Test Definition: DHVD

1,25-Dihydroxyvitamin D, Serum

Overview

Useful For

Evaluation of selected patients with disorders of calcium and phosphate metabolism

Evaluation of chronic kidney disease with suspected abnormalities of vitamin D metabolism

Investigation of suspected hereditary disorders of vitamin D metabolism, including vitamin D-dependent rickets

Evaluation of parathyroid hormone-independent hypercalcemia, particularly when granulomatous disease, lymphoma, or CYP24A1 deficiency is suspected

As a second-line test following measurement of 25-hydroxyvitamin D when clinically indicated

Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

The 25-hydroxyvitamin D test (25HDN / 25-Hydroxyvitamin D2 and D3, Serum) in serum is the preferred initial test for assessing vitamin D status and most accurately reflects the body's vitamin D stores. In the presence of renal disease or hypercalcemia, testing of 1,25-dihydroxy vitamin D (DHVD) may be needed to adequately assess vitamin D status.

Specimen Required

Patient Preparation:
Fasting: 4 hours, preferred but not required
Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 1.5 mL Serum
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-General Request (T239)
-Renal Diagnostics Test Request (T830)

Specimen Minimum Volume

Serum: 0.7 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	30 days	
	Ambient	7 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Vitamin D is a generic designation for a group of fat-soluble, structurally similar steroids which act as hormones. Vitamin D is obtained through dietary intake as ergocalciferol (vitamin D2) or cholecalciferol (vitamin D3) and is also synthesized in the skin following ultraviolet light exposure. Both forms are converted in the liver by CYP2R1 to 25-hydroxyvitamin D (25HDN), the major circulating form and the best indicator of total body vitamin D stores.

The biologically active hormone, 1,25-dihydroxyvitamin D (DHVD), is produced primarily in the kidneys by 1alpha-hydroxylation of 25HDN through CYP27B1. Renal production is tightly regulated by parathyroid hormone (PTH), serum calcium and phosphate concentrations, and fibroblast growth factor-23. DHVD promotes intestinal calcium and phosphate absorption, as well as renal calcium and phosphate reabsorption resulting in a net positive calcium balance that supports skeletal mineralization and suppresses PTH synthesis. In addition to its effects on calcium and bone metabolism, DHVD regulates the expression of a multitude of genes in many other tissues including immune cells, muscle, vasculature, and reproductive organs.

Measurement of 25-hydroxyvitamin D is the preferred laboratory test for assessment of vitamin D status because it most accurately reflects total body vitamin D stores. Measurement of DVHD should be reserved for selected clinical situations involving disorders of calcium metabolism, chronic kidney disease, hereditary disorders of vitamin D metabolism, granulomatous disease, lymphoma, or unexplained hypercalcemia. DVHD levels are decreased in hypoparathyroidism and in chronic renal failure. DHVD levels may be high in primary hyperparathyroidism and in physiologic hyperparathyroidism secondary to low calcium or vitamin D intake or absorption. Some patients with granulomatous diseases (eg, sarcoidosis) and malignancies containing nonregulated 1-alpha hydroxylase in the lesion

might have hypercalcemia that appears vitamin D mediated with normal or high serum phosphate (hyperphosphatemia) and hypercalcemia (both of which might be severe) in addition to low PTH and absent parathyroid hormone-related peptide (PTHRP). Assessment of 24,25-dihydroxyvitamin D might also be required in patients with hypercalcemia that does not appear to be driven by PTH or PTHRP and may be helpful in assessment of patients with loss of function inactivating CYP24A1 mutations.

Reference Values

Males:
<16 years: 24-86 pg/mL
> or =16 years: 18-64 pg/mL

Females:
<16 years: 24-86 pg/mL
> or =16 years: 18-78 pg/mL

For International System of Units (SI) conversion for Reference Values, see
www.mayocliniclabs.com/order-tests/si-unit-conversion.html

Interpretation

Decreased concentrations are observed in:
-Chronic kidney disease
-Hypoparathyroidism
-Hereditary deficiency of renal CYP27B1 (vitamin D-dependent rickets type 1)

Increased concentrations are observed in:
-Primary hyperparathyroidism
-Secondary hyperparathyroidism
-Granulomatous diseases (eg, sarcoidosis)
-Certain lymphomas
-Rare disorders with increased extrarenal CYP27B1 activity

Normal or low 1,25-dihydroxyvitamin D (DVHD) concentrations do not exclude vitamin D intoxication because circulating DHVD concentrations remain under physiologic regulation despite markedly elevated 25-hydroxyvitamin D concentrations.

Cautions

No significant cautionary statements.

Clinical Reference

1 Demay MB, Pittas AG, Bikle DD, et al. Vitamin D for the Prevention of Disease: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab. 2024;109(8):1907-1947. doi:10.1210/clinem/dgae290
2. Institute of Medicine (US) Committee to Review Dietary Reference Intakes for Vitamin D and Calcium. In: Ross AC, Taylor CL, Yaktine AL, Del Valle HB, eds.Washington, Dietary Reference Intakes for Calcium and Vitamin D. National Academies Press: 2011. Available at www.ncbi.nlm.nih.gov/books/NBK56070.
3. Vitamin D-Fact Sheet for Health Professionals. US Department of Health and Human Services, National Institutes of Health. Updated June 27, 2025. Accessed September 15, 2026. Available at

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5. Strathmann FG, Laha TJ, Hoofnagle AN. Quantification of 1a,25-dihydroxy vitamin D by immunoextraction and liquid chromatography-tandem mass spectrometry. Clin Chem. 2011;57(9):1279-1285. doi:10.1373/clinchem.2010.161174
6. Herrmann M. Assessing vitamin D metabolism - four decades of experience. Clin Chem Lab Med. 2023;61(5):880-894. doi:10.1515/cclm-2022-1267
7. Biancuzzo RM, Clarke N, Reitz RE, Travison TG, Holick MF. Serum concentrations of 1,25-dihydroxyvitamin D2 and 1,25-dihydroxyvitamin D3 in response to vitamin D2 and vitamin D3 supplementation. J Clin Endocrinol Metab. 2013;98(3):973-9. doi:10.1210/jc.2012-2114
8. Shah AD, Hsiao EC, O'Donnell B, et al. Maternal Hypercalcemia Due to Failure of 1,25-Dihydroxyvitamin-D3 Catabolism in a Patient With CYP24A1 Mutations. J Clin Endocrinol Metab. 2015;100(8):2832-2836. doi:10.1210/jc.2015-1973

Performance

Method Description
Deuterated isotopically labeled 1,25-dihydroxyvitamin D2 and D3 are added to the sample as internal standards. 1,25-Dihydroxyvitamin D2 and D3 and the internal standards are extracted using immunopurification. Extracts are then derivatized and analyzed by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
2 to 5 days

Specimen Retention Time
2 weeks

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

Fees & 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 account representative. For assistance, contact Customer Service.

Test Definition: DHVD

1,25-Dihydroxyvitamin D, Serum

Test Classification

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

CPT Code Information

82652

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
DHVD	1,25-Dihydroxyvitamin D, S	62290-2

Result ID	Test Result Name	Result LOINC® Value
8822	1,25-Dihydroxyvitamin D, S	62290-2