Medical Coverage Policy

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Nutritional Support

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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 and have discretion in making individual coverage determinations. 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 the use of oral, enteral or parenteral nutritional supplements that may be necessary for some individuals to maintain adequate nutrition.

Coverage Policy

Coverage for oral and enteral nutritional formula for insured and other state-regulated benefit plans is frequently governed by state mandates. Oral and enteral nutritional formula benefit plan language differs significantly across plans but coverage is most often limited to formula for infants under 12 months of age with an inborn error of metabolism. Refer to the applicable benefit plan document to determine benefit availability and the terms, conditions and limitations of coverage.

Oral and Enteral Infant Nutritional Formula

Infant (i.e., ≤ 12 months of age) nutritional formula is considered medically necessary when specifically formulated for the treatment of an inborn error of metabolism (e.g., disorder of amino acid or organic acid metabolism).

Home Enteral Infusion Pumps

Coverage for Durable Medical Equipment (DME) home enteral infusion pumps is subject to the terms, conditions and limitations of the applicable benefit plan's Durable Medical Equipment (DME) benefit and schedule of copayments. Please refer to the applicable benefit plan document to determine benefit availability and the terms, conditions and limitations of coverage. Coverage for a home enteral infusion pump is independent of whether or not coverage exists for the formula being used.

If coverage for home enteral infusion pumps is available, one (1) home enteral infusion pump is considered medically necessary DME when gravity or syringe feedings are not tolerated or a controlled rate of infusion is required.

Home Parenteral Nutrition

Home parenteral/home total parenteral nutrition (TPN) is considered medically necessary when nutritional status cannot be adequately maintained on oral or enteral feedings.

Home Parenteral Infusion Pumps

Coverage for home parenteral infusion pumps is subject to the terms, conditions and limitations of the applicable benefit plan's Durable Medical Equipment (DME) benefit and schedule of copayments. Please refer to the applicable benefit plan document to determine benefit availability and the terms, conditions and limitations of coverage.

If coverage for home parenteral infusion pumps is available, one (1) home parenteral infusion pump and associated supplies are considered medically necessary DME when criteria for home parenteral nutrition have been met.

Intradialytic Parenteral Nutrition (IDPN)

Intradialytic parenteral nutrition (IDPN) is considered medically necessary when BOTH of the following criteria are met:

- the individual is on chronic hemodialysis
- the individual is a candidate for total parenteral nutrition (i.e., nutritional status cannot be adequately maintained on oral or enteral feedings)

Specialized intradialytic parenteral nutrition solutions are considered clinically equivalent, but not clinically superior, to standard formulations of intradialytic parenteral nutrition.

Coverage for specialized intradialytic parenteral nutrition may depend upon the applicable health benefit plan definition of medical necessity. Many health benefit plans administered by Cigna contain definitions of medical necessity which include a cost comparison component. For example, some benefit plans administered by Cigna define Medically Necessary/Medical Necessity, in pertinent part, as "not more costly than an alternative service or sequence of services at least as likely to produce equivalent therapeutic or diagnostic results as to the diagnosis or treatment of that individual's illness, injury or disease. Because there are various intradialytic parenteral nutrition preparations, where one may be significantly more expensive than the other but not proven to be clinically superior, a more expensive specialized intradialytic parenteral nutritional solution may be considered not medically necessary under these plans.

Digestive Enzyme Cartridge

A digestive enzyme cartridge (e.g., Relizorb™) for use with enteral tube feeding is considered medically necessary for the treatment of pancreatic insufficiency due to cystic fibrosis when there is documented failure of pancreatic enzyme replacement therapy (PERT).

A digestive enzyme cartridge (e.g., Relizorb™) for ANY other indication is considered experimental, investigational or unproven.

Not Medically Necessary Items

Each of the following items is considered not medically necessary for ANY indication:

- standardized or specialized infant formula for conditions other than inborn errors of metabolism, including, but not limited to: food allergies; multiple protein intolerances; lactose intolerances; gluten-free formula for gluten-sensitive enteropathy/celiac disease; milk allergies; sensitivities to intact protein; protein or fat maldigestion; intolerances to soy formulas or protein hydrolysates; prematurity; or low birth-weight
- baby food
- banked breast milk provided to a non-hospitalized infant
- dietary additives and food supplements
- food thickeners
- gluten-free food products
- grocery items that can be blenderized and used with an enteral feeding system
- high protein powders and mixes
- lactose-free products; products to aid in lactose digestion
- low carbohydrate diets
- normal grocery items
- nutritional supplement puddings
- oral/enteral formula used to replace fluids and electrolytes
- oral vitamins and minerals
- weight-loss foods and formula; products to aid weight loss

General Background

Specialized nutritional support is often required for patients who have chronic disease or for those undergoing long-term rehabilitation who are at risk for malnutrition. Nutritional support can be provided orally, enterally (through a tube into the stomach or small intestine) and intravenously.

Malnutrition is commonly defined in the medical literature as a non-edematous or post-dialysis weight loss of at least 10% of ideal body weight over a three-month period or a serum albumin of less than 3.4 grams/dL. Malnutrition can occur in otherwise healthy individuals when they are deprived of adequate nutrients for an extended period of time. Compared to younger adults, malnutrition in older individuals is more common and can have a greater impact on health outcomes. The prevalence of malnutrition in older adults is dependent upon the population studied, and varies by geography, age and living situation (Ritchie and Yukawa, 2021).

Malnutrition in children can be acute or chronic. Acute malnutrition occurs in approximately 32.7 million children and is primarily a problem in resource-limited regions especially South Asia (including Afghanistan, India, Pakistan, Bangladesh, and Nepal) and sub-Saharan Africa. Acute malnutrition is uncommon in North America, Australia, and other resource-rich regions (Goday, 2020). Chronic malnutrition occurs in 144 million children. The prevalence has gradually declined in most regions during the past three decades (from 39.3 percent in 1990 to 21.3 percent in 2020). The decline is associated with improvements in education, socioeconomic status, sanitation, access to maternal health services, and family planning. However, the prevalence of stunting remains unacceptably high in many regions, particularly South Asia and sub-Saharan Africa, where it affects more than 30 percent of children (Goday, 2020).

Oral and Enteral Nutrition

Nutritional support provided via the gastrointestinal tract can be taken by mouth or provided enterally. Oral nutrition refers to nutrition taken through the mouth. Enteral nutrition is commonly defined as the provision of nutritional requirements through a tube in the stomach or small intestine. The major types of enteral nutrition formulas include the following (Makola, 2005):

1. Elemental/amino acid-based: contains free amino acids, glucose polymers, and are low fat with only about 2% to 3% of calories derived from long chain triglycerides (LCT)

2. Semi-elemental: contains peptides of varying chain length, simple sugars, glucose polymers or starch and fat, primarily as medium chain triglycerides (MCT)
3. Standard or polymeric: contains intact proteins, complex carbohydrates and mainly LCTs
4. Specialized/disease-specific and immune-enhancing: contains biologically active substances or nutrients such as glutamine, arginine, nucleotides or essential fatty acids

For certain metabolic and malabsorption disorders, an infant or child may require an elemental formal because of the inability to digest whole proteins found in standard formula. Individuals may require enteral nutritional therapy to provide sufficient nutrients to maintain weight and strength commensurate with their overall health status if their nutritional needs cannot be met through dietary adjustments and/or oral supplements. In general, patients may require enteral nutritional therapy when they have one of the following:

- a functional impairment or disease of the structures that normally permit food to reach the small bowel
- a disease of the small bowel that impairs digestion and/or absorption of an oral diet

For most facility inpatient stays, room and board, including food, are covered. Room and board charges are generally inclusive of the bed, related room charges, and food, including special diets such as cardiac, diabetic, clear liquids, etc., along with general services and activities needed for the care of an inpatient. Some services such as enteral and intravenous feedings may be reimbursed separately.

Inborn Errors of Metabolism
Oral or enteral nutritional formula may be required for infants, defined by the Centers for Disease Control and Prevention (CDC) as zero to one year of age (CDC, 2021), with inborn errors of metabolism (IEM). The broad category of “metabolic diseases” includes inborn errors of amino acid metabolism, such as phenylketonuria, maternal phenylketonuria, maple syrup urine disease, homocystinuria, methylmalonicacidemia, propionicacidemia, isovalericacidemia, and other disorders of leucine metabolism; glutaricaciduria type I and tyrosinemia types I and II; and urea cycle disorders. These are all disorders treatable by dietary modifications, which can prevent complications like severe intellectual disability and death (Greer: American Academy of Pediatrics Committee on Nutrition, 2003). In these disorders, the metabolic pathway is disrupted and excessive accumulation of an amino acid or other product results. If the appropriate dietary restriction of one or more applicable amino acids is introduced early in life, complications can be prevented or limited. Specialized medical food, including low protein and amino acid modified food, may be required as the infant outgrows the need for formula. Globally, different IEM classifications and IEM screening methods are used which causes the prevalence of IEMs to be different between countries. Because of their heterogeneity, different disorders have different distinct epidemiologies, presentations, and inheritability. There are certain populations that have increased carrier rates for IEM, and testing of asymptomatic future parent’s decreases disease prevalence. Preconception screening started in the Ashkenazi Jewish population which screened for carriers of Tay-Sachs disease. Due to the carrier screening, the prevalence of Tay-Sachs disease decreased by 90% between 1970 and 1993 in the Jewish populations of North America (Jeanmonod, et al., 2021; Ismail, et al., 2020; Kruszka and Regier, 2019).

While conditions such as mitochondrial disorders are considered metabolic diseases, there is typically no specific treatment for these disorders. As such, specific nutritional replacement therapy does not treat the condition or prevent neurologic injury and subsequent developmental issues in infants and children.

Malabsorption Syndromes
Malabsorption is impaired nutrient absorption at any point where nutrients are absorbed. Malabsorption disorders can be caused by mucosal abnormalities usually resulting in malabsorption of multiple nutrients or malabsorption of specific nutrients (carbohydrate, fat, protein, vitamins, minerals, and trace elements). Malabsorption affects millions of people worldwide and has multiple etiologies that obscures the prevalence and incidence. However, some malabsorption syndromes can be estimated by discussing the epidemiology of subgroups. Gluten-sensitive enteropathy (GSE) is present at its highest rates in Europeans and North Americans. GSE can be found in parts of India and is rarest in those of Asian, Caribbean, and African descent. Tropical sprue is known for affecting residents and visitors to Puerto Rico, the Caribbean, West Africa, northern South America, south-east Asia, and India (Zuvarox and Belletieri, 2021).

Individuals with malabsorption syndromes may benefit from enteral nutritional support. Enteral nutritional support may be indicated when the formula comprises the primary source of nutrition (i.e., 60% or more of caloric nutritional intake).

Malabsorption syndromes may be associated with or due to a number of diseases, including but not limited to (Mason, 2021; Zuvarox and Belletieri, 2021; Shamir, 2020):

- pancreatic amylase deficiency
- lactase deficiency (hypolactasia)
- lactose malabsorption
- tropical sprue
- celiac disease
- Crohn's disease
- ulcerative colitis (when there are documented objective signs and symptoms of malabsorption such as serum albumin levels)
- small bowel resection
- small bowel disease
- small intestinal bacterial overgrowth
- cystic fibrosis
- chronic pancreatitis
- pancreatic cancer
- Whipple disease
- liver disease
- cholestasis
- inflammatory bowel disease (IBS)
- bariatric surgery
- fat malabsorption
- vitamin B12 deficiency

Malabsorption can also be due to the use of specific drugs that cause inadequate digestion or bind or precipitate bile salts such as neomycin, cholestyramine and orlistat.

Enteral Infusion Pumps
Enteral feedings are delivered by syringe, gravity, or via an electric infusion pump. Feedings can be delivered on an intermittent or continuous basis. Pump-controlled infusions may be recommended for jejunal feedings and for gastrostomy feedings to decrease gastroesophageal reflux. Medically necessary indications for the use of a pump include:

- The individual's medical condition is such that gravity or syringe feeding is not clinically appropriate (e.g., there is a risk of aspiration or reflux).
- The individual's medical condition requires that the nutritional formula administration rate is such that a pump is required to titrate infusion for patient safety (i.e., less than 100 cc per hour).
- The individual has severe diarrhea, dumping syndrome, fluctuating blood glucose levels, or a condition that results in circulatory overload.

U.S. Food and Drug Administration (FDA): According to the FDA, an infusion pump is a medical device that delivers fluids in a controlled manner to a patient in a clinical setting or at home. There are multiple types of infusion pumps which include large volume, syringe and enteral pumps. Many pumps have safety features such as alarms that are intended to activate in the event of a problem. These infusion pumps are approved through the FDA 510(k) process as Class II devices.

Parenteral Nutrition

Parenteral nutrition refers to the intravenous provision of micro- or macro-nutrients to prevent or correct nutritional deficiency. It is typically reserved for situations when there is inadequate or insufficient absorption of nutrients through the gastrointestinal tract. Peripheral parenteral nutrition (PPN) is typically used for a short time (up to two weeks) because of limited patient tolerance and few suitable peripheral veins. In patients whose disease produces temporary or permanent loss of the absorptive surface of the small intestine, longer term parenteral nutrition may be required. Long-term total parenteral nutrition (TPN) is necessary when parenteral feedings are indicated for longer than two weeks, peripheral access is limited, nutrient needs are large or fluid restriction is required. TPN is delivered through a central catheter that is burrowed through a subcutaneous tunnel on the anterior chest. Home parenteral nutrition may be indicated in patients who require long-term TPN. Indications for home parenteral nutrition include: bowel infarction, pathological conditions resulting in short bowel syndrome, inflammatory bowel disease with multiple fistulas, malabsorption-associated radiation enteritis, scleroderma, carcinoma of the bowel, an abdominal cavity that results in chronic obstruction, intestinal dysfunction, or diarrhea and malabsorption associated with aggressive chemotherapy or abdominal irradiation.

In general, it is clinically appropriate to initiate parenteral nutrition when all of the following are met:

- Weight and strength maintenance commensurate with the patient's overall health status cannot be achieved by modifying the nutrient composition of the enteral diet (e.g., lactose-free diet) or by utilizing pharmacologic means to treat the etiology of the malabsorption.
- The patient is malnourished (i.e., 10% weight loss over three months or less and serum albumin less than or equal to 3.4 gm/dL).
- The patient has a disease or clinical condition that has not responded to altering the manner of delivery of appropriate nutrients (e.g., slow infusion of nutrients through a tube with the tip located in the stomach or jejunum).

In addition to the above criteria, additional specific indications for parenteral nutrition include any of the following:

- The patient has undergone (within the past three months) massive small bowel resection leaving less than or equal to five feet of small bowel beyond the ligament of Treitz.
- The patient has a short bowel syndrome severe enough that the patient has a net gastrointestinal fluid and electrolyte malabsorption such that on an oral intake of 2.5–3 liters/day the enteral losses exceed 50% of the oral/enteral intake, and the urine output is less than one liter/day.
- The patient requires bowel rest for at least three months and is receiving intravenously 20–35 cal/kg/day for treatment of symptomatic pancreatitis with/without pancreatic pseudocyst, severe exacerbation of regional enteritis, or a proximal enterocutaneous fistula where tube feeding distal to the fistula is not possible.
- The patient has complete mechanical small bowel obstruction where surgery is not an option.
- The patient is significantly malnourished (i.e., 10% weight loss over three months or less and serum albumin less than or equal to 3.4 gm/dl) and has very severe fat malabsorption (i.e., fecal fat exceeds 50% of oral/enteral intake on a diet of at least 50 gm of fat/day as measured by a standard 72-hour fecal fat test).
- The patient is significantly malnourished (i.e., 10% weight loss over three months or less and serum albumin less than or equal to 3.4 gm/dL) and has severe motility disturbance of the small intestine and/or stomach that is unresponsive to medication.

The use of parenteral nutrition is not without risk and should only be considered when adequate nutritional intake cannot be achieved through oral or enteral nutrition. Parenteral nutrition can cause serious complications related to the presence of intravenous lines and metabolic imbalances from inappropriate nutrient formulations. Central venous catheter insertion can result in damage to local structures including: pneumothorax, brachial plexus injury, subclavian and carotid artery puncture, hemothorax, thoracic duct injury, and chylothorax. Air embolism and thrombosis of the catheter or veins can also occur. Fluid overload, hypertriglyceridemia, hypercalcemia, hypoglycemia, hyperglycemia and nutrient deficiencies can all result from administering the inappropriate combination and proportion of nutrients (Howard, et al., 2003; Klein and Rubin, 2002; Koretz, et al., 2001).

Intradialytic Parenteral Nutrition (IDPN)

IDPN, which includes intraperitoneal nutrition (IPN), is a form of parenteral nutrition infused during dialysis. IDPN has been proposed as a treatment option for protein calorie malnutrition in an effort to decrease the associated morbidity and mortality experienced by some patients on maintenance hemodialysis or peritoneal dialysis. This type of parenteral nutrition has the advantage of providing calories and protein during hemodialysis without the need for a central venous catheter (Ikizlet, et al., 2020; Kopple, 2001). Among dialysis patients, survival declines with increasing age, (patients > 45 years) and survival is substantially lower in the United States than in Europe and Japan. As a group, African American and Asian American dialysis patients have a lower mortality rate than whites (Henrich and Burkart 2020).

The nutritional components of typical IDPN solutions are as follows (Dukkipati, et al., 2010):

Standard IDPN Composition (final concentrations are 11% amino acids, 11.1% dextrose, 4.6% lipids): Protein: 97 g; Carbohydrate: 98 g; Fat: 41 g; Non-protein kcal: 743; Total volume: 880 ml

Carbohydrate-Control IDPN Composition (final concentrations are 11.6% amino acids, 8.9% dextrose, 4.6% lipids): Protein: 96 g; Carbohydrate: 73.5 g; Fat: 38 g; Non-protein kcal: 630; Total volume: 825 ml

IDPN is generally indicated when the malnourished patient suffers from a permanently (i.e., greater than three months) impaired gastrointestinal tract and there is insufficient absorption of nutrients to maintain adequate strength and weight. It may also be indicated in malnourished patients with a functioning gastrointestinal tract but who are metabolically challenged, resulting in the inability to meet protein and energy requirements (1.2 gm protein/kg/day) with food intake or enteral feedings. The clinical record should demonstrate that the patient cannot be maintained on oral or enteral feedings and that due to severe pathology of the gastrointestinal tract or metabolic challenges, the patient must be infused with nutrients. Infusions should be vital to the nutritional stability of the patient and not supplemental to a deficient diet caused by dialysis.

Indications for IDPN include both of the following:

- patients who cannot tolerate or have not responded adequately to oral or enteral supplements
- patients who have clinical signs of malnutrition such as serum albumin concentrations of < 3.4 gm/dL, a 10% loss of ideal body weight, a dietary protein intake of < 0.8 gm/kg, and a dietary intake of < 25 kcal/kg (Lazarus, 1999).

Literature Review: While there is compelling evidence demonstrating the role that malnutrition plays in morbidity and mortality in the chronic dialysis patient, the evidence is less clear on treatment options and the impact specific treatments, including IDPN, have on health outcomes. Thabet et al. (2017) reported the results of a prospective randomized control study that evaluated the efficacy of intradialytic parenteral nutrition (IDPN) therapy in malnourished patients (n=40) with refractory anemia. The study included patients 22 to 56 years of age who were on regular hemodialysis (HD) three times a week for at least six months. The patients had been prescribed a maintenance dose of 300 IU/Kg/week of erythropoietin and were malnourished according to a BMI < 23, a positive malnutrition inflammation score (MIS) and baseline serum albumin less than 3.5g/dl. The patients were randomized into two groups. Group I (n=20) received IDPN during each HD session for six months and Group II (n=20) did not receive IDPN. The primary outcome was the improvement of refractory anemia in patients that received IDPN. Additional outcomes included MIS, body weight and serum albumin levels. No patients were lost to follow-up. A gradual increase in hemoglobin level, serum albumin and BMI alongside a gradual decrease in MIS score were observed in patients who received IDPN therapy after three and six months of treatment when compared to their baseline. There was a significant elevation of the hemoglobin level and serum albumin in the IDPN group when compared with the other group after three months of treatment (p=0.001) and (p=0.003) respectively, while the MIS score was significantly decreased (p=0.001). The BMI was significantly increased after six months of treatment in the IDPN group (p=0.001). The intradialytic infusion of IDPN solutions was well tolerated. Side effects such as flushing, headache and fever were not seen in any of the patients. However, the authors noted that 18 of the 20 patients in the IDPN group were nauseated occasionally, but this side effect was tolerated by the patients.

Marsen et al. (2017) conducted a prospective, multicenter RCT (n=107) of maintenance hemodialysis patients with protein-energy wasting (PEW) to evaluate the impact of IDPN on biochemical and clinical parameters of

nutritional status. Patients randomized to the intervention group (n=53) received standardized nutritional counseling plus IDPN three times weekly for 16 weeks followed by a treatment-free period of 12 weeks. The control group (n=54) received standardized nutritional counseling only. Patient selection criteria included moderate to severe malnutrition, maintenance hemodialysis therapy (three times per week) for more than six months, and presence of two of the following three criteria: albumin <35 g/L, prealbumin <250 mg/L, or phase angle alpha <4.5° assessed by bioelectrical impedance analysis. The primary outcome measure was the change in serum prealbumin from baseline to end the of the study period (V6/week 16). Secondary outcomes included increase in parameters of protein metabolism (albumin, transferrin, PCR), and improvement in health-related quality of life (SF-12). The trial was completed by 32/53 (60.4%) patients in the intervention group and 47/54 (87.0%) patients in the control group. The proportion of patients who achieved a relevant (> 15%) increase in prealbumin level at week four was twice as high in the intervention group compared to the control group (41.0% vs. 20.5%; p=0.0415). the increase was sustained at 12 weeks. Analyses showed no statistically significant or clinically important differences in the measured secondary study outcomes for either treatment. The overall occurrence of adverse events, primarily gastrointestinal disorders, was higher in patients receiving IDPN compared to patients in the control group. The study is limited by the short-term follow-up period and loss to follow-up. However the results suggest that IDPN administration may improve prealbumin levels in malnourished hemodialysis patients in the short-term.

A systematic review by Sigrist et al. (2010) found the evidence from available randomized controlled trials (RCTs) (n=3 studies) insufficient to demonstrate either a net benefit or a net harm associated with the use of IDPN in malnourished hemodialysis patients. Another systematic review (n=3 RCTs) by Foulks (1999) found considerable heterogeneity in study design, patients selected for therapy, types of IDPN used and outcome criteria. Therefore a clear recommendation could not be made regarding the use of IDPN.

Cano et al. (2007) conducted an RCT (n=166) of malnourished hemodialysis patients who received oral nutritional supplements with or without 12 months of IDPN. Multivariate analysis showed that an increase in prealbumin of > 30 mg/L within three months, a marker of nutritional improvement, independently predicted a 54% decrease in two-year mortality, as well as reduced hospitalizations and improved general well-being. Both groups demonstrated improvement in body mass index and the nutritional parameters serum albumin and prealbumin ($p<0.05$). Study results demonstrated no survival advantage for the IDPN group.

Additional evidence in the published peer-reviewed medical literature evaluating the safety and effectiveness of IDPN consists of nonrandomized comparative trials, cohort studies, and case series (Korzets, et al., 2008; Joannidis, et al., 2008; Cherry, et al., 2002; Pupim, et al., 2002; Capelli, et al., 1994; Chertow, et al., 1994). Some studies have had small sample sizes and short duration of follow-up. Outcomes have included improvement in dry weight, serum albumin levels, and survival rates. The largest study to date, Chertow et al. (1994), was a multicenter retrospective case series comparing the morbidity of IDPN patients (n=1679) with untreated controls (n=22,517). Dialysis patients with a serum albumin of < 3.4 gm/dL who were treated with IDPN experienced increased albumin and creatinine levels, as demonstrated on time trend analyses. A reduction in the odds of death at one year with the effect stronger at lower levels of creatinine compared to controls was also reported.

Although study results have been variable, in general the available evidence is supportive of the use of IDPN in a subset of maintenance hemodialysis patients who are unable to meet daily nutritional requirements with oral or enteral intake.

Specialized Intradialytic Nutrition Solutions: Specialized solutions of IDPN (e.g., Proplete® [Pentec Health, Inc. Boothwyn, PA]) have purportedly been formulated to meet the needs of the hemodialysis patients who are protein malnourished or take in enough calories but inadequate amounts of protein. According to the manufacturer, Proplete contains no lipids and less carbohydrates compared to traditional IDPN. Specialized formulations of IDPN have not been proven to be clinically superior to a standard formulation of total parenteral nutrition.

Literature Review: Currently there are no available clinical studies in the published peer-reviewed medical literature clinical studies demonstrating the superiority of specialized preparations of IDPN. It has not been

shown that use of specialized solutions result in better outcomes (e.g., improvement in dry weight, serum albumin levels) for dialysis patients compared to standard preparations.

Pancreatic Insufficiency
Insufficient production of pancreatic enzymes (exocrine pancreatic insufficiency, EPI) causes malabsorption of fat, protein, and several micronutrients including the vitamins A, D, E, and K. The exact prevalence of pancreatic exocrine insufficiency is unknown. However, in patients who have chronic pancreatitis the incidence of EPI is 85% with severe disease, 30% with mild disease and 85% in newborns with cystic fibrosis (Zuvarox and Belletieri, 2021). The most common causes of EPI are chronic pancreatitis and cystic fibrosis (Baker, et al., 2020).

In chronic pancreatitis, inflammatory changes in the pancreas results in permanent structural damage, which can lead to impairment in exocrine function of pancreatic duct and acinar cells (Stevens and Conwell, 2020). The progressive loss of functioning pancreatic tissue leads to insufficient secretion of digestive enzymes into the duodenum. The prevalence of chronic pancreatitis differs regionally by etiology. Alcohol-related pancreatitis is more common in the West and Japan, as compared to other Asian countries. There is wide variation in the prevalence of a form of chronic pancreatitis that is endemic to tropical countries (20 to 125/100,000 persons reported in two parts of South India). In the United States, alcohol is associated with approximately one-half of all cases of chronic pancreatitis. Approximately 10 to 30 percent of all cases are idiopathic. The number of patients labeled as idiopathic depends in large part on how detailed and comprehensive the search is for an etiology. Chronic pancreatitis in women is mostly idiopathic, while in men, alcohol- and tobacco-associated chronic pancreatitis are more common (Forsmark, et al., 2020).

Treatment for chronic pancreatitis exocrine pancreatic insufficiency includes dietary management, lifestyle changes (i.e., decrease in alcohol consumption and smoking cessation) and pancreatic enzyme replacement therapy (PERT). If PERT treatment fails, increasing the enzyme dose (doubled or tripled) or a proton pump inhibitor (PPI) should be used. If these strategies fail, another cause for maldigestion can be investigated. Overdosing with PERT is impossible since the luminal enzymes are not absorbed (Löhr, et al., 2017).

Cystic fibrosis causes defective functioning of the CF transmembrane conductance regulator (CFTR) which leads to impaired transport of chloride, sodium, and bicarbonate. As a result, water does not diffuse out of the cell into the mucus layer, leading to thick epithelial secretions which can lead to obstruction in the pancreatic ducts. In the United States, CF occurs in approximately 1:3200 White Americans, 1:10,000 Hispanic Americans,1:10,500 Native Americans, 1:15,000 Black Americans, and 1:30,000 Asian Americans. CF is also recognized in a variety of populations, not only in regions familiar with CF but in South and East Asia, Africa, and Latin America, although the overall prevalence in these regions is low (Katkin, 2020).

Treatment for cystic fibrosis is pancreatic enzyme replacement therapy (PERT). PERT clearly improves fecal fat absorption in most patients with pancreatic insufficiency. CF patients have the risk of developing fibrosing colonopathy with high doses of PERT, therefore a maximum dose of 2500 lipase units/kg body weight per meal (or less than 10,000 lipase units/kg body weight per day) is recommended (Katkin, et al., 2021).

Pancreatic enzymes are extracts of porcine pancreas containing varying amounts of lipase, protease, and amylase. Most pancreatic enzyme preparations consist of capsules containing microspheres. Older children and adults generally swallow the capsule whole. For younger children and infants, enzymes are administered by opening the capsule and sprinkling the microspheres on food. When there is evidence of malnutrition patients may require enteral feeding. The standard of care for administering PERT with enteral feed is before the feeding, in the middle of the feeding and after the feeding. However, PERT is not FDA approved for use with enteral nutrition (Katkin, et al., 2021; Schwarzenberg, et al., 2019).

U.S. Food and Drug Administration (FDA): According to the FDA, Relizorb is an enzyme packed cartridge that hydrolyzes fats in enteral formula. The FDA granted 510(k) Class II clearance for Relizorb on June 30, 2016 for the use in adult patients to hydrolyze fats in enteral formula (FDA, 2016). A subsequent 510(k) was granted on July 12, 2017 that expanded the use to include pediatric patient's ages 5 years and above (FDA, 2017). A revised version of Relizorb was cleared on December 4, 2019 was considered to be substantially equivalent to the predicate device. There was not any changes to target population or intended use (FDA, 2019).

Literature Review – Cystic Fibrosis: The peer-reviewed medical literature supports the use of digestive enzyme cartridges for the treatment of pancreatic insufficiency in cystic fibrosis patients (≥ 5 years old) when there is failure of pancreatic enzyme replacement therapy (PERT) (Freedman, et al., 2017; Stevens, et al., 2018).

A prospective, single-arm, multicenter, open-label study (ASSURE trial) conducted by Stevens et al. (2018) evaluated the safety, tolerability and improvement of fatty acids (FA) in red blood cells (RBC) when using a Relizorb cartridge during enteral nutrition (EN) feedings in patients (n=39) with cystic fibrosis (CF). Patients were included in the study if they were ≥ 4 years with a confirmed diagnosis of CF, a documented history of exocrine pancreatic insufficiency (EPI), taking enteral formula a minimum of four times per week, using pancreatic enzyme replacement therapy (PERT), and consuming an unrestricted fat diet. The primary outcome measured the change in the omega-3 index, which is a measure of the percentage of total DHA (docosahexaenoic acid) plus EPA (eicosapentaenoic acid) relative to the total fatty acid (FA) composition present in RBC membranes. Secondary efficacy outcomes included changes in plasma and erythrocyte membrane composition (%) of total EPA, total DHA, and omega-6 to omega-3 FAs (a key marker of inflammation) as well as plasma concentrations of total DHA+EPA. Changes in weight gain and standardized body weight and body mass index (BMI) were also examined. Safety and tolerability outcomes included the frequency and severity of adverse events (AEs) and unanticipated adverse device effects (UADEs), incidence of GI symptoms, clinical and laboratory findings, vital signs, and use of concomitant medications. All outcomes were measured at observation initiation (day 14), before Relizorb initiation (day 0), and at 30-day intervals during the Relizorb treatment period (days 30, 60, and 90). Thirty-six patients completed the 90-day study, there were not any adverse events related to Relizorb use. Fat absorption increased significantly from a baseline value of 4.4%, to 8.4% at 60 days and 9.4% at 90 days ($p<0.001$ for each increase from baseline to 60 and 90 days). The secondary efficacy outcomes changed significantly from baseline to each post-baseline visit. The composition (%) of erythrocyte membrane total DHA and total EPA, and plasma concentrations of total DHA+EPA values increased. The omega-6 to omega-3 FA ratios decreased in both erythrocyte membranes and plasma. Body mass index (BMI) did not change significantly over the course of the study period. Author noted limitations included the small patient population, short term follow-up and the open label study design. Furthermore, other than EN, dietary intake was not recorded limiting the ability to assess whether oral caloric intake was adequate to lead to weight gain.

Freedman et al. (2017) conducted a multicenter, randomized, double-blind, crossover trial (n=33) to evaluate the safety, tolerability, and fat absorption of a new in-line digestive cartridge (Relizorb) that hydrolyzes fat in enteral formula provided to patients with cystic fibrosis (CF). The trial included subjects that had a diagnosis of CF, history of exocrine pancreatic insufficiency (EPI), received enteral nutrition at least four times a week through a feeding tube, used pancreatic enzyme replacement therapy (PERT), and stable health status. The study was divided into three periods A, B and C. In period A, all subjects received standard enteral formula (Peptamen 1.5) for seven days. Subjects were then randomized into two groups during period B. One group had digestive cartridges and the second group had placebo/sham cartridges. After a seven day washout period, there was a crossover and subjects received enteral nutrition through the opposite cartridge. In period C, all subjects received impact peptide (high fat and long chain triglycerides) given overnight with Relizorb digestive cartridge for seven days. The outcomes measured changes in plasma fatty acid concentrations of docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) for 24 hours along with the safety and tolerability of the cartridge. When Relizorb was compared with placebo were the total and peak concentration of DHA+EPA were significantly higher with digestive cartridge use ($p<0.001$). There were no gastrointestinal (GI) adverse effects reported that were temporally associated with digestive or placebo cartridges. Three, 11, and four non-GI adverse effects occurred in periods A, B, and C, respectively and were not considered to be treatment related. Adverse effects such as such as abdominal pain, bloating, constipation and diarrhea, were lower with digestive cartridge use during period C compared with period A. In addition, > 50% of subjects reported a decrease in severity of most GI events with digestive cartridge use in period C compared with period A. Author noted limitations of the study were the small sample size and the use of only one feeding cartridge to measure fat absorption and seven days to measure safety. Additional randomized controlled trials with larger patient populations and long-term follow-up are needed to support the outcomes of this study.

Hayes published an updated Search and Summary in 2018 on the digestive enzyme cartridge, Relizorb (Alcresta Therapeutics Inc.) for enzyme hydrolysis in patients receiving enteral nutrition. The review included five abstracts

(one multi-center, randomized, one double-blind, cross-over study, a case study and two review articles). Hayes concluded that there was sufficient evidence to support the use of Relizorb for patients with cystic fibrosis on enteral nutrition. However, there continues to be insufficient published evidence about the use of Relizorb in other patients receiving enteral nutrition with conditions affecting breakdown and absorption of dietary fats (Hayes 2018).

Literature Review – Other Causes: There is insufficient evidence to support the effectiveness of digestive enzyme cartridges for the treatment of pancreatic insufficiency caused by multiple conditions including: chronic pancreatitis, diabetes mellitus, pancreatic cancer, pancreatic duct obstruction, gastrectomy, small bowel resection, short bowel syndrome, celiac disease Crohn's disease, Shwachman-Diamond syndrome and Zollinger-Ellison syndrome. Randomized controlled trials with long term follow-up are needed to determine whether the digestive enzyme cartridge improves outcomes compared to alternative treatment modalities.

Professional Societies/Organizations
American Gastroenterological Association (AGA): The AGA published medical position statements on enteral (1995) and parenteral (2001) nutrition. Enteral nutrition is considered for patients who cannot or will not eat, who have a functioning gastrointestinal tract and a safe method of access. Enteral support should be initiated after 1–2 weeks without nutrition. Enteral feeding is preferable over parenteral therapy, provided there are no contraindications, access can be obtained safely and oral intake is not possible. Mechanical obstruction is the only contraindication to enteral feeding. For short-term needs, a nasogastric or nasoenteric tube is used, whereas a gastrostomy or jejunostomy tube is used for long-term needs. In general, parenteral nutrition is indicated to prevent the adverse effects of malnutrition in patients who are unable to obtain adequate nutrients by oral or enteral routes. The decision to use parenteral nutrition requires an understanding of the patient's clinical condition and anticipated outcome, judgment as to the patient's ability to tolerate undernutrition, knowledge of the clinical efficacy of parenteral nutrition and an appreciation of the patient's desires and needs.

Cystic Fibrosis Foundation: The cystic fibrosis foundation evidence-informed guidelines on enteral tube feeding for individuals with cystic fibrosis stated they do not recommend for or against a specific method of providing pancreatic enzyme therapy during enteral tube feeding in individuals with CF. It is common for patients with CF on enteral feeding to take enzymes at the beginning and end of a nocturnal feed, and sometimes, in the middle of the feed (Schwarzenberg, et al., 2016).

National Kidney Foundation (NKF): The NKF clinical practice guideline for nutrition in children with chronic kidney disease stated that a trial of IDPN to augment inadequate nutritional intake is suggested for malnourished children (BMI-for-height-age < 5th percentile) receiving maintenance hemodialysis who are unable to meet their nutritional requirements through oral and tube feeding (NKF/Kidney Disease Outcomes Quality Initiative [KDOQI], 2009).

National Kidney Foundation Kidney Disease Outcomes Quality Initiative (KDOQI)/Academy of Nutrition and Dietetics (Academy): The KDOQI and Academy joint clinical practice guideline for nutrition in the CKD: 2020 update stated that maintenance hemodialysis (MHD) patients may benefit from IDPN therapy if all of the following are met (Ikizler, et al., 2020):

- protein energy wasting (PEW) is evident with inadequate dietary protein and/or energy intake
- unable to administer or tolerate adequate oral nutrition, including food supplements or enteral feeding
- protein and energy requirements can be met when IDPN is used in with oral intake or enteral feeding

The guideline recommended that for adults with stage 5D CKD on MHD with PEW, IDPN may be used to improve and maintain nutritional status if nutritional requirements cannot be met with existing oral and enteral intake.

Additionally, IDPN therapy should not be used as a long-term solution, it should be discontinued and oral nutritional supplementation (ONS) should begin when there are improvements in nutritional status and patients are capable of using the oral or enteral route.

No health disparities were identified by the investigators, however the authors noted that that the guideline does not stratify patients based on their ethnic or racial backgrounds.

Use Outside of the US
The 2020 European Society for Clinical Nutrition and Metabolism (ESPEN) guideline on clinical nutrition in hospitalized patients with acute or chronic kidney disease stated that intradialytic parenteral nutrition (IDPN) can be used for non-critically ill hospitalized patients who are malnourished or at risk for malnutrition with CKD and kidney failure (KF) on hemodialysis. Additionally the committee stated that parenteral provision of nutrients during hemodialysis is a safe and convenient approach for individuals who cannot tolerate oral or enteral administration of nutrients. However, the use of IDPN before counseling and oral nutritional supplementation (ONS) is not recommended (Fiaccadori, et al., 2021).

The 2020 European Society for Clinical Nutrition and Metabolism (ESPEN) guideline on clinical nutrition in acute and chronic pancreatitis stated that if pancreatic exocrine insufficiency (PEI) is diagnosed PERT shall be initiated. Additionally the committee recommended that in cases where there is insufficient clinical response, PERT dosage should be increased or a protein pump inhibitor (PPI) should be added. If there continues to be treatment failure, other causes of malabsorption should be ruled out. If enteral nutrition is required, pancreatic enzymes should be supplemented in patients with signs of exocrine failure. Patients who do not improve with semi-elemental formula, pancreatic enzymes can be administered with the formula. This involves opening the capsules and suspending the enzyme microspheres in thickened acidic fluid (such as the mildly thickened fruit juice) for delivery via the feeding tube (Arvanitakis, et al., 2020).

The United European Gastroenterology evidence based guidelines for the diagnosis and therapy of chronic pancreatitis (HaPanEU) recommended that if there is unsatisfactory clinical response with oral nutrition, the enzyme dose may be increased (doubled or tripled) or a proton pump inhibitor (PPI) may be used. If these strategies fail, additional causes for maldigestion should be explored. According to the guideline, it is recommended that if patients are not responding to oral nutrition, enteral nutrition is indicated and PERT may be administered alongside in patients whose nutritional status does not improve with peptide/MCT based feeds (Löhr, et al., 2017).

A 2006 guideline developed by the National Institute for Health and Clinical Excellence (NICE) states that nutrition support should be considered in people who are malnourished, as defined by any of the following:

- a body mass index (BMI) of less than 18.5 kg/m^2
- unintentional weight loss greater than 10% within the last 3–6 months
- a BMI of less than 20 kg/m^2 and unintentional weight loss greater than 5% within the last 3–6 months

Nutrition support should also be considered for those at risk for malnutrition including individuals who have a poor absorptive capacity, have high nutrient losses, and/or have increased nutritional needs from causes such as catabolism. The guideline further stated that if there is either partial or complete intestinal failure (e.g., obstruction, ileus, extensive surgical resection, malabsorption), or if the gastrointestinal tract cannot be accessed, some or all of a patient's nutritional needs may be met using an intravenous infusion of parenteral nutrition (PN) (NICE, 2006; updated 2017).

Medicare Coverage Determinations

	Contractor	Policy Name/Number	Revision Effective Date
NCD	National	Enteral and Parenteral Nutritional Therapy (180.2)	7/11/1984

Note: Please review the current Medicare Policy for the most up-to-date information.

Coding/Billing Information

Note: 1) This list of codes may not be all-inclusive.
2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Generally excluded from coverage regardless of indication or use:

HCPCS Codes	Description
B4149	Enteral formula, manufactured blenderized natural foods with intact nutrients, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4150	Enteral formula, nutritionally complete with intact nutrients, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4152	Enteral formula, nutritionally complete, calorically dense (equal to or greater than 1.5 Kcal/ml) with intact nutrients, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4153	Enteral formula, nutritionally complete, hydrolyzed proteins (amino acids and peptide chain), includes fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4158	Enteral formula, for pediatrics, nutritionally complete with intact nutrients, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber and/or iron, administered through an enteral feeding tube, 100 calories = 1 unit
B4159	Enteral formula, for pediatrics, nutritionally complete soy based with intact nutrients, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber and/or iron, administered through an enteral feeding tube, 100 calories = 1 unit
B4160	Enteral formula, for pediatrics, nutritionally complete calorically dense (equal to or greater than 0.7 Kcal/ml) with intact nutrients, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4161	Enteral formula, for pediatrics, hydrolyzed/amino acids and peptide chain proteins, includes fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
S9432	Medical foods for noninborn errors of metabolism
S9433	Medical food nutritionally complete, administered orally, providing 100% of nutritional intake

Oral and Enteral Infant Nutritional Formula

Considered Medically Necessary when infant (i.e., ≤ 12 months of age) nutritional formula is specifically formulated for the treatment of an inborn error of metabolism (e.g., disorder of amino acid or organic acid metabolism):

HCPCS Codes	Description
B4154†	Enteral formula, nutritionally complete, for special metabolic needs, excludes inherited disease of metabolism, includes altered composition of proteins, fats, carbohydrates, vitamins and/or minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4155†	Enteral formula, nutritionally incomplete/modular nutrients, includes specific nutrients, carbohydrates (e.g. glucose polymers), proteins/amino acids (e.g. glutamine, arginine), fat (e.g. medium chain triglycerides) or combination, administered through an enteral feeding tube, 100 calories = 1 unit
B4157	Enteral formula, nutritionally complete, for special metabolic needs for inherited disease of metabolism, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
B4162	Enteral formula, for pediatrics, special metabolic needs for inherited disease of metabolism, includes proteins, fats, carbohydrates, vitamins and minerals, may include fiber, administered through an enteral feeding tube, 100 calories = 1 unit
S9435††	Medical foods for inborn errors of metabolism

†Note: Generally excluded from coverage when used to treat conditions other than infant inborn errors of metabolism

††Note: Considered Medically Necessary if used to report infant nutritional formula for the treatment of inborn errors of metabolism

ICD-10-CM Diagnosis Codes	Description
D81.810	Biotinidase deficiency
D81.818	Other biotin-dependent carboxylase deficiency
E70.0	Classical phenylketonuria
E70.1	Other hyperphenylalaninemias
E70.20-E70.29	Disorder of tyrosine metabolism
E70.40-E70.49	Disorders of histidine metabolism
E70.5	Disorders of tryptophan metabolism
E70.81	Aromatic L-amino acid decarboxylase deficiency
E70.89	Other disorders of aromatic amino-acid metabolism
E70.9	Disorder of aromatic amino-acid metabolism, unspecified
E71.0	Maple-syrup-urine disease
E71.110-E71.118	Branched-chain organic acidurias
E71.120-E71.128	Disorders of propionate metabolism
E71.19	Other disorders of branched-chain amino-acid metabolism
E71.2	Disorder of branched-chain amino-acid metabolism, unspecified
E71.30	Disorder of fatty-acid metabolism, unspecified
E71.310-E71.318	Disorders of fatty-acid oxidation
E71.32	Disorders of ketone metabolism
E71.39	Other disorders of fatty-acid metabolism
E71.40	Disorders of carnitine metabolism, unspecified
E71.41	Primary carnitine deficiency
E71.42	Carnitine deficiency due to inborn errors of metabolism
E71.448	Other secondary carnitine deficiency
E71.50	Peroxisomal disorder, unspecified
E71.520	Childhood cerebral X-linked adrenoleukodystrophy
E71.53	Other group 2 peroxisomal disorders
E71.541	Zellweger-like syndrome
E71.542	Other group 3 peroxisomal disorders
E71.548	Other peroxisomal disorders
E72.00-E72.09	Disorders of amino-acid transport
E72.10-E72.19	Disorders of sulfur-bearing amino-acid metabolism
E72.20-E72.29	Disorder of urea cycle metabolism
E72.3	Disorders of lysine and hydroxylysine metabolism
E72.4	Disorders of ornithine metabolism
E72.50-E72.59	Disorder of glycine metabolism
E72.89	Other specified disorders of amino-acid metabolism

ICD-10-CM Diagnosis Codes	Description
E72.9	Disorder of amino-acid metabolism, unspecified
E74.00-E74.09	Glycogen storage disease
E74.21	Galactosemia
E74.29	Other disorders of galactose metabolism
E74.4	Disorders of pyruvate metabolism and gluconeogenesis
E75.21	Fabry (-Anderson) disease
E75.22	Gaucher disease
E75.23	Krabbe disease
E75.26	Sulfatase deficiency
E78.72	Smith-Lemli-Opitz syndrome
E88.41	MELAS syndrome
E88.42	MERRF syndrome

Home Parenteral/Home Total Parenteral Nutrition (TPN) and Intradialytic Parenteral Nutrition (IDPN)

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

HCPCS Codes	Description
B4164	Parenteral nutrition solution; carbohydrates (dextrose), 50% or less (500 ml=1 unit)-home mix
B4168	Parenteral nutrition solution; amino acid, 3.5% (500 ml=1 unit)-home mix
B4172	Parenteral nutrition solution; amino acid, 5.5% thru 7%, (500 ml=1 unit)-home mix
B4176	Parenteral nutrition solution; amino acid, 7% thru 8.5% (500 ml=1 unit)-home mix
B4178	Parenteral nutrition solution; amino acid, greater than 8.5% (500 ml=1 unit)- home mix
B4180	Parenteral nutrition solution; carbohydrates (dextrose), greater than 50% (500 ml=1 unit)-home mix
B4185	Parenteral nutrition solution, per 10 grams lipids
B4189	Parenteral nutrition solution; compounded amino acids and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength, 10 to 51 grams of protein-premix
B4193	Parenteral nutrition solution; compounded amino acids and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength, 52 to 73 grams of protein-premix
B4197	Parenteral nutrition solution; compounded amino acids and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength, 74 to 100 grams of protein-premix
B4199	Parenteral nutrition solution; compounded amino acids and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength, over 100 grams of protein-premix
B4216	Parenteral nutrition; additives (vitamins, trace elements, heparin, electrolytes) home mix per day
B5000	Parenteral nutrition solution; compounded amino acid and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength; renal Amirosyn -rf, NephrAmine, renamine - premix
B5100	Parenteral nutrition solution; compounded amino acid and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength; hepatic HepatAmine - premix
B5200	Parenteral nutrition solution; compounded amino acid and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength; stress branch chain amino acids-FreAmine-HBc-premix
B9004	Parenteral infusion pump; portable
B9006	Parenteral infusion pump; stationary

Home Enteral/Parenteral Infusion Pumps

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

HCPCS Codes	Description
B9002	Enteral nutrition infusion pump, any type

Digestive Enzyme Cartridge

Considered Medically Necessary for the treatment of pancreatic insufficiency due to cystic fibrosis when criteria in the applicable policy statements listed above are met:

HCPCS Codes	Description
B4105†	In-line cartridge containing digestive enzyme(s) for enteral feeding, each

†Note: Considered Experimental, Investigational or Unproven for ANY other indication

Additional Items

Considered Not Medically Necessary:

HCPCS Codes	Description
B4100	Food thickener, administered orally, per ounce
B4102	Enteral formula, for adults, used to replace fluids and electrolytes (e.g. clear liquids), 500 ml=1 unit
B4103	Enteral formula, for pediatrics, used to replace fluids and electrolytes (e.g. clear liquids), 500 ml=1 unit
B4104	Additive for enteral formula (e.g.fiber)
S9434	Modified solid food supplements for inborn errors of metabolism
T2101†	Human breast milk processing, storage and distribution only

†Note: Considered Not Medically Necessary when provided to a non-hospitalized infant

ICD-10-CM Diagnosis	Description
	All Codes

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