## Overview

### Useful For
First preferred test for screening for catecholamine-secreting tumors in a random urine specimen when requesting both homovanillic acid and vanillylmandelic acid

Supporting a diagnosis of neuroblastoma

Monitoring patients with a treated neuroblastoma

### Highlights
Homovanillic acid (HVA) and vanillylmandelic acid (VMA) measurements in urine are used for screening children for catecholamine-secreting tumors such as neuroblastoma, pheochromocytoma, and other neural crest tumors and monitoring those who have had treatment for these tumors.

HVA measurement is also useful to diagnose children with disorders of catecholamine metabolism such as monoamine oxidase-A deficiency and dopamine beta-hydroxylase deficiency, which results in decreased or elevated urinary HVA values, respectively.

VMA is not the analyte of choice for diagnosis of pheochromocytoma, which is better detected by testing for metanephrines.

Treatment with L-dopa can impact test results and should be discontinued 24 hours prior to collection. Bactrim can impact test results and should be noted at time of collection.

### Method Name
Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

### NY State Available
Yes

## Specimen

### Specimen Type
Urine

### Advisory Information
In the past, this test has been used to screen for pheochromocytoma. However, vanillylmandelic acid (VMA) is not the analyte of choice to rule out a diagnosis of pheochromocytoma. Recommended tests for that purpose include:

- PMET / Metanephrines, Fractionated, Free, Plasma
- METAF / Metanephrines, Fractionated, 24 Hour, Urine
- CATU / Catecholamine Fractionation, Free, 24 Hour, Urine

### Necessary Information
1. Patient's age is required.
2. All patients receiving L-dopa should be identified to the laboratory when vanillylmandelic acid (VMA) and homovanillic acid (HVA) tests are ordered.

3. Bactrim may interfere with detection of the analyte. All patients taking Bactrim should be identified to the laboratory when VMA and HVA tests are ordered.

**Specimen Required**

**Patient Preparation:** Administration of L-dopa may falsely increase homovanillic acid and vanillylmandelic acid results; it should be discontinued 24 hours prior to and during collection of specimen.

**Supplies:** Urine Tubes, 10 mL (T068)

**Specimen Volume:** 5 mL

**Collection Instructions:**

1. Collect a random urine specimen.

2. Adjust urine pH to 1 to 5 with 50% acetic or hydrochloric acid.

**Forms**

*If not ordering electronically, complete, print, and send an Oncology Test Request* (T729) with the specimen.

**Specimen Minimum Volume**

2 mL

**Reject Due To**

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

**Specimen Stability Information**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
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<tbody>
<tr>
<td>Urine</td>
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**Clinical and Interpretive**

**Clinical Information**

Elevated values of homovanillic acid (HVA), vanillylmandelic acid (VMA), and other catecholamine metabolites (eg, dopamine) may be suggestive of the presence of a catecholamine-secreting tumor (eg, neuroblastoma, pheochromocytoma, or other neural crest tumors). HVA and VMA levels may also be useful in monitoring patients who have been treated as a result of the above-mentioned tumors. HVA levels may also be altered in disorders of catecholamine metabolism: monamine oxidase-A deficiency can cause decreased urinary HVA values, while a deficiency of dopamine beta-hydrolase (the enzyme that converts dopamine to norepinephrine) can cause elevated urinary HVA values.

**Reference Values**
VANILLYLMANDELIC ACID

<1 year: <25.0 mg/g creatinine
1 year: <22.5 mg/g creatinine
2-4 years: <16.0 mg/g creatinine
5-9 years: <12.0 mg/g creatinine
10-14 years: <8.0 mg/g creatinine
> or =15 years: <7.0 mg/g creatinine

HOMOVANILIC ACID

<1 year: <35.0 mg/g creatinine
1 year: <30.0 mg/g creatinine
2-4 years: <25.0 mg/g creatinine
5-9 years: <15.0 mg/g creatinine
10-14 years: <9.0 mg/g creatinine
> or =15 years: <8.0 mg/g creatinine

**Interpretation**

Homovanillic acid (HVA) and vanillylmandelic acid (VMA) concentrations are elevated in more than 90% of patients with neuroblastoma; both tests should be performed. A positive test could be due to a genetic or nongenetic condition. Additional confirmatory testing is required.

A normal result does not exclude the presence of a catecholamine-secreting tumor.

Elevated HVA and VMA values are suggestive of a pheochromocytoma, but they are not diagnostic.

**Cautions**

No significant cautionary statements

**Clinical Reference**


Performance

Method Description

Homovanillic acid (HVA) is measured by solid-phase extraction (SPE) of a 1-mL aliquot of urine. A known amount of stable isotope-labeled HVA internal standard (IS) is added to each urine specimen prior to SPE. HVA and IS are eluted from the SPE column with methanol. The methanol is evaporated and the HVA and IS are redissolved in liquid chromatography tandem-mass spectrometry (LC-MS/MS) mobile phase. A portion of this prepared extract is injected onto a LC column that separates HVA and IS from the bulk of any remaining specimen matrix. The HVA and IS are measured by mass spectrometry/tandem-mass spectrometry using the selected reaction monitoring mode. HVA is quantified using the ratio to IS versus urine calibrators. (Magera MJ, Stoor A, Helgeson JK, et al: Determination of homovanillic acid in urine by stable isotope dilution and electrospray tandem mass spectrometry. Clin Chim Acta 2001;306:35-41)

Vanillylmandelic acid (VMA) is measured by solid-phase extraction (SPE) of a 1-mL aliquot of urine. A known amount of stable isotope-labeled VMA (IS) is added to each urine specimen prior to SPE. VMA and IS are eluted from the SPE column with methanol. The methanol is evaporated and the VMA and IS are redissolved in LC-MS/MS mobile phase. A portion of this prepared extract is injected onto a LC column that separates VMA and IS from the bulk of any remaining specimen matrix. The VMA and IS are measured by MS/MS using the selected reaction monitoring mode. VMA is quantified using the ratio to IS versus urine calibrators. (Magera MJ, Thompson AL, Stoor AL, et al: Determination of vanillylmandelic acid in urine by stable isotope dilution and electrospray tandem mass spectrometry. Clin Chem 2003;49:825-826)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday, Thursday; 8 a.m.

Analytic Time

2 days (not reported on Sunday)

Maximum Laboratory Time

4 days

Specimen Retention Time

7 days

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. For assistance, contact Customer Service.
Test Definition: VH
VMA and HVA, Random, U

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 U.S. Food and Drug Administration.

CPT Code Information
83150-HVA
84585-VMA

LOINC® Information

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<th>Order LOINC Value</th>
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