;38[9]:3187-3189)

PDF Report

No

Specimen Retention Time

1 week

Performing Laboratory Location

Rochester

Fees & Codes**Test Classification**

This test was developed, and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

87798

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
LVZV	Varicella-Zoster Virus PCR	94584-0

Result ID	Reporting Name	LOINC®
SRC70	Specimen Source	39111-0
36046	Varicella-Zoster Virus PCR	94584-0