

LCD for Vitamin D Assay Testing (L31076)

Contractor Information

Contractor Name

Wisconsin Physicians Service Insurance Corporation

Contractor Number

00951, 00952, 00953, 00954, 52280, 05101, 05201, 05301, 05401, 05102, 05202, 05302, 05402

Contractor Type

Carrier - FI - MAC

LCD Information

LCD ID Number

L31076

LCD Title

Vitamin D Assay Testing

Contractor's Determination Number

PATH- 032

AMA CPT / ADA CDT Copyright Statement

CPT codes, descriptions and other data only are copyright 2010 American Medical Association (or such other date of publication of CPT). All Rights Reserved. Applicable FARS/DFARS Clauses Apply. Current Dental Terminology, (CDT) (including procedure codes, nomenclature, descriptors and other data contained therein) is copyright by the American Dental Association. © 2002, 2004 American Dental Association. All rights reserved. Applicable FARS/DFARS apply.

CMS National Coverage Policy

Language quoted from Centers for Medicare and Medicaid Services (CMS). National Coverage Determinations (NCDs) and coverage provisions in interpretive manuals is italicized throughout the policy. NCDs and coverage provisions in interpretive manuals are not subject to the Local Coverage Determination (LCD) Review Process (42 CFR 405.860[b] and 42 CFR 426 [Subpart D]). In addition, an administrative law judge may not review an NCD. See Section 1869(f)(1)(A)(i) of the Social Security Act. Unless otherwise specified, italicized text represents quotation from one or more of the following CMS sources:

Title XVIII of the Social Security Act (SSA):

Section 1862(a)(1)(A) excludes expenses incurred for items or services which are not reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member. Section 1833(e) prohibits Medicare payment for any claim which lacks the necessary information to process the claim.

Medicare Benefit Policy Manual; Chapter 15 – Covered Medical and Other Health Services

80.1 - Clinical Laboratory Services

(Rev. 79; Issued: 10-19-07; Effective: 01-01-03; Implementation: 11-19-07)

Section 1833 and 1861 of the Act provides for payment of clinical laboratory services under Medicare Part B. Clinical laboratory services involve the biological, microbiological, serological, chemical, immunohematological, hematological, biophysical, cytological, pathological, or other examination of materials derived from the human body for the diagnosis, prevention, or treatment of a disease or assessment of a medical condition. Laboratory services must meet all applicable requirements of the Clinical Laboratory Improvement Amendments of 1988 (CLIA), as set forth at 42 CFR part 493. Section 1862(a)(1)(A) of the Act provides that Medicare payment may not be made for services that are not reasonable and necessary. Clinical laboratory services must be ordered and used promptly by the physician who is treating the beneficiary as described in 42 CFR 410.32(a), or by a qualified nonphysician practitioner, as described in 42 CFR 410.32(a)(3).

See section 80.6 of this manual for related physician ordering instructions.

See the Medicare Claims Processing Manual Chapter 16 for related claims processing instructions.

Medicare Claims Processing Manual; Chapter 16 - Laboratory Services

Primary Geographic Jurisdiction

Oversight Region

Original Determination Effective Date

For services performed on or after 12/15/2010

Original Determination Ending Date

Revision Effective Date

Revision Ending Date

Indications and Limitations of Coverage and/or Medical Necessity

Vitamin D is a hormone, synthesized by the skin, the liver, and then metabolized by the kidney to an active hormone, calcitriol. An excess of vitamin D may lead to hypercalcemia. Vitamin D deficiency may lead to a variety of disorders. This LCD identifies the indications and limitations of Medicare coverage and reimbursement for these services.

Vitamin D is called a "vitamin" because of its availability from an exogenous source, predominately from oily fish in the form of cholecalciferol, vitamin D3. Plant-based vitamin D is in the form of ergocalciferol, D2. It is really a hormone, as it is synthesized by the skin and metabolized by the liver and then, the kidney to an active hormone, calcitriol, which then acts in its classical action to absorb calcium from the intestine, and promote bone mineralization. In the skin, 7-dehydrocholesterol is converted to vitamin D3 in response to sunlight, a process that is inhibited by sunscreen with a skin protection factor (SPF) of 8 or greater. Once in the blood, vitamin D2 or D3 from diet, or D3 from skin production are carried by an alpha-2-globulin, vitamin D binding protein, and are carried to the liver where they are hydroxylated to yield 25-hydroxyvitamin D (25OHD; calcidiol). 25OHD then is converted in the kidney to 1, 25(OH)2D (calcitriol) by the action of 25OHD-1-alpha hydroxylase (CYP27B1). The CYP27B1 in the kidney is regulated by nearly every hormone involved in calcium homeostasis, and its activity is stimulated by PTH, estrogen, calcitonin, prolactin, growth hormone, low calcium levels, and low phosphorus levels. Its activity is inhibited by calcitriol, thus providing the feedback loop that helps regulate its synthesis.

An excess of vitamin D is unusual, but may lead to hypercalcemia. Vitamin D deficiency may lead to a variety of disorders; the well-described is rickets in growing children or osteomalacia in adults. Evaluating the status of a patient's vitamin D sufficiency is accomplished by measuring the level of 25-hydroxyvitamin D. Measurement of other metabolites is generally not necessary outside of several unusual metabolic bone disorders or in chronic kidney disease-mineral bone disorder (CKD-MBD).

Indications:

Measurement of vitamin D levels is indicated for patients with:

- chronic kidney disease stage III or greater;
- osteoporosis;
- osteomalacia;
- osteopenia;
- osteogenesis imperfecta
- osteosclerosis
- hypocalcemia;
- hypercalcemia;
- hypoparathyroidism;
- hyperparathyroidism;
- rickets;
- vitamin D deficiency to monitor the efficacy of replacement therapy;
- fibromyalgia;
- granuloma forming diseases;
- hypovitaminosis D,
- hypervitaminosis D
- long term use of anticonvulsants or glucocorticoids and other medications known to lower -vitamin D levels;
- malabsorption states;
- obstructive jaundice;
- cirrhosis;
- psoriasis;
- Paget's disease of bone;
- gastric bypass

Limitations:

For Medicare beneficiaries, screening tests are governed by statute (Social Security Act 1861 {nn}). Vitamin D testing may not be used for routine screening.

Assays of calcitriol need not be performed for each of the above conditions. The most common type of vitamin D deficiency is that of 25 OH Vitamin D.

The 1,25-dihydroxy form of vitamin D is generally only required to assist in the diagnosis of certain cases of rare endocrine disorders (primary hyperparathyroidism, hypothyroidism, pseudohypoparathyroidism), or for diagnosing and treating renal osteodystrophy and vitamin D-dependent and vitamin D resistant rickets, or in cases of unknown causes of hypercalcemia, including sarcoidosis. Level of both 25OHD and calcitriol are not needed as a panel for determining a patient's vitamin D status or to monitor routine vitamin D replacement therapy for most diseases. It is expected that the medical record will justify the tests chosen for a particular disease entity that all available components of 25 OH vitamin D and other metabolite levels will not be performed routinely on every patient and that supportive documentation for test choices will be available to the Contractor upon request.

This Contractor does not expect to receive billing for the various component sources of 25 OH vitamin D separately (such as stored D or diet derived D). Only one total 25 OH vitamin D assay (comprising the sum of both 25OHD2 and 25OHD3) will be considered for reimbursement on any particular day, if medically necessary, for the patient's condition.

Once a beneficiary has been shown to be vitamin D deficient, further testing may be medically necessary only to ensure adequate replacement has been accomplished for this vitamin deficiency, although, generally, other parameters are measured. Annual testing of the vitamin D status may be appropriate depending upon the indication and other mitigating factors. Because there can be variability in individual 25OHD responses to supplemental vitamin D in high-risk individuals, the serum 25OHD levels could be retested after about 3 months of supplementation to confirm that the target 25OHD level has been reached. If the follow up test shows they have not yet reached the target level, the test can be repeated in another 3 months until the target level is achieved.

Testing Methods

Several methods are available for measuring circulating concentrations of 25-OH-D. Medicare will cover laboratory tests that give practitioners accurate and reliable information. The method used to perform this testing should be validated.

Coding Information

Bill Type Codes:

Contractors may specify Bill Types to help providers identify those Bill Types typically used to report this service. Absence of a Bill Type does not guarantee that the policy does not apply to that Bill Type. Complete absence of all Bill Types indicates that coverage is not influenced by Bill Type and the policy should be assumed to apply equally to all claims.

011x	Hospital Inpatient (Including Medicare Part A)
012x	Hospital Inpatient (Medicare Part B only)
013x	Hospital Outpatient
014x	Hospital - Laboratory Services Provided to Non-patients
018x	Hospital - Swing Beds
021x	Skilled Nursing - Inpatient (Including Medicare Part A)
023x	Skilled Nursing - Outpatient
071x	Clinic - Rural Health

072x	Clinic - Hospital Based or Independent Renal Dialysis Center
077x	Clinic - Federally Qualified Health Center (FQHC)
083x	Ambulatory Surgery Center
085x	Critical Access Hospital

Revenue Codes:

Contractors may specify Revenue Codes to help providers identify those Revenue Codes typically used to report this service. In most instances Revenue Codes are purely advisory; unless specified in the policy services reported under other Revenue Codes are equally subject to this coverage determination. Complete absence of all Revenue Codes indicates that coverage is not influenced by Revenue Code and the policy should be assumed to apply equally to all Revenue Codes.

Revenue codes only apply to providers who bill these services to the fiscal intermediary or Part A MAC. Revenue codes do not apply to physicians, other professionals and suppliers who bill these services to the carrier or Part B MAC.

Please note that not all revenue codes apply to every type of bill code. Providers are encouraged to refer to the FISS revenue code file for allowable bill types. Similarly, not all revenue codes apply to each CPT/HCPCS code. Providers are encouraged to refer to the FISS HCPCS file for allowable revenue codes. All revenue codes billed on the inpatient claim for the dates of service in question may be subject to review.

0300	Laboratory - General Classification
0301	Laboratory - Chemistry
0309	Laboratory - Other Laboratory

CPT/HCPCS Codes

82306	VITAMIN D; 25 HYDROXY, INCLUDES FRACTION(S), IF PERFORMED
82652	VITAMIN D; 1, 25 DIHYDROXY, INCLUDES FRACTION(S), IF PERFORMED

ICD-9 Codes that Support Medical Necessity

Note: ICD-9 codes must be coded to the highest level of specificity

CPT code: 82306

Note: Use V58.65 with 268.2, to describe current long term use of glucocorticoids and V58.69 with 268.2 to describe long term use of anticonvulsants and other medication known to lower vitamin D levels.

010.00 - 018.96

	PRIMARY TUBERCULOUS COMPLEX UNSPECIFIED EXAMINATION - UNSPECIFIED MILIARY TUBERCULOSIS TUBERCLE BACILLI NOT FOUND BY BACTERIOLOGICAL OR HISTOLOGICAL EXAMINATION BUT TUBERCULOSIS CONFIRMED BY OTHER METHODS (INOCULATION OF ANIMALS)
135	SARCOIDOSIS
252.00 - 252.9	HYPERPARATHYROIDISM, UNSPECIFIED - UNSPECIFIED DISORDER OF PARATHYROID GLAND
268.0 - 268.9	RICKETS ACTIVE - UNSPECIFIED VITAMIN D DEFICIENCY
275.3	DISORDERS OF PHOSPHORUS METABOLISM
275.41	HYPOCALCEMIA
275.42	HYPERCALCEMIA
277.00 - 277.09	CYSTIC FIBROSIS WITHOUT MECONIUM ILEUS - CYSTIC FIBROSIS WITH OTHER MANIFESTATIONS
278.8	OTHER HYPERALIMENTATION
359.5	MYOPATHY IN ENDOCRINE DISEASES CLASSIFIED ELSEWHERE
555.0 - 555.9	REGIONAL ENTERITIS OF SMALL INTESTINE - REGIONAL ENTERITIS OF UNSPECIFIED SITE
556.0 - 556.9	ULCERATIVE (CHRONIC) ENTEROCOLITIS - ULCERATIVE COLITIS UNSPECIFIED
571.2	ALCOHOLIC CIRRHOSIS OF LIVER
571.5	CIRRHOSIS OF LIVER WITHOUT ALCOHOL
571.6	BILIARY CIRRHOSIS
571.8	OTHER CHRONIC NONALCOHOLIC LIVER DISEASE
579.0 - 579.9	CELIAC DISEASE - UNSPECIFIED INTESTINAL MALABSORPTION
585.3	CHRONIC KIDNEY DISEASE, STAGE III (MODERATE)
585.4	CHRONIC KIDNEY DISEASE, STAGE IV (SEVERE)
585.5	CHRONIC KIDNEY DISEASE, STAGE V
585.6	END STAGE RENAL DISEASE
588.81	SECONDARY HYPERPARATHYROIDISM (OF RENAL ORIGIN)
649.20 - 649.24	BARIATRIC SURGERY STATUS COMPLICATING PREGNANCY, CHILDBIRTH, OR THE PUERPERIUM, UNSPECIFIED AS TO EPISODE OF CARE OR NOT APPLICABLE - BARIATRIC SURGERY STATUS COMPLICATING PREGNANCY, CHILDBIRTH, OR THE PUERPERIUM, POSTPARTUM CONDITION OR COMPLICATION
696.1	OTHER PSORIASIS AND SIMILAR DISORDERS

701.0	CIRCUMSCRIBED SCLERODERMA
710.0	SYSTEMIC LUPUS ERYTHEMATOSUS
710.3	DERMATOMYOSITIS
729.1	MYALGIA AND MYOSITIS UNSPECIFIED
731.0	OSTEITIS DEFORMANS WITHOUT BONE TUMOR
733.00 - 733.09	OSTEOPOROSIS UNSPECIFIED - OTHER OSTEOPOROSIS
733.90	DISORDER OF BONE AND CARTILAGE UNSPECIFIED
756.51	OSTEOGENESIS IMPERFECTA
756.52	OSTEOPETROSIS
949.2 - 949.5	BLISTERS WITH EPIDERMAL LOSS DUE TO BURN (SECOND DEGREE) UNSPECIFIED SITE - DEEP NECROSIS OF UNDERLYING TISSUES DUE TO BURN (DEEP THIRD DEGREE UNSPECIFIED SITE WITH LOSS OF A BODY PART
V45.86	BARIATRIC SURGERY STATUS
V58.65	LONG-TERM (CURRENT) USE OF STEROIDS
V58.69	LONG-TERM (CURRENT) USE OF OTHER MEDICATIONS
CPT code: 82652	
010.00 - 018.96	PRIMARY TUBERCULOUS COMPLEX UNSPECIFIED EXAMINATION - UNSPECIFIED MILIARY TUBERCULOSIS TUBERCLE BACILLI NOT FOUND BY BACTERIOLOGICAL OR HISTOLOGICAL EXAMINATION BUT TUBERCULOSIS CONFIRMED BY OTHER METHODS (INOCULATION OF ANIMALS)
135	SARCOIDOSIS
200.30 - 200.38	MARGINAL ZONE LYMPHOMA, UNSPECIFIED SITE, EXTRANODAL AND SOLID ORGAN SITES - MARGINAL ZONE LYMPHOMA, LYMPH NODES OF MULTIPLE SITES
202.10 - 202.28	MYCOSIS FUNGOIDES UNSPECIFIED SITE - SEZARY'S DISEASE INVOLVING LYMPH NODES OF MULTIPLE SITES
252.00 - 252.9	HYPERPARATHYROIDISM, UNSPECIFIED - UNSPECIFIED DISORDER OF PARATHYROID GLAND
268.0	RICKETS ACTIVE
278.8	OTHER HYPERALIMENTATION
585.3	CHRONIC KIDNEY DISEASE, STAGE III (MODERATE)
585.4	CHRONIC KIDNEY DISEASE, STAGE IV (SEVERE)
585.5	CHRONIC KIDNEY DISEASE, STAGE V
585.6	END STAGE RENAL DISEASE

588.81	SECONDARY HYPERPARATHYROIDISM (OF RENAL ORIGIN)
756.51	OSTEOGENESIS IMPERFECTA
756.52	OSTEOPETROSIS

Diagnoses that Support Medical Necessity

ICD-9 Codes that DO NOT Support Medical Necessity

ICD-9 Codes that DO NOT Support Medical Necessity Asterisk Explanation

Diagnoses that DO NOT Support Medical Necessity

General Information

Documentation Requirements

The patient's medical record must contain documentation that fully supports the medical necessity for services included within this LCD. (See "Indications and Limitations of Coverage.") This documentation includes, but is not limited to, relevant medical history, physical examination, and results of pertinent diagnostic tests or procedures.

Appendices

Utilization Guidelines

In accordance with CMS Ruling 95-1 (V), utilization of these services should be consistent with locally acceptable standards of practice.

1. Only one 25 OH vitamin D level will be reimbursed in any 24 hour period. Storage and supplement components will not be reimbursed separately.
2. Only one 1,25-OH vitamin D level will be reimbursed in a 24 hour period if medically necessary.
3. Assays of vitamin D levels for conditions other than ICD 9-CM codes 268.0-268.9 will be limited to once a year.
4. Assays of the appropriate vitamin D levels for ICD-9 CM codes 268.0-268.9 will be limited to 4 per year, for the previously identified deficient form of vitamin D.

(Because there can be variability in individual 25OHD responses to supplemental vitamin D in high-risk individuals, the serum 25OHD levels could be retested after about 3 months of supplementation to confirm that the target 25OHD level has been reached. If the follow up test shows they have not yet reached the target level, the test can be repeated in another 3 months until the target level is achieved.)

Sources of Information and Basis for Decision

(WPS Medicare Services is not responsible for the continued viability of websites listed)

- Adams J, Kantorovich V, Wu C, Javanbakt M, Hollis B.; Resolution of vitamin D insufficiency in osteopenic patients results in rapid recovery of bone mineral density; *The Journal of Clinical Endocrinology and Metabolism*. 1999; 84:8:2729-2730.
- Am. J. Kidney Dis.50(1):59-68(2007) "Changes in serum 25-hydroxyvitamin D and plasma intact PTH levels following treatment with ergocalciferol in patients with CKD", Al Aly, Z, et. al.
- American Medical Association (AMA). Council on Science and Public Health "Appropriate Supplementation of Vitamin D," CSAPH Report 4-A-09.
- Autier P, Gandini S.; Vitamin D Supplementation and Total Mortality; *Arch Intern Med*. September 2007; 167:16:1730-1737.
- Binkley N, Krueger D, Cowgill CS, Plum L, Lake E, Hansen KE, et al. Assay variation confounds the diagnosis of hypovitaminosis D: a call for standardization. *J Clin Endocrinol Metab* 2004; 89:3152-
- Bischoff-Ferrari HA, Dawson-Hughes B, Willett W, et al.; Effect of vitamin D on Falls a Meta-analysis. *JAMA*. April 2004; 291:16:1999-2006; www.jama.com
- Bischoff-Ferrari HA, Dietrich T, Orav EJ, Dawson-Hughes B.; Positive association between 25-Hydroxy vitamin D levels and bone mineral density: a population-based study of younger and older adults; *The American Journal of Medicine*; 2004;116:634-639.
- Bischoff-Ferrari HA, Willett W, Wong J, Giovannucci E, Dietrich T, Dawson-Hughes B.; Fracture prevention with vitamin D supplementation, a meta-analysis of randomized controlled trials; *JAMA*, May 2005; 293:18:2257-2264; www.jama.com
- Bodnar LM, Simhan HN, Powers RW, Frank MP, Cooperstein E, Roberts JM.; High prevalence of vitamin D insufficiency in black and white pregnant women residing in the northern United States and their neonates. *J Nutr*. 2007; 137:447-452; <http://jn.nutrition.org>
- Brenner: Brenner and Rector's *The Kidney*, 8th ed. Saunders, An imprint of Elsevier; Copyright © 2007.
- Brophy Marcus M. Vitamin D tests soar as deficiency, diseases linked; *USATODAY.com*.
- Cannell J.J.; Autism and Vitamin D. *Med Hypothese*. 2008; 70:4:750-759; <http://www.ncbi.nlm.nih.gov/pubmed/17920208>;
- Cannell JJ, Hollis BW, Zasloff M, Heaney RP.; Diagnosis and treatment of vitamin D deficiency; *Expert Opin Pharmacother*; 2008; 9:1-12.
- Chapuy M, Arlot M, Duboeuf F, et al.; vitamin D3 and calcium to prevent hip fractures in elderly women. *The New England Journal of Medicine*; December 1992; 327:23:1637-1641.
- Chocano-Bedova, P., Ronnenberg, A.G., *Vitamin D and Tuberculosis*, *Nut Rev*, 2009 May; 67(5): 289-93
- Chronic Kidney Disease 2006: A Guide to Select NKF-KDOQI Guidelines and Recommendations.
- Clinical practice guidelines for bone metabolism and disease in chronic kidney disease; *American Journal of Kidney Diseases*; October 2004.
- Collins, N, Maher, J, Cole, M, et al. A prospective study to evaluate the dose of vitamin D required to correct low 25-hydroxyvitamin D levels, calcium, and alkaline phosphatase in patients at risk of developing antiepileptic drug-induced osteomalacia. *Q J Med* 1991; 78:113.
- Compston, JE. Hepatic osteodystrophy: Vitamin D metabolism in patients with liver disease. *Gut* 1986; 27:1073.
- Cranney A, Horsley T, O'Donnell, et al.; Effective and safety of vitamin D in relation to bone health; *AHRQ Publication No. 07-E013*; August 2007.
- Dawson-Hughes B, Harris S, Krall E, Dallal G. Effect of calcium and vitamin D supplementation on bone density in men and women 65 years of age or older; *The New England Journal of Medicine*, September 1997; 337:10:670-676.
- Diamond T, Eisman J, Mason R, et al.; Vitamin D and adult bone health in Australia and New Zealand: a position statement; *MJA*; March 2005; 182:6.
- Dibble, JB, Sheridan, P, Losowsky, MS.; A survey of vitamin D deficiency in gastrointestinal and liver disorders; *Q J Med* 1984; 53:119.
- Disorders involving calcium, phosphorus, and magnesium; *Primary Care: Clinics in Office Practice*. June 2008; 35:2. W. B. Saunders Company; Copyright© 2008.

Dusso AS, Brown AJ, Slatopolsky E. Vitamin D. *Am J Physiol Renal Physiol.* 2005; 289:F8-F28.

El-Hajj Fuleihan G, Nabulsi M, Tamim H, Maalouf J, Salamoun M, Khalife H, Choucair M, Arabi A, Vieth R.; Effect of Vitamin D Replacement on Musculoskeletal Parameters in School Children: A Randomized Controlled Trial; *J Clin Endocrinol Metab.* 2006 Feb; 91(2):405-12. Epub 2005 Nov 8.

Ernst B, Thurnheer M, Schmid SM, Wilms B, Schultes B. Seasonal variation in the deficiency of 25-hydroxyvitamin D(3) in mildly to extremely obese subjects. *Obes Surg.* 2009 Feb; 19(2):180-3. Epub 2008 Jul 29.

Gaugris S, Heaney RP, Boonen S, et al. Vitamin D inadequacy among post-menopausal women: a systematic review. *Q J Med.* 2005; 98:667-676.

Giovanucci E. Can vitamin D reduce total mortality? *Arch Intern Med.* September 2007; 167:16:1709-1710.

Gloth, FM, Gundberg CM, Hollis BW, et al. Vitamin D deficiency in homebound elderly persons. *JAMA* 1995; 274:1683

Goldner WS, Stoner JA, Thompson J, Taylor K, Larson L, Erickson J, McBride C. Prevalence of vitamin D insufficiency and deficiency in morbidly obese patients: a comparison with non-obese controls. *Obes Surg.* 2008 Feb;18(2):145-50.

Goldstein, DA, Haldimann, B, Sherman, D, et al.; Vitamin D metabolites and calcium metabolism in patients with nephrotic syndrome and normal renal function; *J Clin Endocrinol Metab* 1981; 52:116.

Goltzman D and Cole D.E.C.; Hypoparathyroidism: In primer on the metabolic bone diseases and disorders of bone metabolism; American Society of Bone and Mineral Research, 2006; 6:216.

Gordon PL, Sakkas GK, Doyle JW, Shubert T, Johansen KL.; Relationship between vitamin D and muscle size and strength in patients on hemodialysis. *J Ren Nutr.* 2007 Nov; 17 (6):397-407. PubMed PMID: 17971312.

Hahn, T.J.; Drug-induced disorders of vitamin D and mineral metabolism; *Clin Endocrinol Metab*, 1980; 9:107.

Hathcock J, Shao A, Vieth R, Heaney R. Risk assessment for vitamin D. *Am J Clin Nutr.*; 2007; 85:6-18.

Heaney R.; Nutrition and chronic disease; *Mayo Clin Proc*, March 2006; 81:3:297-299.

Holick MF.; Resurrection of vitamin D deficiency and rickets; *J Clin Invest* 2006; 116:2062-72.

Holick, M.; High prevalence of vitamin D inadequacy and implications for health; *Mayo Clin Proc.* March 2006; 81:3:353-373.

Holick M.; Vitamin D Deficiency; *N Engl J Med*; 2007; 357:266-81.

Hollis B.; Vitamin D requirement during pregnancy and lactation; *Journal of Bone and Mineral Research*, 2007; V39-V44.

Hollis B, Wagner, C. Vitamin D requirements during lactation: high-dose maternal supplementation as therapy to prevent hypovitaminosis D for both the mother and the nursing infant; 2004, 80:1752s-1758s. www.ajcn.org

Horwitz M, Hodak S, Stewart A. Non-Parathyroid Hypercalcemia. In: *Primer on Metabolic Bone Diseases and Disorders of Mineral Metabolism.* 7th ed., 2008:7:307-312.

Jackson R, LaCroix A, Gass M, et al. Calcium plus vitamin D supplementation and the risk of fracture. *N Engl J Med.* February 2006; 354:7; www.nejm.org

Johnson, JM, Maher, JW, Demaria, EJ, et al.; The Long-term Effects of Gastric Bypass on Vitamin D Metabolism; *Ann Surg* 2006; 243:701.

Kaidar-Person O., Person B., Szomstein S., Rosenthal R.J.; Nutritional deficiencies in morbidly obese patients: a new form of malnutrition? Part A: vitamins. *Obes Surg.* 2008 Jul; 18(7):870-6. Epub 2008 Mar 4.; Review.

Klein, GL, Chen, TC, Holick, MF, et al. Synthesis of vitamin D in skin after burns. *Lancet* 2004; 363:291.

Kronenberg; *Williams Textbook of Endocrinology*, 11th ed. Vitamin D related disorders; Saunders, An Imprint of Elsevier; Copyright © 2008; www.mdconsult.com

Kumar, R.; Hepatic and Intestinal Osteodystrophy and the Hepatobiliary Metabolism of Vitamin D; *Ann Intern Med* 1983; 98:662.

Lal Y, Nair P, Lovrien F, and Freeman JW.; Osteomalacia presenting as pain syndromes of uncertain etiology; *S D Med*, 2009 May; 62:5:197, 199, 201.

Lappe J, Travers-Gustafson D, Davies K, Recker R, Heaney R. *Am J Clin Nutr.*2007;85:1586-91.

Lata PF, Elliott ME.; Patient assessment in the diagnosis, prevention, and treatment of osteoporosis; *Nutrition in Clinical Practice*, June 2007; 22:3:261-275.

LeBoff M, Kohlmeier L, Hurwitz S, Franklin J, Wright J, Glowacki J. Occult vitamin D deficiency in Postmenopausal US Women with Acute Hip Fracture; *JAMA*, April 1999; 281:16:1505-1511.

Leventis P, Patel S. Clinical aspects of vitamin D in the management of rheumatoid arthritis; *Rheumatology*; 2008;47:11:1617-1621.

Liu PT, Stenger S, Li H, et al. Toll-like receptor triggering of a vitamin D-mediated human antimicrobial Response; *Science*; March 2006; 311:1770-1773.

Liu Philip T., Stenger, Steffen, Tang, Dominic H. and Modlin, Robert L.; Cutting Edge: Vitamin D-Mediated Human Antimicrobial Activity against Mycobacterium tuberculosis Is Dependent on the Induction of Cathelicidin; *The Journal of Immunology*, 2007, 179, 2060 -2063

MacLaughlin, J, Holick, MF. Aging decreases the capacity of human skin to produce vitamin D3. *J Clin Invest* 1985; 76:1536.

McPherson & Pincus: *Henry's Clinical Diagnosis and Management by Laboratory Methods*, 21st ed. W. B. Saunders Company; Copyright © 2006.

Metabolic bone disease in gastrointestinal illness; *Gastroenterology Clinics*; March 2007; 36:1. W. B. Saunders Company; Copyright © 2007.

Moe S.; Disorders involving Calcium, Phosphorus and Magnesium; *Prim Care Clin Office Pract*. 2008; 3, 215-237.

Mouyis M, Ostor A, Crisp A, et al. Hypovitaminosis D among rheumatology outpatients I clinical practice. *Rheumatology* 2008; 47:1349-1351.

Nichols, J.; *The Controversy Surrounding Vitamin D Lab Testing*; 11/03/2008

O'Keefe, JH, Carter MD, Lavie CJ. Primary and Secondary Prevention of Cardiovascular Diseases: A Practical Evidence-Based Approach. *Mayo Clin Proc* 2009; 84(8):741-757.

Prince R, Austin N, Devine A, Dick I, Bruce D, Zhu K. Effects of ergocalciferol added to Calcium on the risk of falls in elderly high-risk women. *Arch Intern Med*. January 2008; 168:1:103-108.

Rollins, Genna; Vitamin D Testing—What's the Right Answer? Labs Grapple with Confusing Analytics, Evidence; *Clinical Laboratory News*, July 2009: Volume 35, Number 7

Sánchez-Hernández J, Ybarra J, Gich I, De Leiva A, Rius X, Rodríguez-Espinosa J, Pérez A. Effects of bariatric surgery on vitamin D status and secondary hyperparathyroidism: a prospective study. *Obes Surg*. 2005 Nov-Dec; 15(10):1389-95.

Schleicher, PhD, Rosemary L., Pfeiffer, PhD; Christine M.; Vitamin D Testing How Will We Get it Right? ; *Clinical Laboratory News*, December 2009: Volume 35, Number 12

Schilling, T, Pecherstorfer, M, Blind, E, et al. Parathyroid hormone-related protein (PTH-rP) does not regulate serum 1, 25-dihydroxyvitamin D levels in hypercalcemia of malignancy. *J Clin Endocrinol Metab* 1993; 76:801.

Shoback D.; Update in osteoporosis and metabolic bone disorders; *Journal of Clinical Endocrinology & Metabolism*, 2007; 92:3:747-753; jcem.endojournals.org

Silverberg SJ and Bilezikian JP.; Primary hyperparathyroidism. In: primer on metabolic bone diseases and disorders of mineral metabolism, 7th ed. 2008; 7; 302-306.

Silverberg SJ, Shane E, Dempster DW and Bilezikian J.P.; The effects of vitamin D insufficiency in patients with primary hyperparathyroidism. *AM J Med*. 1999; 107:6:561-561.

Singh, Ravinder J.; Are Clinical Laboratories Prepared for Accurate Testing of 25-Hydroxy Vitamin D? Letter to the Editor; *Clinical Chemistry*, 2008, 54, 221-223

Slovik D, Adams J, Neer R, Holick M, Potts J. Deficient production of 1,25-Dihydroxyvitamin D in elderly osteoporotic patients; *The New England Journal of Medicine*, August 1981;305:7:372-374.

Sotaniemi, EA, Hakkarainen, HK, Puranen, JA, Lahti, RO. Radiologic bone changes and hypocalcemia with anticonvulsant therapy in epilepsy. *Ann Intern Med* 1972; 77:389.

The Journal of Clinical Endocrinology & Metabolism 88(11):5109–5115, Low Vitamin D Status, High Bone Turnover, and Bone Fractures in Centenarians.

The Journal of Clinical Endocrinology & Metabolism, Vitamin D Insufficiency and Hyperparathyroidism in a Low Income, Multiracial, Elderly Population

Tomida, K., et. al. "Serum 25-hydroxyvitamin D as an independent determinant of 1-84 PTH and bone mineral density in non-diabetic predialysis CKD patients"; *Bone*, (2008)

Vieth R, Bischoff-Ferrari, H., Boucher B., et al.; The urgent need to recommend an intake of vitamin D that is effective; *Am J of Clin Nutr*; 2007; 85:649-650.

Välimäki, MJ, Tiihonen, M, Laitinen, K, et al. Bone mineral density measured by dual-energy X-ray absorptiometry and novel markers of bone formation and resorption in patients on antiepileptic drugs. *J Bone Miner Res* 1994; 9:631.

Vitamin D Deficiency in African American Kidney Transplant Recipients: Bringing a Common Problem to Light; *Transplantation*: 15 March 2008 - Volume 85 - Issue 5 - pp 670-672

Wagner CL, Greer FR.; Prevention of rickets and vitamin D deficiency in infants, children and adolescents; *Pediatrics* 2008;122:1142-1152; www.pediatrics.org

Wang T, Pencina M, Booth S, et al.; Vitamin D deficiency and risk of cardiovascular disease. *Circulation*; 2008; 117:503-511; circ.ahajournals.org
Ward KA, Das G, Berry JL, Roberts SA, Rawer R, Adams JE, Mughal Z. Vitamin D status and muscle function in post-menarchal adolescent girls; *J. Clin Endocrinol Metab.* 2009 Feb; 94(2):559-63. Epub 2008 Nov 25.
Webb, A.R., Kline, L, Holick, MF. Influence of season and latitude on the cutaneous synthesis of vitamin D3: Exposure to winter sunlight in Boston and Edmonton will not promote vitamin D3 synthesis in human skin. *J Clin Endocrinol Metab* 1988; 67:373.
Wu F, Staykova T, Horne A, et al.; Efficacy of an oral, 10-day course of high-dose calciferol in correcting vitamin D deficiency; *The New Zealand Medical Journal.* August 2003; 116:1179:1-5.
Ybarra J, Sánchez-Hernández J, Pérez A. Hypovitaminosis D and morbid obesity. *Nurs Clin North Am.* 2007 Mar; 42(1):19-27, v. Review.
Zerwekh J.; Assessment of vitamin D in population-based studies, Blood biomarkers of vitamin D status; *American Journal of Clinical Nutrition*, April 2008; 87:4:1087s-1091s.
B. Dawson-Hughes & A. Mithal & J.-P. Bonjour & S. Boonen & P. Burckhardt & G. E.-H. Fuleihan & R. G. Josse & P. Lips & J. Morales-Torres & N. Yoshimura; IOF position statement: Vitamin D Recommendations for older adults; *Osteoporos Int*, DOI 10.1007/s00198-010-1285-3

Other Contractor policies including NGS and Highmark

Advisory Committee Meeting Notes

Meeting Date:

Wisconsin 06/18/2010

Illinois 05/19/2010

Michigan 05/12/2010

Minnesota 05/06/2010

J5: Iowa, Kansas, Missouri, Nebraska 06/24/2010

Date of the Open Meeting: 04/22/2010

This policy does not reflect the sole opinion of the contractor or Contractor Medical Director. Although the final decision rests with the MAC contractor this policy was developed in cooperation with advisory groups which include representatives from various specialties, and adapted for the purpose of converting to MAC jurisdiction.

Start Date of Comment Period

06/24/2010

End Date of Comment Period

08/08/2010

Start Date of Notice Period

11/01/2010

Revision History Number

Revision History Explanation

11/21/2010 - For the following CPT/HCPCS codes either the short description and/or the long description was changed. Depending on which description is used in this LCD, there may not be any change in how the code displays in the document:

82306 descriptor was changed in Group 1

82652 descriptor was changed in Group 1

Reason for Change

Last Reviewed On Date

11/01/2010

Related Documents

This LCD has no Related Documents.

LCD Attachments

Billing and Coding Guidelines - 12/15/2010 (PDF - 37,270 bytes)

All Versions

Updated on 11/21/2010 with effective dates 12/15/2010 - N/A

Updated on 10/22/2010 with effective dates 12/15/2010 - N/A