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## The International Society of Renal Nutrition and Metabolism Commentary on the National Kidney Foundation and Academy of Nutrition and Dietetics KDOQI Clinical Practice Guideline for Nutrition in Chronic Kidney Disease

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### Abstract

The Academy of Nutrition and Dietetics and the National Kidney Foundation collaborated to provide an update to the Clinical Practice Guidelines (CPG) for nutrition in chronic kidney disease (CKD). These guidelines provide a valuable update to many aspects of the nutrition care process.

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They include changes in the recommendations for nutrition screening and assessment, macronutrients, and targets for electrolytes and minerals. The International Society of Renal Nutrition and Metabolism assembled a special review panel of experts and evaluated these recommendations prior to public review. As one of the highlights of the CPG, the recommended dietary protein intake range for patients with diabetic kidney disease is 0.6-0.8 g/kg/day, whereas for CKD patients without diabetes it is 0.55-0.6 g/kg/day. The International Society of Renal Nutrition and Metabolism endorses the CPG with the suggestion that clinicians may consider a more streamlined target of 0.6-0.8 g/kg/day, regardless of CKD etiology, while striving to achieve intakes closer to 0.6 g/kg/day. For implementation of these guidelines, it will be important that all stakeholders work to detect kidney disease early to ensure effective primary and secondary prevention. Once identified, patients should be referred to registered dietitians or the region-specific equivalent, for individualized medical nutrition therapy to slow the progression of CKD. As we turn our attention to the new CPG, we as the renal nutrition community should come together to strengthen the evidence base by standardizing outcomes, increasing collaboration, and funding well-designed observational studies and randomized controlled trials with nutritional and dietary interventions in patients with CKD.

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## Background

DIET IS FUNDAMENTAL to nearly every aspect of care in patients with chronic kidney disease (CKD). In the early stages of CKD, dietary interventions can slow CKD progression and onset of symptoms, while in later stages it may delay the need for kidney replacement therapy.<sup>1</sup> Medical nutrition therapy also plays an important role in preventing and treating protein-energy wasting, electrolyte imbalances, and bone and mineral abnormalities. However, dietary regimens for kidney diseases are also among the most restrictive of any chronic disease.<sup>2</sup>

The National Kidney Foundation and the Academy of Nutrition and Dietetics have provided an update to the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI) Clinical Practice Guidelines for Nutrition in Chronic Kidney Disease.<sup>3</sup> While the update process did not directly involve the International Society of Renal Nutrition and Metabolism (ISRNM), the largest international nutritional organization for patients with kidney disease, many ISRNM members played important roles in the guideline development. The ISRNM also assembled a special review panel of 15 international experts (see Appendix S1) who evaluated these recommendations prior to public review. Later, remaining members of the ISRNM Council and renal nutrition leaders reviewed and critically analyzed the updated guidelines. Members also considered the meaning of the nutrition guidelines and how the field moves forward toward the future of renal nutrition.

## Major Changes to the Updated Guidelines

Clinicians will notice a number of changes from the previous version of the guidelines.<sup>4</sup> The first step in the nutrition care process is nutrition assessment. The new guidelines suggest that it is reasonable to screen patients with CKD stages 3-5D for nutrition status biannually and provide direction for when a registered dietitian or international equivalent should conduct a detailed nutrition assessment. Another welcomed change is the emphasis on

global or composite scores, as opposed to single biomarkers (i.e., albumin, prealbumin, and normalized protein catabolic rate), to indicate nutritional status. While there is strong evidence for single measures (e.g., albumin) as predictors of hospitalization and mortality,<sup>5</sup> some have been widely utilized as a marker of overall nutritional status, particularly in patients undergoing dialysis. The new emphasis on composite scores may lead to a move away from such single biomarker measurements as isolated metrics of nutritional status.

Many clinicians will welcome the new recommendations for minerals and electrolytes. In the past, clinicians may have felt obligated to restrict sodium, potassium, and phosphorus in all patients with CKD. Owing to the limited overlap in foods high in these minerals, such eating patterns are difficult to follow and may contribute to reduced overall dietary intake.<sup>2,6</sup> These restrictions also led to reduced intakes of foods traditionally considered healthy, such as fruits, vegetables, whole grains, legumes, and nuts.<sup>6</sup> The new guidelines allow dietitians to work with patients to adjust dietary intake to maintain serum levels of these minerals and electrolytes. This will allow patients to expand their diet to include more of these heart-healthy foods and implement a more individualized approach.

There are also important changes that will influence protein, energy, and delivery of macronutrients. The most noticeable difference is in the recommendations for low-protein diets (Table 1). The new guidelines make distinctions between predialysis patients with and without diabetes and provide specific ranges of protein for each. For clinically stable patients with stage 3-5 CKD and without diabetes, the new recommendations specify a range of 0.55-0.60 g/kg/day or a very low—protein diet of 0.28-0.43 g/kg/day supplemented with keto-acid analogs. This latter recommendation may be difficult in some geographic locations due to the continued unavailability of keto-acid analogs or lack of dietitians with hands-on training and experience in this area. Unlike patients without diabetes, which received a 1A recommendation, there was a lack of high-quality data for which to make a recommendation for patients with diabetic kidney disease. However, based on the opinion of experts, a slightly higher range of 0.6-0.8 g/kg/day is recommended.

There is some concern that multiple targets for protein intake among patients with CKD may create confusion and present challenges for implementation. Kidney hyperfiltration caused by high dietary protein intake and resultant protein degradation products is thought to be a contributing factor to kidney function decline.<sup>1,7</sup> Despite the slightly higher protein target for diabetic kidney disease as opposed to nondiabetic CKD, there is evidence that patients with diabetes may experience greater hyperfiltration following protein consumption.<sup>8</sup> Furthermore, the lower dietary protein targets may be challenging to achieve. For example, in the low-protein trials considered in the guidelines actual dietary protein intake was generally above 0.6 g/kg/day despite a prescribed target of 0.55-0.6 g/kg.<sup>9-14</sup> Therefore, it may be reasonable for clinicians to aim for the lower-end of a streamlined target of 0.6-0.8 g/kg/day, regardless of CKD etiology. Clinical judgment, patient preference, and adherence will be important in the application and practical implementation of these updated protein recommendations.

The new renal nutrition guidelines also do not make recommendations related to the type of protein utilized in low-protein diets. This is likely the result of the reliance on randomized

controlled trials. While these provide strong evidence that can limit the risk of bias, in the absence of randomized trials it may be reasonable for clinicians to consider observational data. There are a number of observational studies,<sup>15,16</sup> including a number that have been published after the guidelines evidence review,<sup>17-21</sup> that generally support plant-based protein or eating patterns. Therefore, based on observational data and other considerations such as practicality and implementation, it may be reasonable for nutrition professionals to suggest plant-based proteins with consideration of patient preferences and cultural food habits. Taking these changes into account, the ISRNM endorses the updated nutrition guidelines for patients with CKD.

### Opportunities and Challenges to Implementation

The implementation of these guidelines will require commitment from across the kidney health community. Many patients continue to be unaware that they have reduced kidney function. The early identification of CKD is an important first step to implementing the dietary changes that may slow progression and prevent kidney failure. According to the World Kidney Day 2020 theme, these are important steps to ensure effective primary and secondary prevention of CKD.<sup>22,23</sup> Many organizations including the National Kidney Foundation have initiatives to expand screening. Furthermore, programs like the Kidney Disease Screening and Awareness Program can also expand these efforts with the added bonus of getting students interested in careers in kidney disease.<sup>24</sup>

Once patients are identified as having CKD, it is important that they are referred to registered dietitians or an international equivalent.<sup>25,26</sup> Medical nutrition therapy provided by a registered dietitian has been shown to slow CKD progression and prevent advancing to kidney failure.<sup>27,28</sup> Despite this, physicians have not regularly referred patients with CKD to registered dietitians.<sup>29</sup> There may be many reasons that patients are not referred including the lack of dietitian expertise in developing countries, concern about affordability of these visits, and a lack of emphasis among physicians on dietary intervention. On the patient side, time and resources are often cited as a barrier.<sup>25</sup> Despite these concerns, many European countries have been successful with early dietary intervention.<sup>30</sup> Removing barriers and improving access to professionals with experience in renal nutrition will be important. One potential strategy may be to expand the use of telehealth and telemedicine services. Renal dietitians have been on the forefront of telehealth implementation, and it has been shown to be feasible and increase the access to registered dietitians for many patients with CKD.<sup>31</sup>

Finally, implementing the specialized nutrition recommendations laid out in the current guidelines will require training. To provide all patients with predialysis CKD preventative services, steps need to be undertaken to enable specialized professionals to provide these services at a high volume. Furthermore, in some countries, it is not common to have specially trained dietitians for patients with CKD. Organizations such as the Academy of Nutrition and Dietetics, the National Kidney Foundation, large dialysis providers, and the ISRNM have been at the forefront of training renal dietitians and other health-care professionals. Still additional efforts will be needed if we are to expand secondary and tertiary prevention of CKD through lifestyle interventions.

## Looking Ahead to the Next Guidelines

A review of the guidelines also points to some important limitations in the overall renal nutrition literature. Many of the guideline's statements are based on expert opinion due to the lack of randomized controlled trials. Even when trials were available, many areas had inconsistent outcome measures leading to an inability to draw conclusions. These are important areas to address for improving the science and clarifying clinical practice in the next version of the renal nutrition guidelines.

As the premier international group committed to renal nutrition and metabolism, the ISRNM is in a strong position to help drive advancement in these areas. The ISRNM recently began an affiliation with the Global Renal Exercise Group (GREX), a group committed to fostering collaborative research across multiple disciplines to develop strategies to improve physical activity and optimize health.<sup>32</sup> GREX has already initiated many important international collaborations that will improve evidence related to physical activity and exercise in patients with kidney disease. International collaborations such as GREX will be important to rapidly advance the science of renal nutrition moving forward.

Finally, the ISRNM has conducted many important consensus meetings and published seminal papers that standardized the terminology and treatment of protein-energy wasting.<sup>33–36</sup> This model may effectively address many of the scientific gaps identified in the current guidelines. The benefit of some of these actions, such as standardization of outcomes in renal nutrition research, will be most compelling if they are enacted quickly. If the renal nutrition community comes together, we can ensure that many of the important existing renal nutrition questions are answered in time for the release of the next renal nutrition guidelines. The ISRNM is prepared and more than willing to contribute actively to the development of the next review of these important set of guidelines.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Ranges of dietary protein intake vis-à-vis relevant kidney disease conditions in the context of the KDOQI CPG in Kidney Disease 2020

Dietary Protein Intake Range	Daily Grams of Protein Intake per kg Body Weight (g/kg/day) *	Comment
Protein-free diet	<0.25 g/kg/day	Generally not recommended for any person including CKD patients.
Very low-protein diet	0.25-0.55 g/kg/day	Usually supplemented with essential amino acids or their ketoacids or hydroxy-acids. KDOQI CPG recommends 0.28 to 0.43 g/kg/day with additional keto acid/amino acid analogs to meet protein requirements (0.55 to 0.60 g/kg body weight/day) for metabolically stable CKD patients without diabetes.
Low-protein diet for nondiabetic CKD †	0.55-0.6	Recommended by KDOQI CPG for CKD patients without diabetes.
Low-protein diet (for DKD †)	0.6-0.8 g/kg/day	More consistently recommended for advanced CKD (eGFR <45 ml/min/1.73m <sup>2</sup> or substantial proteinuria), usually no supplementation is needed as long as the regimen contains at least 50% high biologic value proteins. This range is recommended by KDOQI CPG for CKD patients with diabetes.
Moderately low-protein intake	0.8-1.0 g/kg/day	Recommended range for adults without CKD but at high risk of CKD including those with a solitary kidney (following nephrectomy), diabetes mellitus, hypertension, and polycystic kidneys.
Moderate protein intake	1.0-1.2 g/kg/day	Recommended by KDOQI CPG for metabolically stable patients on maintenance HD or PD.
Moderately high-protein diet	1.2-1.5 g/kg/day	Reported protein intake of average United States adult without CKD.
High- to very high-protein diet	>1.5 g/kg/day	Can be used over limited period of time for acute conditions such as hypercatabolic AKI, high-grade burns, and PEW.

AKI, acute kidney injury; CKD, chronic kidney disease; CPG, clinical practice guideline; DKD, diabetic kidney disease; DPI, dietary protein intake; eGFR, estimated glomerular filtration rate; HD, hemodialysis; KDOQI, Kidney Disease Outcomes Quality Initiative; PD, peritoneal dialysis; PEW, protein-energy wasting.

Adapted from Supplementary-Appendix Table S3 by Kalantar-Zadeh and Fouque.<sup>1</sup>

\* KDOQI CPG in Kidney Disease 2020 states it may be reasonable for a Registered Dietitian or Physician to use clinical judgment in determining the method to assess body weight.

† Recommended by the KDOQI Clinical Practice Guidelines in Kidney Disease.