
Overview

Useful For

Diagnosing viral infections in nonrespiratory specimens

This test is **not useful for** viruses that cannot be detected in cell culture including Epstein-Barr virus, rubella virus (order serology), West Nile virus, human papillomavirus, Norwalk virus, or norovirus.

Testing Algorithm

All routine viral cultures are inoculated into cell culture tubes for viral detection. The most common specimens received for routine testing include body fluid, rectal, spinal fluid, and feces. A rapid (16-hour incubation) shell vial cell culture assay will be inoculated when specimens are designated for herpes simplex virus (HSV), adenovirus (AD), or cytomegalovirus (CMV) detection, or as appropriate for source indicated, and will be charged separately for each virus tested.

Information pertaining to specific sources:

Acceptable sources:

- Dermal specimens for enterovirus only (clearly indicate "Enterovirus" on test request)
- Feces: rectal swab (preferred); random fecal specimen (acceptable)
- Brain tissue
- Liver tissue (for CMV and herpes) refrigerated in saline or phosphate buffered saline
- Esophageal tissue, swabs, or brushings

Sources not recommended or not acceptable:

- Blood, lymph node tissue, and bone marrow/bone tissue specimens are frequently toxic to cell culture lines. Most molecular methods are appropriate for these specimen types (exception: bone tissue).
- Ocular fluids (vitreous and aqueous): viral culture is **not** recommended due to usually inadequate volumes. Polymerase chain reaction (PCR) testing is recommended
- Genital, synovial fluid, wound swab, or tissue (includes pus, drainage, or abscess fluid)

See Ordering Guidance for recommended testing on these specimen types.

Special Instructions

- [Parasitic Investigation of Stool Specimens Algorithm](#)

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
TISSR	Tissue Processing	No, (Bill Only)	No
VID2	Additional Testing Virus Ident	No, (Bill Only)	No
SVIR	Viral Smear, Shell Vial	No, (Bill Only)	No

Method Name

Cell Culture

Shell Vial Assay for Herpes Simplex Virus or Cytomegalovirus

NY State Available

Yes

Specimen**Specimen Type**

Varies

Ordering Guidance

Source-based recommendations for testing:

Dermal specimens: Leg, arm, skin, axilla, etc:

Order LHSV / Herpes Simplex Virus (HSV), Molecular Detection, PCR, Varies **and/or** LVZV / Varicella-Zoster Virus, Molecular Detection, PCR, Varies. **If a dermal sample is submitted for viral culture, the laboratory will automatically change the testing to LHSV and LVZV.**

Genital specimens: Cervical, endocervical, genital, labia, penis, perianal, scrotum, vaginal

Order LHSV / Herpes Simplex Virus (HSV), Molecular Detection, PCR, Varies. **If a genital sample is submitted for viral culture, the laboratory will automatically change the testing to LHSV.**

Oral specimens: Gum, mouth, palate, tongue, tonsil, parotid, buccal

Order separate polymerase chain reaction (PCR) tests as appropriate:

LCMV / Cytomegalovirus (CMV), Molecular Detection, PCR, Varies

LHSV / Herpes Simplex Virus (HSV), Molecular Detection, PCR, Varies

LENT / Enterovirus, Molecular Detection, PCR, Varies

LADV / Adenovirus, Molecular Detection, PCR, Varies

LVZV / Varicella-Zoster Virus, Molecular Detection, PCR

Respiratory specimens: Bronchoalveolar lavage, bronchial wash, lung, lung tissue, nasal swab, nasal wash, sputum, throat swab, tracheal aspirate

Order RP / Respiratory Panel, PCR, Nasopharyngeal (NP) for NP swabs and RPB / Respiratory Panel, PCR, Varies for bronchoalveolar lavage, bronchial washings.

For other respiratory sources order separate PCR tests as appropriate:

LCMV / Cytomegalovirus (CMV), Molecular Detection, PCR, Varies

LHSV / Herpes Simplex Virus (HSV), Molecular Detection, PCR, Varies

LENT / Enterovirus, Molecular Detection, PCR, Varies

LADV / Adenovirus, Molecular Detection, PCR, Varies

LVZV / Varicella-Zoster Virus, Molecular Detection, PCR

Infectious agent-based recommendations for testing:

If cytomegalovirus (CMV) is suspected in bone marrow or urine specimens, order LCMV / Cytomegalovirus (CMV), Molecular Detection, PCR, Varies

If herpes simplex virus (HSV) is suspected in a neonatal patient (<1 month), order VHSV / Herpes Simplex Virus (HSV), Culture From Neonates, Varies

State Health Department testing only: specimens **will not be accepted** for viral culture at Mayo Clinic Laboratories for the following diseases (submit directly to your state health department).

-Measles

-Mumps

-High-risk infectious agents including, but not limited to, Ebola and other causative agents of viral hemorrhagic fever, avian influenza, severe acute respiratory syndrome (SARS), Middle Eastern respiratory syndrome coronavirus (MERS-CoV), and SARS CoV-2 (coronavirus 2019: COVID19)

Shipping Instructions

1. Specimen must be transported at refrigerate temperature.

2. Swab specimens should be sent in viral transport media.

3. Specimens must be received and cultured in the laboratory within 7 days post collection.

4. Specimens for viral culture should be transported to the laboratory as soon as possible for optimal recovery.

Necessary Information

Specimen source is required.

Specimen Required

Specimen Type: Body fluid

Sources: Pericardial, peritoneal, amniotic

Container/Tube: Sterile container

Specimen Volume: 1 mL

Specimen Type: Lip

Supplies:

-Swab, Sterile Polyester (T507)

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

Container/Tube: Multimicrobe media (M4-RT)

Specimen Volume: Swab

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

Specimen Type: Rectal

Supplies:

-Swab, Sterile Polyester (T507)

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

Container/Tube: Multimicrobe media (M4-RT)

Specimen Volume: Swab

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

Specimen Type: Spinal fluid

Container/Tube: Sterile vial

Specimen Volume: 1 mL

Specimen Type: Feces

Supplies: Stool Collection Kit, Random (T635)

Container/Tube: Sterile container

Specimen Volume: 5-10 g

Specimen Type: Tissue

Supplies:

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

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

Container/Tube: Sterile container containing 1 mL to 2 mL of sterile saline or multi-microbe medium (M4-RT, M4, or M5).

Specimen Volume: Entire collection

Specimen Type: Dermal (for enterovirus only)

Supplies:

-Swab, Sterile Polyester (T507)

-M4-RT (T605)

-Bartels FlexTrans VTM-3 mL (T892)

-Jiangsu VTM-3 mL (T891)

Container/Tube: Multimicrobe media (M4-RT)

Specimen Volume: Swab

Collection Instructions:

1. Place swab in M4-RT media or other viral transport media (M4 or M5).
2. Clearly label "enterovirus" to ensure proper handling and test setup.

Forms

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

Reject Due To

Gel swab, swab with wood handle, E-swab Reject
Bile (toxic)

Deep seated tissues
Lymph nodes
Synovial fluid
Bone marrow/bone tissue
Wound swabs
Tissue swabs
Pus, abscess and/or drainage material

Specimen Minimum Volume

Body Fluid or Spinal Fluid: 1 mL

Feces: 5 g

Tissue Biopsy: 5 mm

Specimen Stability Information

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

Clinical & Interpretive**Clinical Information**

Viruses are responsible for a broad spectrum of clinical symptoms and diseases. The most commonly isolated viruses are adenovirus, cytomegalovirus (CMV), enteroviruses, herpes simplex virus (HSV), and varicella-zoster virus (VZV).

Many viral infections (eg, HSV, CMV, VZV) can now be treated with antiviral drugs. Early laboratory diagnosis by isolation is very helpful in the medical management of these patients.

Viruses that are detected in cell culture include adenovirus, CMV, enterovirus, HSV, and VZV.

Viruses that are **not** detected in cell culture include Epstein-Barr virus, rubella virus (must order serology), West Nile virus, human papillomavirus, Norwalk virus, or norovirus.

Reference Values

Negative

If positive, virus is identified.

Interpretation

A positive result indicates that virus was present in the specimen submitted. Clinical correlation is necessary to determine the significance of this finding.

Negative results may be seen in a number of situations including absence of viral disease, inability of the virus to grow in culture (examples of organisms not detected by this culture test include Epstein-Barr virus, rubella virus, papilloma, and Norwalk virus), and nonviable organisms submitted.

For patients with diarrhea, see [Parasitic Investigation of Stool Specimens Algorithm](#) in Special Instructions for other diagnostic tests that may be useful.

Cautions

Viral isolation and detection depend on the proper collection and transport of the specimen.

Some viruses (eg, cytomegalovirus) take up to 2 weeks to grow in viral cell culture. Molecular tests (ie, real-time polymerase chain reaction) should be used for rapid diagnosis.

Clinical Reference

1. Clinical and Laboratory Standards Institute. Viral Culture. Proposed Guideline. CLSI document M41-P. Clinical and Laboratory Standards Institute; 2005
2. Ginocchio CC, Harris PC: Reagents, stains, and cell culture: Virology. In: Versalovic J, Carroll KC, et al, eds. Manual of Clinical Microbiology. 10th ed. ASM Press; 2011:1289-1296

Performance**Method Description**

Specimens are inoculated into conventional tube cell cultures (MRC-5 and RMK) and observed for the presence of cytopathic effects (CPE) over a 14-day period. Results of viral cultures are reported when typical CPE are detected and the identity of the isolate has been confirmed by immunofluorescence with specific antisera. (Smith TF: Antibody-enhanced detection of viruses in cell cultures. In: Rose NR, de Macario EC, Folds JD, et al, eds. Manual of Clinical Laboratory Immunology. 5th ed. ASM Press; 1997:618-624; Murray PR, Rosenthal KS, Pfaller MA. Laboratory diagnosis of viral disease. In: Medical Microbiology. 9th ed. Elsevier; 2021:396-402)

The shell-vial assay is also performed on specimens submitted for cytomegalovirus or herpes simplex virus. Shell-vial results may be positive in 16 to 24 hours postinoculation. (Paya CV, Wold AD, Smith TF: Detection of cytomegalovirus infections in specimens other than urine by the shell vial assay and conventional tube cell cultures. J Clin Microbiol. 1987;25:755-757; Murray PR, Rosenthal KS, Pfaller MA. Laboratory diagnosis of viral disease. In: Medical Microbiology. 9th ed. Elsevier; 2021:396-402)

PDF Report

No

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees & Codes

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

87252-Viral culture, non-respiratory

87176-Tissue processing (if appropriate)

87253-Additional testing virus, identification (if appropriate)

87254-Viral smear, shell vial (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
VIRNR	Viral Culture, Non Respiratory	6584-7

Result ID	Reporting Name	LOINC®
VIRNR	Viral Culture, Non Respiratory	6584-7