



# Medical Coverage Policy

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## Serum Folate and Red Blood Cell Folate Testing

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### INSTRUCTIONS FOR USE

The following Coverage Policy applies to health benefit plans administered by Cigna Companies. Certain Cigna Companies and/or lines of business only provide utilization review services to clients and do not make coverage determinations. References to standard benefit plan language and coverage determinations do not apply to those clients. Coverage Policies are intended to provide guidance in interpreting certain standard benefit plans administered by Cigna Companies. Please note, the terms of a customer’s particular benefit plan document [Group Service Agreement, Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer’s benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer’s benefit plan document always supersedes the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Each coverage request should be reviewed on its own merits. Medical directors are expected to exercise clinical judgment where appropriate and have discretion in making individual coverage determinations. Where coverage for care or services does not depend on specific circumstances, reimbursement will only be provided if a requested service(s) is submitted in accordance with the relevant criteria outlined in the applicable Coverage Policy, including covered diagnosis and/or procedure code(s). Reimbursement is not allowed for services when billed for conditions or diagnoses that are not covered under this Coverage Policy (see “Coding Information” below). When billing, providers

*must use the most appropriate codes as of the effective date of the submission. Claims submitted for services that are not accompanied by covered code(s) under the applicable Coverage Policy will be denied as not covered. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. In certain markets, delegated vendor guidelines may be used to support medical necessity and other coverage determinations.*

## Overview

This Coverage Policy addresses serum folate and red blood cell (RBC) folate testing which are two methods of folate testing.

## Coverage Policy

**Serum folate testing (Current Procedural Terminology [CPT®] code 82746) is considered medically necessary for EITHER of the following:**

- Suspected diagnosis of folate deficiency associated with ANY of the following:
  - Anemia, where folate deficiency is in the differential diagnosis (e.g., megaloblastic anemia with or without other associated cytopenias).
  - Neural tube defects and neurologic disorders where folate deficiency is known to be a potential underlying cause.
  - Diseases of the digestive system associated with malabsorption.
  - Eating disorders.
- Monitoring treatment of folate deficiency.

**Serum folate testing is not covered or reimbursable for ANY other indication.**

**Red blood cell (RBC) folic acid testing (Current Procedural Terminology [CPT®] code 82747) is not covered or reimbursable.**

## Health Equity Considerations

Health equity is the highest level of health for all people; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which people are born, grow, live, work, and age.

Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include safe housing, transportation, and neighborhoods; racism, discrimination and violence; education, job opportunities and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

## General Background

Folate, also called vitamin B9 is a water-soluble B vitamin. Folate has many chemical forms, including naturally in foods such as leafy greens, fruits, nuts, beans, peas, seafood, eggs, dairy

products, meat, and poultry. Folic acid is the synthetic form of folate that is found in supplements and added to fortified foods (US Preventive Services Task Force, 2023).

The recommended daily intake of folate ranges from 65 mcg of dietary folate equivalents in infants to 400 mcg of dietary folate equivalents in adults, with higher requirements during pregnancy and lactation (600 and 500 mcg, respectively). Total body folate stores are estimated to be approximately 500 to 20,000 mcg (0.5 to 20 mg). If folate intake ceases, deficiency may develop within weeks to months, or more rapidly if demands for folate are increased. Folic acid overdose is not a major consideration since excess is excreted in the urine.

Folate deficiency has become less common in the United States and many other resource-rich countries following the implementation of routine folic acid supplementation of foods. The Food Fortification Initiative (FFI) has been instituted in many countries, which focuses on the fortification of industrially milled wheat flour, maize flour and rice. This is primarily aimed at reducing the risk of neural tube defects during embryogenesis. However, populations with poor access to nutritious foods or reduced dietary intake are still at risk (Means and Fairfield, 2023a; Means and Fairfield, 2023b).

### **Folate Deficiency:**

Folate measurements should only be ordered to confirm a deficiency in a symptomatic individual. They should not be used to assess the risk of neural tube defects (NTD) or be used as a population screening tool. Most commonly, folate testing is used in the workup of megaloblastic anemia and the workup of neurologic disease (Stabler, 2024).

Conditions that may be associated with folate deficiency include but are not limited to the following:

- Increased requirements:
  - Pregnancy
  - Hemolytic anemia
  - Exfoliative skin diseases
- Intestinal malabsorption
- Certain medications
- Loss during hemodialysis
- Decreased dietary intake
- Rare genetic disorders

There are conditions that are associated with increased cell proliferation, which increased the need for folates for DNA synthesis. Individuals that are pregnant have chronic hemolytic anemias or exfoliative skin diseases, such as severe eczema, are often given daily folic acid to prevent deficiency. Folate deficiency in pregnancy can result in birth defects (anencephaly and spina bifida), which underlies the strong recommendation for folic acid supplementation in women of reproductive age. Inadequate maternal folate intake has also been associated with low infant birth weight, preterm delivery, and fetal growth retardation.

Malabsorption of folates/folic acid supplements can occur if the intestinal absorptive surface has been removed or is dysfunctional. This can result from surgery (e.g., gastric bypass) or inflammatory disorders such as celiac disease and tropical sprue. Medications can interfere with folate metabolism and may cause folate deficiency and/or megaloblastic anemia due to effects on DNA synthesis. These medications include methotrexate and sulfasalazine. When patients are unable to consume a varied, nutrient-rich diet may develop folate deficiency. Examples include those with restrictive diets, chronic alcohol use with a limited diet, severe anorexia, or reduced oral intake in the setting of a systemic illness (Stabler, 2024; Means and Fairfield, 2023a, 2023b,

2023c; Dukhovny and Wilkins-Haug, 2023; Goetzi, 2023; National Institutes of Health (NIH), 2022.

Presentation of folate deficiency is frequently associated with a history of excessive alcohol intake with concurrent poor diet intake. Other patients may be pregnant or lactating; may take certain drugs, such as phenytoin, sulfonamides, or methotrexate; may have chronic hemolytic anemia; or may have underlying malabsorption. Patients with folate deficiency can present with anemia and/or have vague or nonspecific symptoms (fatigue, irritability, cognitive decline), which are partly due to anemia. Additionally, some patients complain of a sore tongue or pain upon swallowing and irritated, cracked sores on one or both corners of your mouth may be observed. These oral lesions typically occur at the time when folate depletion is severe enough to cause megaloblastic anemia, although, occasionally, lesions may occur before the anemia. Patients may also present with gastrointestinal (GI) signs and symptoms, such as nausea, vomiting, abdominal pain, and diarrhea, especially after meals. Anorexia in combination with the above symptoms, may lead to marked weight loss. Neuropsychiatric presentations of folate deficiency may occur and include cognitive impairment, dementia, and depression (Means and Fairfield, 2023b; Coffey-Vega, 2022).

There are certain malabsorptive conditions which may be associated with a combined deficiency of vitamin B12 and folate or combined deficiency of one of these vitamins and iron. Examples include:

- Bariatric surgery
- Malabsorptive states
- Severely limited diets

Anemia is defined as a reduction in one or more of the major red blood cell (RBC) measurements obtained in the complete blood count (CBC): hemoglobin concentration, hematocrit, or RBC count. A low hemoglobin concentration and/or low hematocrit are the parameters most widely used to diagnose anemia. The red blood cell (RBC) indices describe RBC size, hemoglobin content, and uniformity of the RBC population. These values can be very helpful in determining the cause of anemia. The mean corpuscular volume (MCV) and red cell distribution width (RDW) are generally the most useful. Deficiencies of vitamin B12 and/or folate can cause megaloblastic anemia (macrocytic anemia with other features due to impaired cell division) (Means and Brodsky, 2022).

Megaloblastic anemia (or megaloblastic changes) describes a subset of macrocytic anemias in which the increased size of RBCs is caused by abnormal cell division in RBC precursors in the bone marrow. Megaloblastic anemia is a form of macrocytic anemia from ineffective red blood cell production and intramedullary hemolysis (Barcellini, 2022). Megaloblastic anemia is most commonly caused by folate deficiency from dietary deficiency, alcoholism, or malabsorption syndromes or by vitamin B12 deficiency, usually due to pernicious anemia (Means and Brodsky, 2022).

When assessing unexplained macrocytosis (high MCV) or macrocytic anemia, the CBC and/or blood smear would guide diagnosis. For a folate or B12 deficiency, the findings can include the following (Means and Brodsky, 2022):

- Anemia
- Macrocytic red blood cells (RBCs; e.g., mean corpuscular volume [MCV] > 100 fL) or macro-ovalocytosis
- Mild leukopenia and/or thrombocytopenia
- Low reticulocyte count
- Hypersegmented neutrophils on the peripheral blood smear

Oral folic acid (1 to 5 mg daily) is the most common treatment of a folate deficiency, even if malabsorption is present. This dose is usually sufficient because it is above the 200 mcg (0.2 mg) recommended dietary allowance. For women at low risk of NTD, the standard folic acid supplement (multivitamin, prenatal vitamin) is 0.4 mg daily, beginning at least one month prior to attempting conception and continuing throughout pregnancy and for four to six weeks postpartum or until completion of breastfeeding. This is in addition to the amount of food folate contained in a healthy eating pattern. Females who are at higher risk of having a child with an NTD are candidates for higher dose folic acid supplementation (Goetzl, 2023, Means and Fairfield, 2023c).

The reversible causes of deficiency are generally treated for one to four months or until there is laboratory evidence of hematologic recovery. For those with a chronic cause of folate deficiency, such as chronic hemolytic anemia, therapy may be given indefinitely. Periconceptional folic acid supplementation, food fortification with folic acid, and prenatal screening for NTDs combined with access to pregnancy termination have led to a decrease in the prevalence of NTDs at birth where these interventions are applied. Intravenous folic acid may be appropriate in certain settings, such as individuals who are unable to take an oral medication (e.g., due to vomiting or obtundation) or those who have severe or symptomatic anemia due to folate deficiency and hence have a more urgent need for rapid correction (Coffey-Vega, 2022).

### **Literature Review –Folate Deficiency:**

There is a paucity of evidence evaluating the benefit and harm of testing for folate deficiency. Peer-reviewed scientific literature primarily investigates the effects of folic acid supplementation, not testing.

Canadian Agency for Drugs and Technologies in Health (CADTH) conducted a health technology review on folate testing in people with suspected folate deficiency. The author explained that despite the low prevalence of folate deficiency in Canada and the US, serum folate tests continue to be ordered often to assess macrocytic anemia or cognitive abnormalities. However, evidence has shown that serum folate tests in both outpatient and inpatient populations provide low yield in detecting folate deficiency. This has led to the suggestion that serum folate tests should not be routinely ordered, even in patients with macrocytic anemia. This review was done to summarize the evidence regarding diagnostic accuracy, clinical utility, cost-effectiveness and evidenced based guidelines regarding serum folate testing in people with suspected folate deficiency. The report concluded that there was no relevant literature or evidence-based guidelines identified regarding diagnostic test accuracy, clinical utility, cost-effectiveness, or recommendations for serum folate testing in people with suspected folate deficiency; therefore, no summary can be provided (Tran, et al., 2023).

Epstein-Peterson et al (2020) studied the rate of folate deficiency among inpatients with cancer at a cancer center. The study focused on the value of repeated inpatient testing over the single calendar year and co-testing for vitamin B12 deficiency and evaluated the appropriateness of prescribing practices around folate deficiency. Lastly, the relationship between folate deficiency and survival in this patient population was examined. There were 1065 test performed in 937 patients with 7.0% indicating a folate deficiency. The maximum number of tests for a single patient was four, which occurred in five patients, followed by three tests in 14 patients, two tests in 85 patients, and one test in 833 patients. Repeat inpatient testing was low yield with most of the patients never testing folate deficient. Additionally, the authors reported that a folate deficiency was associated with higher risk for death. The authors concluded that folate deficiency was rare in hospitalized cancer patients. The testing for folate deficiency in admitted patients with cancer remains low yield, especially when performed repeatedly, and does not effectively guide therapy. Routine testing as a method for improving care value, even in this at-risk population is not supported.

## **Literature Review – Methods of Folate Testing**

Initial laboratory tests should include a complete blood count (CBC) and a peripheral smear (PS). Laboratory tests in folic acid deficiency would reveal anemia, manifesting as a decrease in hemoglobin and hematocrit levels. Plasma/serum folate may also be measured and is a short-term measurement of folate status based recent folic acid intake. Red blood cell (RBC) folate concentration is a measurement of folate in tissue and is a long-term measurement of folate status over the lifetime of RBCs (Means and Fairfield, 2023b).

There is very poor standardization between folate assays. In one report, a comparison of five automated serum and RBC folate assays showed differences of up to 40% for serum folate and up to 250% for RBC folate. Studies comparing serum folate with RBC folate have found that addition of RBC folate to serum folate testing does not provide substantially more clinical information (Owen and Roberts, 2003). Red blood cell folate is proposed to provide long term folate status, however, the methodology of measuring folate in the presence of the red cell protein matrix has led to poor reproducibility, and the assay cannot be recommended for routine clinical use outside of research investigations (Stabler, 2024).

Cummings et al. (2017) conducted a a cross-sectional study of dietary and genetic predictors of blood folate levels in healthy young adults. The study investigated blood folate level determinants in healthy young adults (n=265), including intake of naturally occurring food folate, synthetic FA, and the interaction of naturally occurring food folate with a common missense variant in the FOLH1 gene thought to affect absorption. The study reported that in healthy young individuals exposed to folic acid fortification, blood folate level is dependent on relative intake from naturally occurring food folate and synthetic sources of folic acid, and on genetic variation in FOLH1 484 genotype. The study also compared serum folate to RBC folate and explained that compared to serum folate, RBC folate is thought to provide a better estimate of folate levels within body tissues. However, RBC folate measurement may be considerably more vulnerable to small variations in sample storage and analysis, which may make it a less reliable measure of folate status. The study also mentioned that RBC folate assays are not standardized and results in the study obtained using ECLIA could not be compared to epidemiological cutoffs for RBC folate insufficiency.

Gilfix (2014) reviewed the utility of serum folate testing compared to red blood cell (RBC) folate testing in the era of folate fortification of flour, which has increased folate concentrations in the general population. Data from three hospitals in Canada on both serum and RBC folate levels were analyzed. While theoretically RBC folate is less susceptible to rapid changes in dietary intake, analytically, the assays have large imprecisions, which limit their usefulness. The authors concluded that there is no evidence to support routine ordering of RBC or serum folate. Even pre-selection of patients seems not to increase the prevalence of measured folate deficiency. Additionally, based on the performance statistics, and as serum folate provides equivalent results to RBC folate in almost all clinical scenarios, routine ordering of RBC folate is no longer warranted.

Farrell et al. (2013) conducted a comprehensive published review of the two folate methods and concluded that assessing a patients folate status can be clinically important evaluation and laboratories are readily able to provide the measurement of serum or red cell folate using automated competitive protein binding (CPB) assays. However, "after assessing many different aspects of the performance of serum and red cell folate assays, this review did not find evidence to justify the higher cost of routinely measuring red cell folate".

There is insufficient evidence to support the accuracy and clinical utility RBC folate testing for the diagnosis of a folate deficiency.

## **Professional Societies/Organizations – Neural Tube Defects**

**US Preventive Services Task Force (USPSTF):** In 2023, the USPSTF reaffirmed that “for persons who are planning to or could become pregnant, there is high certainty that folic acid supplementation has a substantial net benefit to prevent neural tube defects in their offspring”. The task force recommended that all persons planning to or who could become pregnant take a daily supplement containing 0.4 to 0.8mg (400 to 800 µg) of folic acid (USPSTF, 2023).

**American College of Obstetricians and Gynecologists (ACOG):** ACOG’s 2021 update on anemia in pregnancy stated that all pregnant women should be screened for anemia using a complete blood count in the first trimester and again at 24 0/7–28 6/7 weeks of gestation. Patients with hematocrit levels less than 33% in the first and third trimesters and less than 32% in the second trimester should be evaluated further to determine the cause. If iron deficiency is ruled out, other etiologies should be investigated. This recommendation is based primarily on consensus and expert opinion (ACOG, 2021).

ACOG’s joint committee opinion with American Society for Reproductive Medicine (2019) on pre-pregnancy counseling stated that female pre-pregnancy folic acid supplementation should be encouraged to reduce the risk of neural tube defects. There was no mention of measuring serum folate.

ACOG’s 2017 practice bulletin on neural tube defects (NTDs) stated that the association between folic acid supplementation and decreased risk of NTDs is well established. Folate supplementation is an important pre-pregnancy and prenatal recommendation. ACOG recommended the following (ACOG, 2017):

- All women who are planning a pregnancy or able to become pregnant should take folic acid supplementation of 400 micrograms daily.
- Supplementation should start at least 1 month prior to pregnancy and continue through the first 12 weeks of pregnancy.
- Those who are at high risk of NTDs should take 4,000 micrograms of folic acid daily. This should start 3 months before pregnancy and continue until 12 weeks of gestational age.

## **Professional Societies/Organizations – Bariatric Procedures**

**American Association of Clinical Endocrinologists (AACE), American College of Endocrinology (ACE), The Obesity Society (TOH), American Society for Metabolic & Bariatric Surgery (ASMBS), Obesity Medicine Association (OMA), American Society of Anesthesiologists (ASA):** In 2019, the AACE, ACE, TOH, ASMBS, OMA and ASA published an update to the 2013 clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergoing bariatric procedures. In regard to folate testing the guideline recommended (Mechanick, et al., 2020):

- malabsorptive bariatric procedures can cause nutritional anemias that may involve deficiencies in vitamin B12, folate, protein, copper, selenium, and zinc and may be evaluated when routine aggressive case finding for iron-deficiency anemia is negative.

**American Society for Metabolic and Bariatric Surgery (ASMBS):** The 2016 integrated health nutritional guidelines for the surgical weight loss patient on micronutrients recommended that pre-weight loss surgery (WLS) nutrient screening should be recommended for all patients. A folate deficiency would be suspected when the RBC folate is decreased, the serum homocysteine is increased and a normal MMA level.

Additionally, the ASMBS recommended for the prevention of micronutrient deficiency post-weight loss surgery (WLS) patients should take 400–800 mg oral folate daily from their multivitamin and women of childbearing age should take 800–1000 mg oral folate daily (Parrott, et al., 2017).

## **Professional Societies/Organizations – Gastrointestinal Malabsorption**

**American College of Gastroenterology (ACG):** In 2023, the ACG updated the 2013 diagnosis and management of celiac disease guideline. Patients with symptoms, signs, or laboratory evidence suggestive of malabsorption, such as chronic diarrhea with weight loss, steatorrhea, irritable bowel syndrome, abdominal pain, and bloating, should be considered for testing for CD. Testing an EGD with biopsies and serology (tissue transglutaminase [TTG]), other tests could be used which includes complete blood count, alanine aminotransferase, aspartate aminotransferase, vitamins (A, D, E, B12), copper, zinc, folic acid, ferritin, and iron. There is no recommendation or level of evidence attached to this statement (Rubio-Tapi, et al., 2023).

The ACG clinical practice update (2022) on management of short bowel syndrome provided a best practice advice for a nutritional assessment. The initial comprehensive nutritional assessment should be performed by a dietitian experienced in SBS. All patients should be assessed and folate is one of the vitamins to be assessed with recommended supplementation of 1 mg of folate daily.

**American Gastroenterological Association (AGA):** The AGA clinical practice update, expert review on the epidemiology, evaluation, and management of exocrine pancreatic insufficiency (EPI) explained that clinical features of EPI include steatorrhea with or without diarrhea, weight loss, bloating, excessive flatulence, fat soluble vitamin deficiencies, and protein-calorie malnutrition. The AGA's best practice advice included that "screening for vitamin and mineral deficiencies (vitamins A, D, E, K, B12, folate, magnesium, selenium zinc, and iron studies) at the time of diagnosis and then annually based on the clinical status of the patient, remains essential" (Whitcomb, et al., 2023).

In the AGA's clinical practice update on management of refractory celiac disease: expert review a detailed nutritional assessment should be done for macronutrient and micronutrient deficiencies. The deficiencies should be corrected using oral supplementation (Green, et al., 2022).

## **Professional Societies/Organizations – Eating Disorders**

**American Psychiatric Association (APA):** In 2023, the APA's practice guideline for the treatment of patients with eating disorders recommended the following:

- initial physical examination should include (Crone, et al., 2023):
  - vital signs, including temperature, resting heart rate, blood pressure, orthostatic pulse, and orthostatic blood pressure; height, weight, and BMI and physical appearance, including signs of malnutrition or purging behaviors.
  - laboratory assessment should include a complete blood count and a comprehensive metabolic panel, including electrolytes, liver enzymes, and renal function tests.

**American Academy of Pediatrics (AAP):** The AAP (2021) recommended a comprehensive assessment of children and adolescents with suspected eating disorders that includes a detailed and comprehensive physical examination and a full psychosocial assessment. Initial laboratory testing is done to screen for medical complications of eating disorders or to rule out alternate diagnoses. Typical initial laboratory testing includes a complete blood cell count; serum electrolytes, calcium, magnesium, phosphorus, and glucose; liver transaminases; urinalysis; and thyroid-stimulating hormone. Additionally, screening for specific vitamin and mineral deficiencies (e.g., vitamin B12, vitamin D, iron, and zinc) may be done on an individual basis depending on the nutritional history of the patient. The AAP explained that laboratory values are often normal in patients with eating disorders, however normal results do not exclude the presence of serious illness with an eating disorder or the need for hospitalization for medical stabilization (Hornberger, et al., 2021).

## **Professional Societies/Organizations – Methods of Folate Testing**



**American Board of Internal Medicine’s (ABIM) Foundation Choosing Wisely® Initiative:**

A Choosing Wisely statement from American Society for Clinical Pathology (ASCP) stated “do not order red blood cell folate levels at all. In adults, consider folate supplementation instead of serum folate testing in patients with macrocytic anemia.”

The ASCP mentioned that it is rare to have a patient with a folate deficiency and simply treating with folic acid is a more cost-effective approach than blood testing. Additionally, red blood cell folate levels have been used in the past as a substitute for tissue folate levels or a marker for folate status over the lifetime of red blood cells, the result of this testing generally does not add to the clinical diagnosis or therapeutic plan (ASCP, 2017).

**Canadian Agency for Drugs and Technologies in Health (CADTH):** The CADTH published evidence-based guidelines that addressed the lack of clarity on the clinical utility and resource implications of folate testing, as well as the uncertainty regarding the appropriate analytical methods and clinical indications for routine folate testing.

The review concluded “There is insufficient evidence to support the clinical utility of folate testing in patients at risk of folate deficiency, particularly in folic acid fortified regions. Evidence-based guidelines provide recommendations based primarily on low quality evidence and expert consensus to support the use of folate testing in specific clinical populations. There was general agreement among several guidelines that serum folate is preferable to RBC folate; however, no evidence was identified regarding the diagnostic accuracy or comparative clinical utility of the respective assays.” (CADTH, 2015).

**National Pathology Alliance:** The National Pathology Alliance benchmarking review in the UK recommended the measurement of serum folate over RBC folate (Galloway and Rushworth, 2003):

- “Evidence from the literature indicates that serum folate measurements provide equivalent information to red cell folate measurements when attempting to determine whether folate deficiency is present.”

**Medicare Coverage Determinations**

	<b>Contractor</b>	<b>Determination Name/Number</b>	<b>Revision Effective Date</b>
NCD	National	No National Coverage Determination found	
LCD	Novitas Solutions, Inc.	Assays for Vitamins and Metabolic Function (L34914)	7/1/2020

Note: Please review the current Medicare Policy for the most up-to-date information. (NCD = National Coverage Determination; LCD = Local Coverage Determination)

**Coding Information**

**Notes:**

1. This list of codes may not be all-inclusive since the American Medical Association (AMA) and Centers for Medicare & Medicaid Services (CMS) code updates may occur more frequently than policy updates.
2. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

**Considered Medically Necessary when criteria in the applicable policy statements listed above are met:**

<b>CPT®* Codes</b>	<b>Description</b>
82746	Folate, Serum Testing

<b>ICD-10-CM Diagnosis Codes</b>	<b>Description</b>
D46.A	Refractory cytopenia with multilineage dysplasia
D46.B	Refractory cytopenia with multilineage dysplasia and ring sideroblasts
D46.20	Refractory anemia with excess of blasts, unspecified
D46.21	Refractory anemia with excess of blasts 1
D46.4	Refractory anemia, unspecified
D46.9	Myelodysplastic syndrome, unspecified
D50.8	Other iron deficiency anemias
D50.9	Iron deficiency anemia, unspecified
D51.0	Vitamin B12 deficiency anemia due to intrinsic factor deficiency
D51.1	Vitamin B12 deficiency anemia due to selective vitamin B12 malabsorption with proteinuria
D51.2	Transcobalamin II deficiency
D51.3	Other dietary vitamin B12 deficiency anemia
D51.8	Other vitamin B12 deficiency anemias
D51.9	Vitamin B12 deficiency anemia, unspecified
D52.0	Dietary folate deficiency anemia
D52.1	Drug-induced folate deficiency anemia
D52.8	Other folate deficiency anemias
D52.9	Folate deficiency anemia, unspecified
D53.0	Protein deficiency anemia
D53.1	Other megaloblastic anemias, not elsewhere classified
D53.2	Scorbutic anemia
D53.8	Other specified nutritional anemias
D53.9	Nutritional anemia, unspecified
D56.1	Beta thalassemia
D58.2	Other hemoglobinopathies
D59.4	Other nonautoimmune hemolytic anemias
D59.8	Other acquired hemolytic anemias
D59.9	Acquired hemolytic anemia, unspecified
D61.818	Other pancytopenia
D61.89	Other specified aplastic anemias and other bone marrow failure syndromes
D61.9	Aplastic anemia, unspecified
D69.3	Immune thrombocytopenic purpura
D69.49	Other primary thrombocytopenia
D69.59	Other secondary thrombocytopenia
D69.6	Thrombocytopenia, unspecified
D70.8	Other neutropenia
D70.9	Neutropenia, unspecified
D72.819	Decreased white blood cell count, unspecified
E40	Kwashiorkor
E42	Marasmic kwashiorkor

<b>ICD-10-CM Diagnosis Codes</b>	<b>Description</b>
E43	Unspecified severe protein-calorie malnutrition
E44.0	Moderate protein-calorie malnutrition
F02.80	Dementia in other diseases classified elsewhere, unspecified severity, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F02.811	Dementia in other diseases classified elsewhere, unspecified severity, with agitation
F02.818	Dementia in other diseases classified elsewhere, unspecified severity, with other behavioral disturbance
F02.82	Dementia in other diseases classified elsewhere, unspecified severity, with psychotic disturbance
F02.83	Dementia in other diseases classified elsewhere, unspecified severity, with mood disturbance
F02.84	Dementia in other diseases classified elsewhere, unspecified severity, with anxiety
F02.A0	Dementia in other diseases classified elsewhere, mild, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F02.A11	Dementia in other diseases classified elsewhere, mild, with agitation
F02.A18	Dementia in other diseases classified elsewhere, mild, with other behavioral disturbance
F02.A2	Dementia in other diseases classified elsewhere, mild, with psychotic disturbance
F02.A3	Dementia in other diseases classified elsewhere, mild, with mood disturbance
F02.A4	Dementia in other diseases classified elsewhere, mild, with anxiety
F02.B0	Dementia in other diseases classified elsewhere, moderate, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F02.B11	Dementia in other diseases classified elsewhere, moderate, with agitation
F02.B18	Dementia in other diseases classified elsewhere, moderate, with other behavioral disturbance
F02.B2	Dementia in other diseases classified elsewhere, moderate, with psychotic disturbance
F02.B3	Dementia in other diseases classified elsewhere, moderate, with mood disturbance
F02.B4	Dementia in other diseases classified elsewhere, moderate, with anxiety
F02.C0	Dementia in other diseases classified elsewhere, severe, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F02.C11	Dementia in other diseases classified elsewhere, severe, with agitation
F02.C18	Dementia in other diseases classified elsewhere, severe, with other behavioral disturbance
F02.C2	Dementia in other diseases classified elsewhere, severe, with psychotic disturbance
F02.C3	Dementia in other diseases classified elsewhere, severe, with mood disturbance
F02.C4	Dementia in other diseases classified elsewhere, severe, with anxiety
F03.90	Unspecified dementia, unspecified severity, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F03.911	Unspecified dementia, unspecified severity, with agitation
F03.918	Unspecified dementia, unspecified severity, with other behavioral disturbance
F03.92	Unspecified dementia, unspecified severity, with psychotic disturbance
F03.93	Unspecified dementia, unspecified severity, with mood disturbance
F03.94	Unspecified dementia, unspecified severity, with anxiety

<b>ICD-10-CM Diagnosis Codes</b>	<b>Description</b>
F03.A0	Unspecified dementia, mild, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F03.A11	Unspecified dementia, mild, with agitation
F03.A18	Unspecified dementia, mild, with other behavioral disturbance
F03.A2	Unspecified dementia, mild, with psychotic disturbance
F03.A3	Unspecified dementia, mild, with mood disturbance
F03.A4	Unspecified dementia, mild, with anxiety
F03.B0	Unspecified dementia, moderate, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F03.B11	Unspecified dementia, moderate, with agitation
F03.B18	Unspecified dementia, moderate, with other behavioral disturbance
F03.B2	Unspecified dementia, moderate, with psychotic disturbance
F03.B3	Unspecified dementia, moderate, with mood disturbance
F03.B4	Unspecified dementia, moderate, with anxiety
F03.C0	Unspecified dementia, severe, without behavioral disturbance, psychotic disturbance, mood disturbance, and anxiety
F03.C11	Unspecified dementia, severe, with agitation
F03.C18	Unspecified dementia, severe, with other behavioral disturbance
F03.C2	Unspecified dementia, severe, with psychotic disturbance
F03.C3	Unspecified dementia, severe, with mood disturbance
F03.C4	Unspecified dementia, severe, with anxiety
F10.10	Alcohol abuse, uncomplicated
F10.11	Alcohol abuse, in remission
F10.120	Alcohol abuse with intoxication, uncomplicated
F10.121	Alcohol abuse with intoxication delirium
F10.129	Alcohol abuse with intoxication, unspecified
F10.130	Alcohol abuse with withdrawal, uncomplicated
F10.131	Alcohol abuse with withdrawal delirium
F10.132	Alcohol abuse with withdrawal with perceptual disturbance
F10.139	Alcohol abuse with withdrawal, unspecified
F10.14	Alcohol abuse with alcohol-induced mood disorder
F10.150	Alcohol abuse with alcohol-induced psychotic disorder with delusions
F10.151	Alcohol abuse with alcohol-induced psychotic disorder with hallucinations
F10.159	Alcohol abuse with alcohol-induced psychotic disorder, unspecified
F10.180	Alcohol abuse with alcohol-induced anxiety disorder
F10.181	Alcohol abuse with alcohol-induced sexual dysfunction
F10.182	Alcohol abuse with alcohol-induced sleep disorder
F10.188	Alcohol abuse with other alcohol-induced disorder
F10.19	Alcohol abuse with unspecified alcohol-induced disorder
F10.20	Alcohol dependence, uncomplicated
F10.21	Alcohol dependence, in remission
F10.220	Alcohol dependence with intoxication, uncomplicated
F10.221	Alcohol dependence with intoxication delirium
F10.229	Alcohol dependence with intoxication, unspecified
F10.230	Alcohol dependence with withdrawal, uncomplicated
F10.231	Alcohol dependence with withdrawal delirium
F10.232	Alcohol dependence with withdrawal with perceptual disturbance
F10.239	Alcohol dependence with withdrawal, unspecified

<b>ICD-10-CM Diagnosis Codes</b>	<b>Description</b>
F10.24	Alcohol dependence with alcohol-induced mood disorder
F10.250	Alcohol dependence with alcohol-induced psychotic disorder with delusions
F10.251	Alcohol dependence with alcohol-induced psychotic disorder with hallucinations
F10.259	Alcohol dependence with alcohol-induced psychotic disorder, unspecified
F10.26	Alcohol dependence with alcohol-induced persisting amnestic disorder
F10.27	Alcohol dependence with alcohol-induced persisting dementia
F10.280	Alcohol dependence with alcohol-induced anxiety disorder
F10.281	Alcohol dependence with alcohol-induced sexual dysfunction
F10.282	Alcohol dependence with alcohol-induced sleep disorder
F10.288	Alcohol dependence with other alcohol-induced disorder
F10.29	Alcohol dependence with unspecified alcohol-induced disorder
F10.90	Alcohol use, unspecified, uncomplicated
F10.91	Alcohol use, unspecified, in remission
F10.920	Alcohol use, unspecified with intoxication, uncomplicated
F10.921	Alcohol use, unspecified with intoxication delirium
F10.929	Alcohol use, unspecified with intoxication, unspecified
F10.931	Alcohol use, unspecified with withdrawal delirium
F10.932	Alcohol use, unspecified with withdrawal with perceptual disturbance
F10.939	Alcohol use, unspecified with withdrawal, unspecified
F10.94	Alcohol use, unspecified with alcohol-induced mood disorder
F10.950	Alcohol use, unspecified with alcohol-induced psychotic disorder with delusions
F10.951	Alcohol use, unspecified with alcohol-induced psychotic disorder with hallucinations
F10.959	Alcohol use, unspecified with alcohol-induced psychotic disorder, unspecified
F10.96	Alcohol use, unspecified with alcohol-induced persisting amnestic disorder
F10.97	Alcohol use, unspecified with alcohol-induced persisting dementia
F10.980	Alcohol use, unspecified with alcohol-induced anxiety disorder
F10.981	Alcohol use, unspecified with alcohol-induced sexual dysfunction
F10.982	Alcohol use, unspecified with alcohol-induced sleep disorder
F10.988	Alcohol use, unspecified with other alcohol-induced disorder
F10.99	Alcohol use, unspecified with unspecified alcohol-induced disorder
F50.00	Anorexia nervosa, unspecified
F50.01	Anorexia nervosa, restricting type
F50.02	Anorexia nervosa, binge eating/purging type
F50.2	Bulimia nervosa
F50.81	Binge eating disorder
F50.82	Avoidant/restrictive food intake disorder
F50.89	Other specified eating disorder
F50.9	Eating disorder, unspecified
G31.01	Pick's disease
G31.09	Other frontotemporal neurocognitive disorder
G31.1	Senile degeneration of brain, not elsewhere classified
G31.2	Degeneration of nervous system due to alcohol
G31.81	Alpers disease
G31.82	Leigh's disease
G31.83	Neurocognitive disorder with Lewy bodies
G31.84	Mild cognitive impairment of uncertain or unknown etiology
G31.85	Corticobasal degeneration

<b>ICD-10-CM Diagnosis Codes</b>	<b>Description</b>
G31.89	Other specified degenerative diseases of nervous system
G31.9	Degenerative disease of nervous system, unspecified
G60.3	Idiopathic progressive neuropathy
G62.0	Drug-induced polyneuropathy
G62.1	Alcoholic polyneuropathy
G62.2	Polyneuropathy due to other toxic agents
G62.81	Critical illness polyneuropathy
G62.82	Radiation-induced polyneuropathy
G62.89	Other specified polyneuropathies
G62.9	Polyneuropathy, unspecified
G64	Other disorders of peripheral nervous system
K50.00	Crohn's disease of small intestine without complications
K50.011	Crohn's disease of small intestine with rectal bleeding
K50.012	Crohn's disease of small intestine with intestinal obstruction
K50.013	Crohn's disease of small intestine with fistula
K50.014	Crohn's disease of small intestine with abscess
K50.018	Crohn's disease of small intestine with other complication
K50.019	Crohn's disease of small intestine with unspecified complications
K50.10	Crohn's disease of large intestine without complications
K50.111	Crohn's disease of large intestine with rectal bleeding
K50.112	Crohn's disease of large intestine with intestinal obstruction
K50.113	Crohn's disease of large intestine with fistula
K50.114	Crohn's disease of large intestine with abscess
K50.118	Crohn's disease of large intestine with other complication
K50.119	Crohn's disease of large intestine with unspecified complications
K50.80	Crohn's disease of both small and large intestine without complications
K50.811	Crohn's disease of both small and large intestine with rectal bleeding
K50.812	Crohn's disease of both small and large intestine with intestinal obstruction
K50.813	Crohn's disease of both small and large intestine with fistula
K50.814	Crohn's disease of both small and large intestine with abscess
K50.818	Crohn's disease of both small and large intestine with other complication
K50.819	Crohn's disease of both small and large intestine with unspecified complications
K50.90	Crohn's disease, unspecified, without complications
K50.911	Crohn's disease, unspecified, with rectal bleeding
K50.912	Crohn's disease, unspecified, with intestinal obstruction
K50.913	Crohn's disease, unspecified, with fistula
K50.914	Crohn's disease, unspecified, with abscess
K50.918	Crohn's disease, unspecified, with other complication
K50.919	Crohn's disease, unspecified, with unspecified complications
K70.0	Alcoholic fatty liver
K70.10	Alcoholic hepatitis without ascites
K70.11	Alcoholic hepatitis with ascites
K70.2	Alcoholic fibrosis and sclerosis of liver
K70.30	Alcoholic cirrhosis of liver without ascites
K70.31	Alcoholic cirrhosis of liver with ascites
K70.40	Alcoholic hepatic failure without coma
K70.41	Alcoholic hepatic failure with coma
K70.9	Alcoholic liver disease, unspecified

<b>ICD-10-CM Diagnosis Codes</b>	<b>Description</b>
K86.81	Exocrine pancreatic insufficiency
K90.0	Celiac disease
K90.1	Tropical sprue
K90.81	Whipple's disease
K90.821	Short bowel syndrome with colon in continuity
K90.822	Short bowel syndrome without colon in continuity
K90.89	Other intestinal malabsorption
K90.9	Intestinal malabsorption, unspecified
K91.2	Postsurgical malabsorption, not elsewhere classified
Q00.0	Anencephaly
Q00.1	Craniorachischisis
Q00.2	Iniencephaly
Q01.0	Frontal encephalocele
Q01.1	Nasofrontal encephalocele
Q01.2	Occipital encephalocele
Q01.8	Encephalocele of other sites
Q01.9	Encephalocele, unspecified
Q02	Microcephaly
Q03.0	Malformations of aqueduct of Sylvius
Q03.1	Atresia of foramina of Magendie and Luschka
Q03.8	Other congenital hydrocephalus
Q03.9	Congenital hydrocephalus, unspecified
Q04.0	Congenital malformations of corpus callosum
Q04.1	Arhinencephaly
Q04.2	Holoprosencephaly
Q04.3	Other reduction deformities of brain
Q04.4	Septo-optic dysplasia of brain
Q04.5	Megalencephaly
Q04.6	Congenital cerebral cysts
Q04.8	Other specified congenital malformations of brain
Q04.9	Congenital malformation of brain, unspecified
Q05.0	Cervical spina bifida with hydrocephalus
Q05.1	Thoracic spina bifida with hydrocephalus
Q05.2	Lumbar spina bifida with hydrocephalus
Q05.3	Sacral spina bifida with hydrocephalus
Q05.4	Unspecified spina bifida with hydrocephalus
Q05.5	Cervical spina bifida without hydrocephalus
Q05.6	Thoracic spina bifida without hydrocephalus
Q05.7	Lumbar spina bifida without hydrocephalus
Q05.8	Sacral spina bifida without hydrocephalus
Q05.9	Spina bifida, unspecified
Q06.0	Amyelia
Q06.1	Hypoplasia and dysplasia of spinal cord
Q06.2	Diastematomyelia
Q06.3	Other congenital cauda equina malformations
Q06.4	Hydromyelia
Q06.8	Other specified congenital malformations of spinal cord
Q06.9	Congenital malformation of spinal cord, unspecified

ICD-10-CM Diagnosis Codes	Description
Q07.00	Arnold-Chiari syndrome without spina bifida or hydrocephalus
Q07.01	Arnold-Chiari syndrome with spina bifida
Q07.02	Arnold-Chiari syndrome with hydrocephalus
Q07.03	Arnold-Chiari syndrome with spina bifida and hydrocephalus
Q07.8	Other specified congenital malformations of nervous system
Q07.9	Congenital malformation of nervous system, unspecified
Z98.84	Bariatric surgery status

**Not Covered or Reimbursable:**

ICD-10-CM Diagnosis Codes	Description
	All other diagnosis codes

**Not Covered or Reimbursable:**

CPT®*	Description
82747	Folic Acid, RBC (Red Blood Cell)

ICD-10-CM Diagnosis Codes	Description
	All diagnosis codes

**\*Current Procedural Terminology (CPT®) ©2023 American Medical Association: Chicago, IL.**

## References

1. ACOG Committee Opinion No. 762: Prepregnancy Counseling. *Obstet Gynecol.* 2019 Jan;133(1):e78-e89.
2. Anemia in Pregnancy: ACOG Practice Bulletin, Number 233. *Obstet Gynecol.* 2021 Aug 1;138(2):e55-e64.
3. Barcellini W. Macrocytosis/Macrocytic anemia. In: UpToDate, Brodsky RA (Ed), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: January 2022. Accessed November 21, 2023.
4. CDC. CDC Grand Rounds: additional opportunities to prevent neural tube defects with folic acid fortification. *Morbidity and Mortality Weekly Report.* 2010;59:980-4.
5. CDC. Updated Estimates of Neural Tube Defects Prevented by Mandatory Folic Acid Fortification — United States, 1995–2011. *Morbidity and Mortality Weekly Report.* 2015;64(01);1-5.
6. Choosing Wisely. American Society for Clinical Pathology. Thirty-Five Things Physicians and Patients Should Question. September 19, 2017. Accessed November 13, 2023. Available at



URL address: [https://www.ascp.org/content/docs/default-source/get-involved-pdfs/istp\\_choosingwisely/ascp-35-things-list\\_2020\\_final.pdf](https://www.ascp.org/content/docs/default-source/get-involved-pdfs/istp_choosingwisely/ascp-35-things-list_2020_final.pdf)

7. Coffey-Vega K. Folate Deficiency Treatment & Management. Medscape. Updated July 20, 2022. Accessed November 16, 2023. Available at URL address: <https://emedicine.medscape.com/article/200184-treatment?form=fpf>
8. Cordero AM, Crider KS, Rogers LM, Cannon MJ, Berry RJ. Optimal serum and red blood cell folate concentrations in women of reproductive age for prevention of neural tube defects: World Health Organization guidelines. *MMWR Morb Mortal Wkly Rep*. 2015 Apr 24;64(15):421-3.
9. Crider KS, Bailey LB, Berry RJ. Folic acid food fortification-its history, effect, concerns, and future directions. *Nutrients*. 2011 Mar;3(3):370-84.
10. Crider KS, Devine O, Qi YP, Yeung LF, Sekkarie A, Zaganjor I, et al. Systematic Review and Bayesian Meta-analysis of the Dose-response Relationship between Folic Acid Intake and Changes in Blood Folate Concentrations. *Nutrients*. 2019 Jan 2;11(1):71.
11. Crone C, Fochtmann LJ, Attia E, Boland R, Escobar J, Fornari V, et al. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Eating Disorders. *Am J Psychiatry*. 2023 Feb 1;180(2):167-171.
12. Cummings D, Dowling KF, Silverstein NJ, Tanner AS, Eryilmaz H, Smoller JW, Roffman JL. A Cross-Sectional Study of Dietary and Genetic Predictors of Blood Folate Levels in Healthy Young Adults. *Nutrients*. 2017 Sep 8;9(9):994.
13. De Bruyn E, Gulbis B, Cotton F. Serum and red blood cell folate testing for folate deficiency: new features? *Eur J Haematol*. 2014 Apr;92(4):354-9.
14. Devalia V, Hamilton MS, Molloy AM; British Committee for Standards in Haematology. Guidelines for the diagnosis and treatment of cobalamin and folate disorders. *Br J Haematol*. 2014 Aug;166(4):496-513.
15. Donini LM. Eating disorders: a comprehensive guide to medical care and complications (fourth edition) : Edited by Philip Mehler and Arnold Andersen. *Eat Weight Disord*. 2022 Dec;27(8):2987-2988.
16. Dukhovny S, Wilkins-Haug L. Neural tube defects: Overview of prenatal screening, evaluation, and pregnancy management. In: UpToDate, Levine D, Simpson LL. (Eds), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: March 22, 2023. Accessed November 13, 2023.
17. Epstein-Peterson ZD, Li DG, Lavery JA, Barrow B, Chokshi I, Korenstein D. Inpatient folate testing at an academic cancer center: single-year experience. *Support Care Cancer*. 2020 Sep;28(9):4235-4240.
18. Farrell CJ, Kirsch SH, Herrmann M. Red cell or serum folate: what to do in clinical practice? *Clin Chem Lab Med*. 2013 Mar 1;51(3):555-69.
19. Folate Testing: A Review of the Diagnostic Accuracy, Clinical Utility, Cost Effectiveness and Guidelines [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in

Health; 2015 Jul 23. Accessed November 13, 2023. Available at URL address:  
<https://www.ncbi.nlm.nih.gov/books/NBK310977>

20. Galloway M, Rushworth L. Red cell or serum folate? Results from the National Pathology Alliance benchmarking review. *J Clin Pathol*. 2003;56:924-926.
21. Gilfix BM. Utility of measuring serum or red blood cell folate in the era of folate fortification of flour. *Clin Biochem*. 2014 May;47(7-8):533-8.
22. Goetzi LM. Preconception and prenatal folic acid supplementation. In: UpToDate, Wilkins-Haug L. (Eds), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: October 30, 2023. Accessed November 13, 2023.
23. Green PHR, Paski S, Ko CW, Rubio-Tapia A. AGA Clinical Practice Update on Management of Refractory Celiac Disease: Expert Review. *Gastroenterology*. 2022 Nov;163(5):1461-1469.
24. Hornberger LL, Lane MA; COMMITTEE ON ADOLESCENCE. Identification and Management of Eating Disorders in Children and Adolescents. *Pediatrics*. 2021 Jan;147(1):e2020040279.
25. Means RT, Brodsky RA. Diagnostic approach to anemia in adults. In: UpToDate, Elmore JG (Ed), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: September 2022. Accessed November 21, 2023.
26. Means RT, Fairfield KM. Causes and pathophysiology of vitamin B12 and folate deficiencies. In: UpToDate, Takemoto CM, Tirnauer JS. (Eds), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: October 18, 2023a. Accessed November 13, 2023.
27. Means RT, Fairfield KM. Clinical manifestations and diagnosis of vitamin B12 and folate deficiency. In: UpToDate, Takemoto CM, Tirnauer JS. (Eds), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: June 16, 2023b. Accessed November 13, 2023.
28. Means RT, Fairfield KM. Treatment of vitamin B12 and folate deficiencies. In: UpToDate, Takemoto CM, Tirnauer JS. (Eds), UpToDate, Waltham, MA. Literature review current through: October 2023. Topic last updated: October 6, 2023c. Accessed November 13, 2023.
29. Mechanick JI, Apovian C, Brethauer S, Timothy Garvey W, Joffe AM, Kim J, et al. Clinical Practice Guidelines for the Perioperative Nutrition, Metabolic, and Nonsurgical Support of Patients Undergoing Bariatric Procedures - 2019 Update: Cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology, The Obesity Society, American Society for Metabolic and Bariatric Surgery, Obesity Medicine Association, and American Society of Anesthesiologists. *Obesity (Silver Spring)*. 2020 Apr;28(4):O1-O58.
30. National Institutes of Health (NIH): Office of Dietary Supplements. Folate Fact Sheet for Health Professionals. 2022. Accessed November 16, 2023. Available at URL address:  
<https://ods.od.nih.gov/factsheets/Folate-HealthProfessional/>
31. Neural Tube Defects: ACOG Practice Bulletin, Number 187. *Obstet Gynecol*. 2017 Dec;130(6):e279-e290.

32. Owen WE, Roberts WL. Comparison of five automated serum and whole blood folate assays. *Am J Clin Pathol.* 2003 Jul;120(1):121-6.
33. Parrott J, Frank L, Rabena R, Craggs-Dino L, Isom KA, Greiman L. 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 May;13(5):727-741.
34. Rubio-Tapia A, Hill ID, Semrad C, Kelly CP, Greer KB, Limketkai BN, et al. American College of Gastroenterology Guidelines Update: Diagnosis and Management of Celiac Disease. *Am J Gastroenterol.* 2023 Jan 1;118(1):59-76.
35. Stabler SP. Megaloblastic Anemias. In: Goldman L, Cooney KA. *Goldman-Cecil Medicine.* 27th ed. Philadelphia, PA: Elsevier Inc; 2024. Ch 150. pgs 1117-1125.e1
36. Stover P.J. Folate biochemical pathways and their regulation. In: Bailey L.B., editor. *Folate in Health and Disease.* 2nd. CRC Press, Taylor & Francis Group; Gainesville, FL, USA: 2009. pp. 49–74.
37. Theisen-Toupal J, Horowitz G, Breu A. Low yield of outpatient serum folate testing: eleven years of experience. *JAMA Intern Med.* 2014 Oct;174(10):1696-7.
38. Tran K, Mierzwinski-Urban M, Mahood Q. Folate Testing in People with Suspected Folate Deficiency: CADTH Health Technology Review [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2022 Mar.
39. US Preventive Services Task Force; Barry MJ, Nicholson WK, Silverstein M, Chelmow D, Coker TR, Davis EM, et al. Folic Acid Supplementation to Prevent Neural Tube Defects: US Preventive Services Task Force Reaffirmation Recommendation Statement. *JAMA.* 2023 Aug 1;330(5):454-459.
40. Viswanathan M, Treiman KA, Kish-Doto J, Middleton JC, Coker-Schwimmer EJ, Nicholson WK. Folic Acid Supplementation for the Prevention of Neural Tube Defects: An Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA.* 2017 Jan 10;317(2):190-203.
41. Viswanathan M, Urrutia RP, Hudson K, Middleton JC, Kahwati, LC. Folic Acid Supplementation to Prevent Neural Tube Defects: A Limited Systematic Review Update for the U.S. Preventive Services Task Force. Evidence Synthesis No. 230. AHRQ Publication No. 22-05302-EF-1. Rockville, MD: Agency for Healthcare Research and Quality; 2023.
42. Vitamin B12 (2022). AACC. Accessed November 13, 2023. Available at URL address: <https://labtestsonline.org/conditions/vitamin-b12-and-folate-deficiencies>.
43. Whitcomb DC, Buchner AM, Forsmark CE. AGA Clinical Practice Update on the Epidemiology, Evaluation, and Management of Exocrine Pancreatic Insufficiency: Expert Review. *Gastroenterology.* 2023 Nov;165(5):1292-1301.
44. Wilson RD, O'Connor DL. Guideline No. 427: Folic Acid and Multivitamin Supplementation for Prevention of Folic Acid-Sensitive Congenital Anomalies. *J Obstet Gynaecol Can.* 2022 Jun;44(6):707-719.e1. doi: 10.1016/j.jogc.2022.04.004. Erratum in: *J Obstet Gynaecol Can.* 2022 Oct;44(10):1114

## Revision Details

Type of Revision	Summary of Changes	Date
Annual Revision	<ul style="list-style-type: none"><li data-bbox="516 359 846 384">• New coverage policy.</li></ul>	8/17/2024

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