



Vitamin D Testing

LOB(s): <input checked="" type="checkbox"/> Commercial <input checked="" type="checkbox"/> Medicare <input checked="" type="checkbox"/> Medicaid	State(s): <input checked="" type="checkbox"/> Idaho <input checked="" type="checkbox"/> Montana <input checked="" type="checkbox"/> Oregon <input checked="" type="checkbox"/> Washington <input type="checkbox"/> Other: <input checked="" type="checkbox"/> Oregon <input type="checkbox"/> Washington
--	---

Enterprise Policy

PacificSource is committed to assessing and applying current regulatory standards, widely-used treatment guidelines, and evidenced-based clinical literature when developing clinical criteria for coverage determination. Each policy contains a list of sources (references) that serves as the summary of evidence used in the development and adoption of the criteria. The evidence was considered to ensure the criteria provide clinical benefits that promote patient safety and/or access to appropriate care. Each clinical policy is reviewed, updated as needed, and readopted, at least annually, to reflect changes in regulation, new evidence, and advancements in healthcare.

Clinical Guidelines are written when necessary to provide guidance to providers and members in order to outline and clarify coverage criteria in accordance with the terms of the Member's policy. This Clinical Guideline only applies to PacificSource Health Plans, PacificSource Community Health Plans, and PacificSource Community Solutions in Idaho, Montana, Oregon, and Washington. Because of the changing nature of medicine, this list is subject to revision and update without notice. This document is designed for informational purposes only and is not an authorization or contract. Coverage determinations are made on a case-by-case basis and subject to the terms, conditions, limitations, and exclusions of the Member's policy. Member policies differ in benefits and to the extent a conflict exists between the Clinical Guideline and the Member's policy, the Member's policy language shall control. Clinical Guidelines do not constitute medical advice nor guarantee coverage.

Background

Vitamin D is a fat-soluble vitamin that performs an important role in calcium homeostasis and bone metabolism and also affects many other cellular regulatory functions outside the skeletal system. Vitamin D requirements may vary by individual; thus, no one serum vitamin D level cut point defines deficiency, and no consensus exists regarding the precise serum levels of vitamin D that represent optimal health or sufficiency.

Serum 25-OHD is the best index for vitamin D status; while serum 1,25-OH(2)D provides no information about vitamin D status and is often normal or even increased as the result of secondary hyperparathyroidism associated with vitamin D deficiency. The lower limit of normal 25-OHD levels is dependent on the geographical location and sunlight exposure of the reference population (range of 8 to 15 ng/ml). Moreover, there is no consensus on the optimal 25-OHD concentration for skeletal or extra-skeletal health.

Criteria

Commercial

PacificSource considers Vitamin D testing medically necessary for the below ICD-10 diagnosis codes:

A15.0 - A19.9	Tuberculosis
A28.1	Cat-scratch disease

A30.0 - A30.9	Leprosy
A32.9	Listeriosis, unspecified [<i>listeria monocytogenes</i>]
B20	Human immunodeficiency virus [HIV] disease [medications known to reduce vitamin D]
B38.0 - B38.89	Coccidioidomycosis
B39.0 - B39.9	Histoplasmosis
B45.0 - B45.9	Cryptococcosis
B59	Pneumocystosis
B65.0 - B65.9	Schistosomiasis
C82.01 - C82.99	Follicular lymphoma
D80.0 – D80.9	Immunodeficiency with predominantly antibody defects
D86.0 - D86.9	Sarcoidosis
D89.810 - D89.84	Other specified disorders involving the immune mechanism, not elsewhere classified
E05.00 - E05.91	Thyrotoxicosis [hyperthyroidism]
E20 – E20.9	Hypoparathyroidism
E21.0 - E21.3	Hyperparathyroidism
E41 – E43	Nutritional marasmus
E55.0 - E55.9	Vitamin D deficiency
E63.9	Nutritional deficiency, unspecified
E64.3	Sequelae of rickets
E66.01 - E66.9	Overweight and obesity [pre-bariatric surgery]
E67.3 - E67.8	Other hyperalimentation
E83.30 - E83.39	Disorders of phosphorus metabolism and phosphatases
E83.50 - E83.52	Disorders of calcium metabolism
E84.0 - E84.9	Cystic fibrosis
E89.2	Postprocedural hypoparathyroidism
E89.820 - E89.823	Postprocedural hematoma and seroma of an endocrine system organ or structure
G40.001 - G40.919	Epilepsy and recurrent seizures [medications known to reduce vitamin D]
I00 - I01.9	Rheumatic fever without/with heart involvement
J63.2	Berylliosis
K50.00 - K51.919	Crohn's disease and ulcerative colitis
K52.0	Gastroenteritis and colitis due to radiation
K70.20 - K70.41	Alcoholic cirrhosis of liver and alcoholic hepatic failure
K71.10 - K71.11	Toxic liver disease with hepatic necrosis
K71.7	Toxic liver disease with fibrosis and cirrhosis of liver
K72.00 -K72.91	Hepatic failure
K74.0 - K74.5	Hepatic fibrosis
K74.60 - K74.69	Other and unspecified cirrhosis of liver
K76.9	Liver disease, unspecified

K83.5 - K83.8	Biliary cyst
K85.00 - K85.32	Other specified diseases of biliary tract
K85.80 - K85.92	Acute pancreatitis
K86.0 - K86.89	Other diseases of pancreas
K90.0 - K90.41	Intestinal malabsorption
K90.821 - K90.9	Other intestinal malabsorption
K91.2	Postsurgical malabsorption, not elsewhere classified
K91.82	Postprocedural hepatic failure
L40.0 - L40.9	Psoriasis
L92.0 - L92.9	Granulomatous disorders of skin and subcutaneous tissue
M05.00 - M06.9	Rheumatoid arthritis with rheumatoid factor
M80.00xA - M81.8	Osteoporosis with/without current pathological fracture
M83.0 - M83.9	Adult osteomalacia
M85.80 - M85.88	Other specified disorders of bone density and structure
M88	Metabolic bone disease
N04.0 - N04.9	Nephrotic syndrome
N18.1 - N18.9	Chronic kidney disease (CKD)
N20.0 - N20.9	Calculus of kidney and ureter
N22	Calculus of urinary tract in diseases classified elsewhere
N25.0	Renal osteodystrophy
N25.81	Secondary hyperparathyroidism of renal origin
Q78.2	Osteopetrosis
Z21	Asymptomatic human immunodeficiency virus [HIV] infection status [medications known to reduce vitamin D]
Z68.30 - Z68.45	Body mass index [BMI]
Z79.3 - Z79.69	Long term (current) drug therapy
Z94.0 - Z94.9	Transplanted organ and tissue status [medications known to reduce vitamin D]
Z98.84	Bariatric surgery status

Note:

- Vitamin D testing utilizing both CPT® 82306 and CPT® 82652 in combination is not covered or reimbursable.
- Vitamin D testing (CPT® 82306) more frequently than twice in 12 rolling months is not covered or reimbursable for any diagnosis other than chronic kidney disease (CKD), intestinal malabsorption, any diagnosis where the member is receiving Medical Food (per Nutritional Support and Supplies policy), or Vitamin D supplementation of 50,000U or greater.
- Vitamin D testing is Not covered as a part of routine screening

Medicaid

PacificSource Community Solutions follows Oregon Administrative Rules OAR(s) 410-141-3820 to 3830 and 410-151-0000 to 410-151-0003 for coverage of Vitamin D Testing.

PacificSource Community Solutions (PCS) follows the Oregon Health Plan (OHP) Diagnostic Procedure Codes (Procedure Group 1119) for codes 82306 and 82652 for coverage of Vitamin D Testing.

Medicare

PacificSource Medicare follows Article A57719 and Local Coverage Determination (LCD) L34051 for coverage of Vitamin D Testing.

Experimental/Investigational/Unproven

PacificSource considers Vitamin D Testing to be experimental, investigational, or unproven for any indication not listed above

PacificSource considers Vitamin D testing more frequently than twice in 12 rolling months to be experimental, investigational, or unproven for any diagnosis not listed above

Coding Information

The following list of codes are for informational purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement

0038U Vitamin D, 25 hydroxy D2 and D3, by LC-MS/MS, serum microsample, quantitative

82306 Vitamin D; 25 hydroxy, includes fraction(s), if performed

82652 Vitamin D; 1, 25 dihydroxy, includes fraction(s), if performed

CPT® codes, descriptions and materials are copyrighted by the American Medical Association (AMA).

Related Policies

Nutritional Support and Supplies

References

Ahn J, Peters U, Albanes D, et al.; Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial Project Team. Serum vitamin D concentration and prostate cancer risk: A nested case-control study. *J Natl Cancer Inst.* 2008;100(11):796-804.

Aibana O, Huang CC, Aboud S, et al. Vitamin D status and risk of incident tuberculosis disease: A nested case-control study, systematic review, and individual-participant data meta-analysis. *PLoS Med.* 2019;16(9):e1002907.

Allan GM, Cranston L, Lindblad A, et al. Vitamin D: A narrative review examining the evidence for ten beliefs. *J Gen Intern Med.* 2016;31(7):780-791.

Al-Maweri SA, Halboub E, Al-Sufyani G, et al. Is vitamin D deficiency a risk factor for recurrent aphthous stomatitis? A systematic review and meta-analysis. *Oral Dis.* 2020;26(6):1116-1123.

American Society for Clinical Pathology. Don't perform population-based screening for 25-OH-Vitamin D deficiency. *Choosing Wisely.* Philadelphia, PA; ABIM Foundation; February 21, 2013.

<https://www.ascp.org/content/docs/default-source/get-involved-pdfs/20-things>

Arab A, Hadi A, Moosavian SP, et al. The association between serum vitamin D, fertility and semen quality: A systematic review and meta-analysis. *Int J Surg*. 2019;71:101-109.

Aspray TJ, Bowring C, Fraser W, et al; National Osteoporosis Society. National Osteoporosis Society vitamin D guideline summary. *Age Ageing*. 2014;43(5):592-595.

Aung, K., & Htay, T. (2021). USPSTF found insufficient evidence on benefits and harms of screening for vitamin D deficiency in asymptomatic adults. *Annals of internal medicine*, 174(9), JC100. <https://doi.org/10.7326/ACPJ202109210-100>

Bakhshaiesh TO, Nazeri E, Jafarbeik-Iravani N, et al. Vitamin D and breast cancer risk: A systematic review and meta-analysis in Iranian patients. *Ann Med Surg (Lond)*. 2022;80:104162.

Bertone-Johnson ER. Vitamin D and breast cancer. *Ann Epidemiol*. 2009;19(7):462-467.

Bignardi PR, de Andrade Castello P, de Matos Aquino B, Delfino VDA. Is the vitamin D status of patients with COVID-19 associated with reduced mortality? A systematic review and meta-analysis. *Arch Endocrinol Metab*. 2023;67(2):276-288.

Bowman K, Jones L, Pilling LC, et al. Vitamin D levels and risk of delirium: A mendelian randomization study in the UK Biobank. *Neurology*. 2019;92(12):e1387-e1394.

Briot K, Audran M, Cortet B, et al. Vitamin D: Skeletal and extra skeletal effects; recommendations for good practice. *Presse Med*. 2009;38(1):43-54.

Carroll MF, Schade DS. A practical approach to hypercalcemia. *Am Fam Physician*. 2003;67(9):1959-1966.

Cesareo R, Attanasio R, Caputo M, et al; AME and Italian AACE Chapter16. Italian Association of Clinical Endocrinologists (AME) and Italian Chapter of the American Association of Clinical Endocrinologists (AACE) Position Statement: Clinical management of vitamin D deficiency in adults. *Nutrients*. 2018;10(5).

Chandra P, Binongo JN, Ziegler TR, et al. Cholecalciferol (vitamin D3) therapy and vitamin D insufficiency in patients with chronic kidney disease: A randomized controlled pilot study. *Endocr Pract*. 2008;14(1):10-17.

Chlebowski RT, Johnson KC, Kooperberg C, et al; Women's Health Initiative Investigators. Calcium plus vitamin D supplementation and the risk of breast cancer. *J Natl Cancer Inst*. 2008;100(22):1581-1591.

Chung M, Balk EM, Brendel M, et al. Vitamin D and calcium: A systematic review of health outcomes. Evidence Report No. 183. (Prepared by the Tufts Evidence-based Practice Center under Contract No. HHS 290-2007-10055-I). AHRQ Publication No. 09-E015. Rockville, MD: Agency for Healthcare Research and Quality. August 2009.

Cranney A, Weiler HA, O'Donnell S, Puil L. Summary of evidence-based review on vitamin D efficacy and safety in relation to bone health. *Am J Clin Nutr*. 2008;88(2):513S-519S.

Cui X, Zhai Y, Wang S, et al. Effect of the COVID-19 pandemic on serum vitamin D levels in people under age 18 years: A systematic review and meta-analysis. *Med Sci Monit*. 2022;28:e935823.

Dissanayake HA, de Silva NL, Sumanatilleke M, et al. Prognostic and therapeutic role of vitamin D in COVID-19: Systematic review and meta-analysis. *J Clin Endocrinol Metab*. 2022;107(5):1484-1502.

Duque G, Demontiero O, Troen BR. Prevention and treatment of senile osteoporosis and hip fractures. *Minerva Med*. 2009;100(1):79-94.

El-Hamd MA, El Taieb MA, Ibrahim HM, Aly SS. Vitamin D levels in acne vulgaris patients treated with oral isotretinoin. *J Cosmet Dermatol*. 2019;18(1):16-20.

Endocrine Society/American Association of Clinical Endocrinologists. (2013, December 19). Don't routinely measure 1,25-dihydroxyvitamin D unless the patient has hypercalcemia or decreased kidney function. <https://www.aafp.org/pubs/afp/collections/choosing-wisely/140.html>

Fisher SA, Rahimzadeh M, Brierley C, et al. The role of vitamin D in increasing circulating T regulatory cell numbers and modulating T regulatory cell phenotypes in patients with inflammatory disease or in healthy volunteers: A systematic review. *PLoS One*. 2019;14(9):e0222313.

Fogacci S, Fogacci F, Banach M, et al; Lipid and Blood Pressure Meta-analysis Collaboration (LBPMC) Group. Vitamin D supplementation and incident preeclampsia: A systematic review and meta-analysis of randomized clinical trials. *Clin Nutr*. 2020;39(6):1742-1752.

Freedman DM, Chang, S, Falk RT, et al. Serum levels of vitamin D metabolites and breast cancer risk in the prostate, lung, colorectal, and ovarian cancer screening trial. *Cancer Epidemiol Biomarkers Prev*. 2008;17(4):889–894.

Gan J, Galer P, Ma D, et al. The effect of vitamin D supplementation on attention-deficit/hyperactivity disorder: A systematic review and meta-analysis of randomized controlled trials. *J Child Adolesc Psychopharmacol*. 2019;29(9):670-687.

Gandini S, Raimondi S, Gnagnarella P, et al. Vitamin D and skin cancer: A meta-analysis. *Eur J Cancer*. 2009;45(4):634-641.

Gillespie LD, Robertson MC, Gillespie WJ, et al. Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev*. 2009;(2):CD007146.

Gissel T, Rejnmark L, Mosekilde L, Vestergaard P. Intake of vitamin D and risk of breast cancer -- a meta-analysis. *J Steroid Biochem Mol Biol*. 2008;111(3-5):195-199.

Goodwin PJ, Ennis M, Pritchard KI, et al. Prognostic effects of 25-hydroxyvitamin D levels in early breast cancer. *J Clin Oncol*. 2009;27(23):3757-3763.

Gralow JR, Biermann JS, Farooki A, et al. NCCN task force report: Bone health in cancer care. *J Natl Compr Canc Netw*. 2009;7 Suppl 3:S1-S32; quiz S33-S35.

Grant WB. Does vitamin D reduce the risk of dementia? *J Alzheimers Dis*. 2009;17(1):151-159.

Hayes, Inc. Vitamin D screening and testing. Final Evidence Report. Prepared by Hayes, Inc. for the Washington State Health Care Authority. Olympia, WA: Washington State Healthcare Authority; November 16, 2012.

Health Quality Ontario. Clinical utility of vitamin D testing. An evidence-based analysis. *Ont Health Technol Assess Ser*. 2010;10(2):1-93.

Holick MF. Vitamin D for health and in chronic kidney disease. *Semin Dial*. 2005;18(4):266-275.

Holick MF. Vitamin D status: Measurement, interpretation, and clinical application. *Ann Epidemiol*. 2009;19(2):73-78.

Homer CS, Oats J, Middleton P, et al. Updated clinical practice guidelines on pregnancy care. *Med J Aust*. 2018;209(9):409-412.

Hu YC, Wang WW, Jiang WY, et al. Low vitamin D levels are associated with high viral loads in patients with chronic hepatitis B: A systematic review and meta-analysis. *BMC Gastroenterol*. 2019;19(1):84.

Huncharek M, Muscat J, Kupelnick B. Colorectal cancer risk and dietary intake of calcium, vitamin D, and dairy products: A meta-analysis of 26,335 cases from 60 observational studies. *Nutr Cancer*. 2009;61(1):47-69.

Huncharek M, Muscat J, Kupelnick B. Dairy products, dietary calcium and vitamin D intake as risk factors for prostate cancer: A meta-analysis of 26,769 cases from 45 observational studies. *Nutr Cancer*. 2008;60(4):421-441.

Inzucchi SE, Lupsa B. Clinical presentation, diagnosis, and initial evaluation of diabetes mellitus in adults. UpToDate [online serial], Waltham, MA: UpToDate; reviewed July 2023.

Ismailova K, Poudel P, Parlesak A, et al. Vitamin D in early life and later risk of multiple sclerosis -- A systematic review, meta-analysis. *PLoS One*. 2019;14(8):e0221645.

Janssens W, Lehouck A, Carremans C, et al. Vitamin D beyond bones in chronic obstructive pulmonary disease: Time to act. *Am J Respir Crit Care Med*. 2009;179(8):630-636.

Jia J, Hu J, Huo X, et al. Effects of vitamin D supplementation on cognitive function and blood A β -related biomarkers in older adults with Alzheimer's disease: A randomised, double-blind, placebo-controlled trial. *J Neurol Neurosurg Psychiatry*. 2019;90(12):1347-1352.

Jorde R, Figenschau Y, Emaus N, et al. Serum 25-hydroxyvitamin d levels are strongly related to systolic blood pressure but do not predict future hypertension. *Hypertension*. 2010;55(3):792-798.

Kahwati LC, LeBlanc E, Weber RP, et al. Screening for vitamin D deficiency in adults: Updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. 2021;325(14):1443-1463.

Kawahara T, Suzuki G, Mizuno S, et al. Effect of active vitamin D treatment on development of type 2 diabetes: DPVD randomised controlled trial in Japanese population. *BMJ*. 2022;377:e066222.

KDIGO-CKD-MBD-GL-Update.pdf. KDIGO 2017 Clinical Practice Guideline. (2017). <https://kdigo.org/wp-content/uploads/2017/02/2017-KDIGO-CKD-MBD-GL-Update.pdf>

Knight JA, Lesosky M, Barnett H, et al. Vitamin D and reduced risk of breast cancer: A population-based case-control study. *Cancer Epidemiol Biomarkers Prev*. 2007;16(3):422-429.

Kooienga L, Fried L, Scragg R, et al. The effect of combined calcium and vitamin D3 supplementation on serum intact parathyroid hormone in moderate CKD. *Am J Kidney Dis*. 2009;53(3):408-416.

Kramer, H., Berns, J., & Choi, M. (2014). 25-hydroxyvitamin D testing and supplementation in CKD. *American Journal of Kidney Disease*. <https://www.kidney.org/sites/default/files/Vitamin-D-Supplementation-Patients-With-CKD.pdf>

Krist, A. H., Davidson, K. W., Mangione, C. M., Cabana, M., Caughey, A. B., Davis, E. M., Donahue, K. E., Doubeni, C. A., Epling, J. W., Kubik, M., Li, L., Ogedegbe, G., Owens, D. K., Pbert, L., Silverstein, M., Stevermer, J., Tseng, C. W., & Wong, J. B. (2021). Screening for Vitamin D Deficiency in Adults: US Preventive Services Task Force Recommendation Statement. *JAMA - Journal of the American Medical Association*, 325(14), 1436-1442. <https://doi.org/10.1001/jama.2021.3069>

Kushner RF, Cummings S, Herron DM. Bariatric surgery: Postoperative nutritional management. UpToDate [online serial]. Waltham, MA: UpToDate; reviewed October 2018.

Larsson SC, Flicker L. Vitamin D: A novel protective factor for delirium? *Neurology*. 2019;92(12):553-554.

Lee DM, Tajar A, Ulubaev A, et al; EMAS study group. Association between 25-hydroxyvitamin D levels and cognitive performance in middle-aged and older European men. *J Neurol Neurosurg Psychiatry*. 2009;80(7):722-729.

Li H, Stampfer MJ, Hollis JB, et al. A prospective study of plasma vitamin D metabolites, vitamin D receptor polymorphisms, and prostate cancer. *PLoS Med*. 2007;4(3):e103.

Lorenzo Sellares V, Torregrosa V. Changes in mineral metabolism in stage 3, 4, and 5 chronic kidney disease (not on dialysis). *Nefrologia*. 2008;28 Suppl 3:67-78.

Machado V, Lobo S, Proença L, et al. Vitamin D and periodontitis: A systematic review and meta-analysis. *Nutrients*. 2020;12(8):2177.

Mahoney MC, Bevers T, Linos E, Willett WC. Opportunities and strategies for breast cancer prevention through risk reduction. *CA Cancer J Clin*. 2008;58(6):347-371.

McCullough ML, Bandera EV, Moore DF, Kushi LH. Vitamin D and calcium intake in relation to risk of endometrial cancer: A systematic review of the literature. *Prev Med*. 2008;46(4):298-302.

Mires S, Caputo M, Overton T, Skerritt C. Maternal micronutrient deficiency and congenital heart disease risk: A systematic review of observational studies. *Birth Defects Res*. 2022;114(17):1079-1091.

Mishra P, Parveen R, Bajpai R, Agarwal N. Vitamin D deficiency and comorbidities as risk factors of COVID-19 infection: A systematic review and meta-analysis. *J Prev Med Public Health*. 2022;55(4):321-333.

Mowry EM, Azevedo CJ, McCulloch CE, et al. Body mass index, but not vitamin D status, is associated with brain volume change in MS. *Neurology*. 2018;91(24):e2256-e2264.

National Comprehensive Cancer Network (NCCN). Breast cancer. NCCN Clinical Practice Guidelines in Oncology, Version 3.2018. Fort Washington, PA: NCCN; 2018.

National Comprehensive Cancer Network (NCCN). Breast cancer screening and diagnosis. NCCN Clinical Practice Guidelines in Oncology, Version 3.2018. Fort Washington, PA: NCCN; 2018.

National Kidney Foundation (NKF). Clinical practice guidelines for bone metabolism and disease in chronic kidney disease. Guideline 7: Prevention and treatment of vitamin D deficiency in CKD patients. New York, NY: NKF; 2004. Available at: http://www.kidney.org/professionals/KDOQI/guidelines_bone/Guide7.htm . Accessed August 21, 2009.

Newberry SJ, Chung M, Shekelle PG, et al. Vitamin D and calcium: A systematic review of health outcomes (update). Evidence report/technology assessment No. 217 prepared by the Southern California Evidence-based Practice Center under contract No. 290- 2012-00006-I. AHRQ Publication No. 14-E004-EF. Rockville, MD: Agency for Healthcare Research and Quality, 2014.

Okazaki R. Clinical significance of measuring vitamin D metabolites. *Clin Calcium*. 2007;17(10):1543-1547.

Oregon Health Authority. (2020, July). Better Health for oregonians: Opportunities to reduce low ... <http://www.orhealthleadershipcouncil.org/wp-content/uploads/2020/07/Oregon-Low-Value-Care-Report-Final-July-2020.pdf>

Pacheco-Gonzalez RM, Garcia-Marcos L, Morales E. Prenatal vitamin D status and respiratory and allergic outcomes in childhood: A meta-analysis of observational studies. *Pediatr Allergy Immunol*. 2018;29(3):243-253.

Palacios C, Kostiuik LK, Peña-Rosas JP. Vitamin D supplementation for women during pregnancy. *Cochrane Database Syst Rev.* 2019;7:CD008873.

Park SK, Garland CF, Gorham ED, et al. Plasma 25-hydroxyvitamin D concentration and risk of type 2 diabetes and pre-diabetes: 12-year cohort study. *PLoS One.* 2018;13(4):e0193070.

Parrott J, Frank L, Rabena R, et al. American Society for Metabolic and Bariatric Surgery integrated health nutritional guidelines for the surgical weight loss patient 2016 update: Micronutrients. *Surg Obes Relat Dis.* 2017;13(5):727.

Pazirandeh S, Burns DL. Overview of vitamin D. *UpToDate [online serial].* Waltham, MA: UpToDate; reviewed October 2018.

Perna S. Is vitamin D supplementation useful for weight loss programs? A systematic review and meta-analysis of randomized controlled trials. *Medicina (Kaunas).* 2019;55(7).

Peterson LA. Bariatric surgery and vitamin D: Key messages for surgeons and clinicians before and after bariatric surgery. *Minerva Chir.* 2016;71(5):322-336.

Pike KC, Inskip HM, Robinson S, et al. Maternal late-pregnancy serum 25-hydroxyvitamin D in relation to childhood wheeze and atopic outcomes. *Thorax.* 2012;67(11):950-956.

Pilz S, Tomaschitz A, Obermayer-Pietsch B, et al. Epidemiology of vitamin D insufficiency and cancer mortality. *Anticancer Res.* 2009;29(9):3699-3704.

Pittas AG, Chung M, Trikalinos T, et al. Systematic review: Vitamin D and cardiometabolic outcomes. *Ann Intern Med.* 2010;152(5):307-314.

Pittas AG, Kawahara T, Jorde R, et al. Vitamin D and risk for type 2 diabetes in people with prediabetes: A systematic review and meta-analysis of individual participant data from 3 randomized clinical trials. *Ann Intern Med.* 2023;176(3):355-363.

Poolsup N, Suksomboon N, Plordplong N. Effect of vitamin D supplementation on insulin resistance and glycaemic control in prediabetes: A systematic review and meta-analysis. *Diabet Med.* 2016;33(3):290-299.

Sanders KM, Nowson CA, Kotowicz MA, et al; Working group: Australian and New Zealand Bone and Mineral Society and Osteoporosis Australia. Calcium and bone health: Position statement for the Australian and New Zealand Bone and Mineral Society, Osteoporosis Australia and the Endocrine Society of Australia. *Med J Aust.* 2009;190(6):316-320.

Scharla S. Diagnosis of disorders of vitamin D-metabolism and osteomalacia. *Clin Lab.* 2008;54(11-12):451-459.

Shillo P, Selvarajah D, Greig M, et al. Reduced vitamin D levels in painful diabetic peripheral neuropathy. *Diabet Med.* 2019;36(1):44-51.

Slinin Y, Paudel ML, Taylor BC, Fink HA; Osteoporotic Fractures in Men (MrOS) Study Research Group. 25-Hydroxyvitamin D levels and cognitive performance and decline in elderly men. *Neurology.* 2010;74(1):33-41.

Stolzenberg-Solomon RZ, Hayes RB, Horst RL, et al. Serum vitamin D and risk of pancreatic cancer in the prostate, lung, colorectal, and ovarian screening trial. *Cancer Res.* 2009;69(4):1439-1447.

Travis RC, Crowe FL, Allen NE, et al. Serum vitamin D and risk of prostate cancer in a case-control analysis nested within the European Prospective Investigation into Cancer and Nutrition (EPIC). *Am J Epidemiol.* 2009;169(10):1223-1232.

United States Preventive Services Task Force (USPSTF). Final recommendation statement. Vitamin D deficiency: Screening. Rockville, MD: USPSTF; November 25, 2014.

United States Preventive Services Task Force (USPSTF). Final recommendation statement. Vitamin D, calcium, or combined supplementation for the primary prevention of fractures in community-dwelling adults: Preventive medication. Rockville, MD: USPSTF; April 2018.

US Preventive Services Task Force; Krist AH, Davidson KW, Mangione CM, et al. Screening for vitamin D deficiency in adults: US Preventive Services Task Force recommendation statement. JAMA. 2021;325(14):1436-1442.

Vieth R. Vitamin D supplementation, 25-hydroxyvitamin D concentrations, and safety. Am J Clin Nutr. 1999;69(5):842-856.

Wang M-J, Dunn EC, Okereke OI, et al. Maternal vitamin D status during pregnancy and offspring risk of childhood/adolescent depression: Results from the Avon Longitudinal Study of Parents and Children (ALSPAC). J Affect Disord. 2020;265:255-262.

Wei Z, Zhang J, Yu X. Maternal vitamin D status and childhood asthma, wheeze, and eczema: A systematic review and meta-analysis. Pediatr Allergy Immunol. 2016;27(6):612-619.

Zhang H, Wang P, Jie Y, et al. Predictive value of 25-hydroxyvitamin D level in patients with coronary artery disease: A meta-analysis. Front Nutr. 2022;9:984487.

Zhou M, Huang R. Associations of serum total 25OHD, 25OHD3, and epi-25OHD3 with insulin resistance: Cross-sectional analysis of the National Health and Nutrition Examination Survey, 2011-2016. Nutrients. 2022;14(17):3526.

Appendix

Policy Number:

Effective: 7/1/2024

Next review: 3/1/2025

Policy type: Enterprise

Author(s):

Depts.: Health Services

Applicable regulation(s): Social Security Act, Section 1862(a)(7), 42 CFR 410.32(a), CMS A57719 and LCD L34051, Oregon Administrative Rules OAR(s) 410-141-3820 to 3830 and 410-151-0000 to 410-151-0003.

Commercial OPs: 3/2024

Government OPs: 2/2024