Molina Clinical Policy
Intradialytic Parenteral Nutrition (IDPN) / Intraperitoneal Parenteral Nutrition (IPN): Policy No. 421

Last Approval: 10/12/2022
Next Review Due By: October 2023

DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. Policies are not a supplementation or recommendation for treatment; Providers are solely responsible for the diagnosis, treatment and clinical recommendations for the Member. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (e.g., will be paid for by Molina) for a particular Member. The Member's benefit plan determines coverage – each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their Providers will need to consult the Member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a Member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid Members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCP and provide the directive for all Medicare members.[1] References included were accurate at the time of policy approval and publication.

OVERVIEW

Protein-energy wasting (PEW) is used to describe the depletion of body protein mass, decreased fat mass, and/or energy fuel supplies in patients with **chronic kidney disease (CKD)** (Fouque et al., 2008). The underlying pathophysiological mechanisms are multiple and include factors related to end stage renal disease (ESRD), comorbidities, dialysis, and inadequate nutrition (Fouque et al., 2008). A global meta-analysis of 90 studies on PEW incidence in patients on hemodialysis reported a median prevalence of 43%, making it a frequent syndrome in this patient group (Carrero et al., 2018). CKD patients with PEW have increased morbidity, mortality, and diminished quality of life (QOL). The gastrointestinal tract is the preferred route for nutritional intake, however if this is not possible, parenteral nutrition is an option. **Intradialytic nutrition** is a specialized form of parenteral nutrition administered to malnourished patients with ESRD on dialysis. It consists of:

1. **Intradialytic parenteral nutrition (IDPN),** a type of parenteral nutritional therapy administered to malnourished patients undergoing hemodialysis; and
2. **Intraperitoneal nutrition (IPN),** a type of parenteral nutritional therapy administered to malnourished patients undergoing peritoneal dialysis.

IDPN is the infusion of an intravenous hyperalimentation formula of hyperalimentation, such as amino acids, glucose, and lipids, during dialysis, to treat protein calorie malnutrition. IDPN has been offered as a therapy option for patients on maintenance dialysis to reduce the morbidity and mortality associated with protein calorie malnutrition. In hemodialysis, the IDPN infusion is supplied through the venous port of the dialysis tubing approximately 30 minutes after the start of dialysis and continues for the length of a dialysis session. Whereas during peritoneal dialysis, which is frequently referred to as IPN, parenteral nutrition is injected into the peritoneal cavity. IDPN and IPN have distinct accesses, but both are techniques of parenteral nutrition administration during dialysis and will be referred to as IDPN.

IDPN solutions are consistent with those used for TPN. A typical solution contains 10% amino acids and 40% to 50% glucose, 10% to 20% lipids, or a mixture of carbohydrate or lipids, depending on patient needs. IDPN may be associated with a lower-than-expected delivered dose of dialysis due, possibly, to increased urea generation (Beddhu et al. 2022). IDPN infusions typically deliver 800 to 1200 kcal in glucose, lipids, and amino acids; however, depending on the hemodialysis filter used and whether they have been reused, some amino acids may be lost in the dialysate (Cano 2007; Ikizler 1994; Sarav & Friedman, 2018). It is administered via the venous drip chamber during routine dialysis sessions three times per week, thus eliminating the need for additional clinic visits, extended dialysis time, or additional lines.

There are limited data regarding the adverse effects of IDPN but due to disease severity and comorbidities in this patient population, adverse events such as nausea, muscle pain, infections, and procedural complications may be common; however, no differences between IDPN and control groups were reported (Anderson et al. 2018).

Multiple RCTs, observational studies, and systematic reviews are included in the evidence for individuals undergoing hemodialysis who receive IDPN. Relevant outcomes include overall survival, disease status change, morbid events, measures of health status, QOL, and mortality and morbidity related to treatment. There is evidence that IDPN is

generally safe and effective for improving non-fluid weight gain over time; however, the evidence does not demonstrate benefits in patient outcomes with the use of IDPN for those who would not otherwise qualify for TPN, according to published systematic reviews. Moreover, most of these studies are hindered by a small sample size, the lack of standardization of hemodialysis frequency and intensity, and the absence of monitoring or recording of oral nutritional intake (ASPEN; Worthington et al. 2017). These confounding factors have significantly hindered the ability to expand the effectiveness of IDPN as a standard of therapy to all hemodialysis patients. Furthermore, the effect of IDPN on long-term outcomes, such as the risk or progression of cardiovascular diseases, or overall survival, is not discussed in any of these studies from the perspective of clinical outcomes. There is no clear evidence that IDPN improves survival, and there are currently no comparative data available. As a result, the available evidence is insufficient to conclude that the technology improves overall health outcomes.

Regulatory Status

The FDA does not regulate IDPN as a procedure; however, the FDA does regulate the equipment used for IDPN, which includes hemodialysis blood access devices and infusion pumps.

TPN solutions are compounded by a pharmacy from individual ingredients (such as dextrose, amino acids, and trace elements) into a finished product based on a prescription and do not require FDA approval through the new drug application process.

RELATED POLICIES

Enteral Nutrition: Policy No. 406

COVERAGE POLICY

NOTE: IDPN and IPN have distinct accesses, but both are techniques of parenteral nutrition administration during dialysis and will be referred to as IDPN.

A. IDPN is considered **not medically necessary or investigational** in the following individuals:

1. IDPN is ordered in addition to regular TPN unless given in lieu of their daily TPN.
2. Member who would not otherwise be considered candidates for TPN.

B. Intradialytic nutrition, including IDPN or IPN, may be authorized when **ALL** of the following criteria are met:

1. Member is on chronic dialysis with evidence of protein-energy wasting (PEW); **AND**
2. Documentation of evaluation, criteria and parameters applied confirming PEW, including but not limited to, biochemical criteria; low body weight, reduced total body fat, or weight loss; a decrease in muscle mass; and low protein or energy intakes; **AND**

   Note: Progressive declines in body mass index (BMI), albumin, and protein nitrogen appearance may be suggestive of PEW. Preferably, each criterion should be documented at least three times, ideally two to four weeks apart (Bansal S, 2022).
3. Member is candidate for TPN (i.e., nutritional status cannot be adequately maintained on oral or enteral feedings); **AND**
4. **ALL** of the following documentation:

   a. Member cannot be sustained on oral or enteral feedings and requires intravenous nutrient infusion due to severe pathology of the alimentary tract; **AND**

   b. Physical signs, symptoms, and test results clearly indicating severe pathology of the alimentary tract;

AND

c. Dietary assessment, physical examination, and laboratory examination, including any progressive drop in BMI, albumin, and protein nitrogen appearance indicative of PEW.

CONTINUATION OF THERAPY

Member meets **ALL** of the following criteria for continuation of treatment. Documentation required.

1. Continuous dependence on dialysis; **AND**
2. Positive clinical response to therapy; **AND**
3. Member has NOT experienced a drug-related adverse event or toxicity associated with IDPN treatment.
4. Discontinuation of IDPN may be reasonable if **ONE** of the following criteria is met:
    a. Reasonable sustained improvement in protein and nutrition status as indicated by the following:
        - Serum albumin greater than > 4.0 g/dL; **AND**
        - BMI greater than or equal to 18.5 kg/m^2
    b. Treatment goals are not met after 6 months on IDPN (lack of improvement in protein and nutrition status); **OR**
    c. Member tolerates adequate oral or enteral nutrition.

LIMITATIONS AND EXCLUSIONS

The following are considered **contraindications/exclusions** based on insufficient evidence:

1. Adverse clinical response (e.g., infections, metabolic decompensation of pre-existing diabetes mellitus)

The following are considered **experimental, investigational and unproven** based on insufficient evidence:

1. Any indications other than those listed above
2. IDPN administered in addition to regularly planned TPN infusions
3. IDPN as an adjunct to hemodialysis is considered investigational in patients who would not otherwise be considered candidates for TPN.
4. Acute kidney injury patients who do not have ESRD
5. **Specialized IDPN solutions** (e.g., Proplete®) have purportedly been formulated to meet the needs of the hemodialysis patients who are protein malnourished or who consume adequate calories but insufficient protein. IDPN specialized formulations have not been shown to be clinically superior to standard TPN formulations. There are currently no clinical studies in the published peer-reviewed medical literature that demonstrate the superiority of specialized IDPN preparations. It has not been demonstrated that using specialized solutions results in better outcomes (e.g., serum albumin levels) for dialysis patients in comparison to standard preparations.

    NOTE: Coverage for specialized IDPN may be contingent on member's health benefit plan's definition of medical necessity. Medically Necessary/Medical Necessity may be defined as "*not more expensive 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 different IDPN preparations, and one may be significantly more expensive than the other but not proven to be clinically superior, a more costly specialized IDPN solution may be considered not medically necessary under member's plan benefit.

DURATION OF APPROVAL: Initial authorization: 3 months; Continuation of treatment: 6 months.

PRESCRIBER REQUIREMENTS: Prescribed by, or in consultation with, nephrologist

QUANTITY LIMITATIONS: IDPN therapy should not be used as a long-term solution, it should be discontinued, and oral or enteral nutritional supplementation should begin when member tolerates (KDOQI; Ikizler, et al., 2020).

DOCUMENTATION REQUIREMENTS. Molina Healthcare reserves the right to require that additional documentation be made available as part of its coverage determination; quality improvement; and fraud; waste and abuse prevention processes. Documentation required may include, but is not limited to, patient records, test results and credentials of the provider ordering or performing a drug or service. Molina Healthcare may deny reimbursement or take additional appropriate action if the documentation provided does not support the initial determination that the drugs or services were medically necessary, not investigational or experimental, and otherwise within the scope of benefits afforded to the member, and/or the documentation demonstrates a pattern of billing or other practice that is inappropriate or excessive.

SUMMARY OF MEDICAL EVIDENCE

Although there are a few randomized trials, there are no randomized controlled trials (RCTs) demonstrating that IDPN improves major clinical outcomes of IDPN over oral supplements and nutrition counseling. Furthermore, there is no strong evidence that IDPN improves survival, and no comparative data are currently available. Therefore, additional studies are needed to establish the benefits of IDPN.

Marsen et al. (2017) conducted a prospective, multicenter RCT (n=107) of maintenance hemodialysis patients with protein-energy wasting (PEW) to assess the impact of IDPN on biochemical and clinical nutritional status parameters. Patients in the intervention group (n=53) received standardized nutritional counseling plus IDPN three times per week for 16 weeks, followed by a 12-week treatment-free period. Only standardized nutritional counseling was provided to the control group (n=54). The following criteria were used to select patients: moderate to severe malnutrition (Subjective Global Assessment Score B or C), more than 6 months of maintenance hemodialysis therapy (three times per week), and the presence of 2 of the following 3 criteria: 1) albumin 35 g/L, 2) prealbumin 250 mg/L, or 3) phase angle alpha 4.5° as measured by bioelectrical impedance analysis. The change in serum prealbumin from baseline to the end of the study period (week 16) was the primary outcome measure. Secondary outcomes included an increase in protein metabolism parameters (albumin, transferrin, and PCR) and an improvement in health-related quality of life (SF-12). The trial was completed by 32/53 (60.4%) intervention group patients and 47/54 (87.0%) control group patients. The proportion of patients that showed at least 15% or more increase in prealbumin levels compared to baseline was higher in the IDPN group (41.0%) than in the control group at 16 weeks s (20.5%), with sustained response thereafter. QOL, as measured by 12-Item Short-Form Health Survey, did not differ statistically between the 2 treatment arms. At 12 weeks, the increase was maintained. Analyses revealed no statistically significant or clinically significant differences in the secondary study outcomes measured for either treatment. When compared to the control group, patients receiving IDPN experienced more AEs, primarily GI disorders. The short follow-up period and loss to follow-up limit the study. However, the findings suggest that IDPN administration may temporarily improve prealbumin levels in malnourished hemodialysis patients.

Cano et al. (2007) conducted a study of 186 malnourished hemodialysis patients (n=186) that received oral nutritional supplements with or without IDPN for one year and at two years. After two years of follow-up, the study found that serum albumin increased considerably at 3, 6, 12, and 18 months in both groups. At follow-up endpoints from baseline, no changes between groups were observed. Based on intention-to-treat analysis, no differences were found in 2-year survival, hospitalizations, Karnofsky score, BMI, or serum albumin and prealbumin levels between treatment groups.

Anderson et al. (2018) published a systematic review for the United States Department of Veterans Affairs Evidence Synthesis Program. The review assessed the efficacy and adverse effects of IDPN for treating malnutrition in hemodialysis patients. Five RCTs and 6 comparative observational studies were included in the review (4 prospective and 2 retrospective). The reviewers also identified three systematic reviews, but they were only used to identify additional primary studies because they did not include a formal quality assessment of individual studies or any relevant primary studies. Clinically relevant improvements in individual indicators of nutrition status, global nutrition status, mortality, morbidity, hospitalization, and QOL were among the outcomes. Primary studies compared IDPN to oral supplements, dietary counseling, or standard care. The studies did not define usual care, which could include dietary counseling or oral supplements based on patient condition and physician recommendation. Except for one large retrospective cohort study (n=24196), the study sample sizes were small (ranging from 12 to 196). Malnutrition criteria

varied across studies, with most using serum albumin of 3.5 g/dL or 4.0 g/dL along with at least one other predictor (weight loss, BMI, nutritional score or assessment). No studies compared IDPN to enteral nutrition. It was noted that IDPN did not improve patient mortality, hospitalization, or QOL compared to oral supplements and dietary counseling. Additionally, observational studies reported mixed results for IDPN compared to usual care for mortality, with results differing based on baseline serum albumin levels. The systematic review concluded that "IDPN does not appear to improve patient health or clinically important nutritional outcomes compared to the standard and recommended treatments of oral supplementation or dietary counseling." The authors further noted that "Although IDPN has not been explicitly studied in hemodialysis patients who have failed adequate trials of or are unable to receive dietary counseling, oral, and/or enteral tube feeding due to malfunctioning GI tract or other issues, since evidence – albeit limited – has not raised concerns about IDPN safety, we agree with existing guidelines that it appears reasonable to consider use of IDPN in this population."

A Health Technology Assessment (HTA) report titled Intradialytic Parenteral Nutrition (IDPN) for End-Stage Renal Disease in Adults (2020) assessed the efficacy and safety of IDPN for malnourished patients with CKD or ESRD receiving hemodialysis. Seven studies met the inclusion criteria for this report: 4 RCTs (Cano et al., 2007; Liu et al., 2016; Marsen et al., 2017; Thabet et al., 2017) and 3 retrospective comparative cohort studies (Capelli et al., 1994; Chertow et al., 1994; Hiroshige et al., 1998). In all studies, IDPN was given 3 times per week during hemodialysis treatments to malnourished ESRD patients with baseline serum albumin values less than 3.5 g/dL. Although IDPN treatment regimens varied between trials, they often comprised the standard components of protein, fat, and carbs. The duration of the treatment varied from 16 weeks to 1 year. IDPN was compared to oral supplements in 3 studies (Capelli et al., 1994; Cano et al., 2007; Liu et al., 2016), dietary/nutritional counseling in 2 studies (Hiroshige et al., 1998; Marsen et al., 2017), and usual/standard care in 2 studies (Chertow et al., 1994; Thabet et al., 2017). No studies comparing IDPN to enteral tube feeding assistance was identified.

The HTA concluded that IDPN is relatively safe and is related to improvements in baseline laboratory markers (serum albumin, serum prealbumin, creatinine), BMI/body weight, and death rates when compared to traditional therapy. The findings also reflect individual study limitations, heterogeneity in IDPN formulation trials, and unanswered questions about patient selection criteria for IDPN and long-term benefits. (Hayes, 2022).

Beddhu et al. (2022), in a peer-review titled "Pathogenesis and treatment of malnutrition in maintenance hemodialysis patients," recognize that while IDPN is convenient because it is delivered during dialysis and is likely to be beneficial in some patients, it is also the most costly and ineffective nutritional supplement because it often costs twice as much as dialysis and only 70% of the nutrients are delivered to the patient due to loss into the dialysate. The evaluation suggests that IDPN not be used for hemodialysis patients who are unable to consume at least 50% of their authorized calorie intake. In terms of evidence, the authors highlighted that, while several case reports and studies show that IDPN has considerable benefits, most of the research were either retrospective or poorly conducted.

Bansal et al. (2022), in a peer-reviewed article addressing the assessment of nutritional status in hemodialysis patients, noted that several diagnostic criteria for PEW have been established; however, they advise against using these criteria for routine clinical practice because they have not been validated for the diagnosis of PEW and their use has not been shown to improve clinical outcomes. Any progressive drop in BMI, albumin, and protein nitrogen appearance is more indicative of PEW than any single parameter.

National and Specialty Organizations

IDPN is recommended by guidelines for malnourished patients on hemodialysis who have not responded to nutritional counseling, oral, and/or enteral treatments. Nevertheless, despite the paucity of data indicating advantage over advised treatments, IDPN is frequently sought or utilized before beginning other forms of treatment (Anderson et al., 2018).

American Society for Parenteral and Enteral Nutrition (ASPEN)
ASPEN guidelines state that IDPN alone should not be used as the sole nutrition intervention for malnourished CKD patients. IDPN is a supplemental nutrition intervention that can be used in patients when oral intake and/or EN interventions have failed or are insufficient to meet nutrition goals. Existing data suggest that IDPN is safe in certain patients and can improve weight, appetite, serum albumin levels, and survival in malnourished hemodialysis patients. More research is needed to determine which patient populations would benefit most from this intervention (ASPEN; Worthington et al. 2017).

2017 ASPEN Task Force Consensus Recommendations support initiation of IDPN when the TWO of the following criteria is met:

a. Serum albumin concentration less than 3.5 g/dL
b. Evidence of protein malnutrition based on a normalized protein catabolic rate (less than 0.8 g/kg/d)
c. Energy intake less than 25 kcal/kg/d)
d. Weight loss equal to or greater than 10% ideal body weight over 3 months
e. Dysfunctional gastrointestinal tract
f. Inability to administer adequate EN especially if fluid limited
g. Inadequate weight gain over 1 month

2017 ASPEN Task Force Consensus Recommendations suggest discontinuing IDPN if any of the following conditions exist:

a. Reasonable sustained improvement in nutritional parameters
b. Able to sustain weight and return to oral nutritional supplementation.
c. Adverse effects are improved.
d. Lack of improvement after 3 to 6 months of IDPN should also lead to discontinuation and consider TPN instead.

National Kidney Foundation (NKF) / Kidney Disease Outcomes Quality Initiative (KDOQI)
The 2020 Updated KDOQI Clinical Practice Guidelines for Nutrition in Chronic Kidney Disease guidelines, recommend that TPN or IDPN may be options to provide nutrients if the enteral route is inadequate. However, feeding through the gastrointestinal route should be preferred for as long as possible.

Global Recommendations

- 7A: Do not use IDPN as the sole source of nutrition intervention in malnourished patients with CKD.
- 7B: Consider IDPN for adult and pediatric patients with CKD who are malnourished and unable to tolerate adequate oral intake or EN.

The KDOQI also recommends that in adults with CKD with PEW, a trial of IDPN should be administered to patients with stage 5 CKD who are on maintenance hemodialysis (recommendation level 2C) to improve and maintain nutritional status if nutritional requirements cannot be met with existing oral and enteral intake (Ikizler et al., 2020).

SUPPLEMENTAL INFORMATION

Types of IDPN. In compounded admixture-based IDPN, all-in-one IDPN bags are mixed by a pharmacy based on individual patient needs, whereas in commercial admixture-based IDPN, pre-mixed bags are provided for generic use. Compounding single bags based on patient needs is time-consuming and expensive; therefore, commercial pre-mixed bags are far more popular. During hemodialysis, IDPN is administered via intravenous infusion with a pump. Typically, the most concentrated IDPN formula is used to reduce the risk of volume overload and to fit the treatment within the time constraints of a standard hemodialysis session.

CODING & BILLING INFORMATION

CPT Codes

CPT	Description
90935	Hemodialysis procedure with single evaluation by a physician or other qualified health care professional
90937	Hemodialysis procedure requiring repeated evaluation(s) with or without substantial revision of dialysis prescription
90940	Hemodialysis access flow study to determine blood flow in grafts and arteriovenous fistulae by an indicator method
90945	Dialysis procedure other than hemodialysis (eg, peritoneal dialysis, hemofiltration, or other continuous renal replacement therapies), with single evaluation by a physician or other qualified health care professional
90947	Dialysis procedure other than hemodialysis (eg, peritoneal dialysis, hemofiltration, or other continuous

	renal replacement therapies) requiring repeated evaluations by a physician or other qualified health care professional, with or without substantial revision of dialysis prescription
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% through 7%, (500 ml = 1 unit) home mix
B4176	Parenteral nutrition solution; amino acid, 7% through 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, not otherwise specified, 10 grams lipids
B4189	Parenteral nutrition solution; compounded amino acid 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 acid 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 acid 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 acid 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
B4220	Parenteral nutrition supply kit; premix, per day
B4222	Parenteral nutrition supply kit; home mix, per day
B4224	Parenteral nutrition administration kit, per day
B5000	Parenteral nutrition solution compounded amino acid and carbohydrates with electrolytes, trace elements, and vitamins, including preparation, any strength, renal aminosyn 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

CODING DISCLAIMER. Codes listed in this policy are for reference purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement. Listing of a service or device code in this policy does not guarantee coverage. Coverage is determined by the benefit document. Molina adheres to Current Procedural Terminology (CPT®), a registered trademark of the American Medical Association (AMA). All CPT codes and descriptions are copyrighted by the AMA; this information is included for informational purposes only. Providers and facilities are expected to utilize industry standard coding practices for all submissions. When improper billing and coding is not followed, Molina has the right to reject/deny the claim and recover claim payment(s). Due to changing industry practices, Molina reserves the right to revise this policy as needed.

APPROVAL HISTORY

10/12/2022 New Policy. IRO Peer Review. 8/22/2022. Practicing physician board-certified in Nephrology.

REFERENCES

Government Agencies

1. Centers for Medicare and Medicaid Services (CMS). Medicare coverage database (search keywords: parenteral nutrition, intradialytic parenteral nutrition). Available from CMS.
   - *Effective January 1, 2022, the CMS determined that no national coverage determination (NCD) is appropriate at this time for Enteral and Parenteral Nutritional Therapy. In the absence of an NCD, coverage determinations will be made by the Medicare Administrative Contractors under 1862(a)(1)(A) of the Social Security Act.* Available from CMS.
2. Centers for Disease Control and Prevention (CDC). Chronic kidney disease in the United States, 2021. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2021.

Peer Reviewed Publications

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2. Cano NJ, Fouque D, Roth H, et al. Intradialytic parenteral nutrition does not improve survival in malnourished hemodialysis patients: A 2-year multicenter, prospective, randomized study. J Am Soc Nephrol 2007; 18:2583.
3. [DEFINITION] Cano N. Nutritional supplementation in adult patients on hemodialysis. Journal of renal nutrition: The official journal of the Council on Renal Nutrition of the National Kidney Foundation 2007;17:103-5.
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National and Specialty Organizations

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3. National Kidney Foundation (NKF)
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   - Ikizler TA, Burrowes JD, Byham-Gray LD, KDOQI Nutrition in CKD Guideline Work Group, et al. KDOQI clinical practice guideline for nutrition in CKD: 2020 update. Am J Kidney Dis. 2020;76(3 Suppl 1):S1-S107.

Other Peer Reviewed and National Organization Publications (used in the development of this policy)

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   References cited by Hayes
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APPENDIX

Reserved for State specific information. *Information includes, but is not limited to, State contract language, Medicaid criteria and other mandated criteria.*

Medicare National Coverage In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.