

Digest

VOLUME 4
DIET CAN MAKE
A DIFFERENCE:
NUTRITION AND
CHRONIC KIDNEY DISEASE

**The Importance of Nutrition
in Feline Chronic Kidney
Disease**

Jessica Quimby
DVM, PhD, Diplomate ACVIM (SAIM)

**Feeding Management for
Dogs with Chronic Kidney
Disease and Proteinuria**

Aulus Cavalieri Carciofi
BVSc, MSc, PhD
Ariel de Castro
BVSc, MSc Candidate

**Strategies to Improve
Renal Diet Acceptance
in Cats**

Hsiao-Wei Tu
PhD



The importance of nutrition in feline chronic kidney disease

Jessica M. Quimby, DVM, PhD, DACVIM (SAIM)
The Ohio State University, Columbus, Ohio, USA

Several studies have documented the therapeutic value of feeding a renal diet in the management of feline chronic kidney disease (CKD), including amelioration of CKD mineral bone disorder (CKD-MBD), decreased incidence of uremic crisis and increased survival.^{1,2} Feeding a renal diet also decreases fibroblast growth factor 23 (FGF-23) concentrations, a biomarker that is positively correlated with disease stage.¹ However, the failure of the patient to eat the diet negates the benefit of dietary management, and therefore a key therapeutic target for these patients is the maintenance of appetite and food intake.

Clinical signs of nausea, vomiting, and dysrexia are common in feline patients with CKD. Weight loss and loss of lean body mass in these patients is likely attributable to changes in appetite as well as processes such as cachexia and sarcopenia. Therefore, serial evaluations of nutritional status are a key part of CKD patient management, and a proactive nutritional plan should be created for every patient. A nutritional assessment should include body weight, body condition score, muscle condition score, adequacy of caloric intake (including open ended questions about how the pet is eating), and a complete dietary history (including pet food, treats, supplements and items used to give medications).

A nutritional plan is important in feline CKD because low body weight and decreased body condition are associated with a poorer prognosis.² Additionally, appetite is perceived by caregivers as a significant aspect of quality of life.³ Although renal diets contain adequate dietary protein, the patient will be protein deficient if not eating its caloric requirement. In order to increase compliance with renal diet intake, complications of decreased kidney function (hydration, hypokalemia, anemia, etc.) that have the potential

Of Note

- A nutritional plan should be created for every cat with CKD.
- Dietary therapy needs to be tailored to the individual cat.
- Achieving ideal body condition if needed, preserving muscle condition, and maintaining a consistent appetite are important nutritional goals for cats with CKD.

to affect appetite should be addressed. Medical management for inappetence and nausea should be instituted. Lastly, a slow dietary transition over several weeks is recommended. It may be helpful to initially offer the renal diet in a separate bowl(s) as an alternative option instead of mixing together with previous diet. If cats cannot be enticed to eat an appropriate amount of renal diet with medical management, then placement of a feeding tube may facilitate meeting nutritional goals.²

IRIS guidelines recommend feeding a renal diet in cats with stage 3–4 CKD, and recommend considering a renal diet in stage 2 CKD.⁴ There is little evidence to determine if cats with very early stage CKD should start a renal diet. Recently, hypercalcemia has been documented in some cats when switched to a renal diet, likely due to the low phosphorus content and/or unbalanced calcium:phosphorus ratio.⁵ This appears to be more likely in cats with phosphorus <3.5 and lower potassium.⁵ In these instances switching to a slightly less phosphorus restricted diet with a more balanced calcium:phosphorus ratio has resulted in resolution of hypercalcemia.^{6,7} Additionally FGF-23 may be helpful in determining if cats with

serum phosphorus within the normal range would benefit from phosphate restriction.⁴

Monitoring response to treatment and recognizing that there are individual cats at each stage who will need adjustments to their dietary therapy is important. Strategies may include modifying protein content based on nutritional need, increasing phosphorus restriction through diet and then phosphate binders if serum phosphorus or FGF-23 fails to meet target concentrations, alternatively reducing phosphorus restriction in cases where serum calcium increases and hypercalcemia is a concern, and being cautious with the use of products that might exacerbate hypercalcemia. Recent advances in renal diet formulations aid in this endeavor. The concept is that dietary therapy, like any other kind of therapy, needs to be tailored to the individual cat (**Box 1**).

Box 1. Nutrition Checklist for Cats with CKD

- ❑ Perform a nutritional assessment, including body weight, body condition score, muscle condition score, and diet history
- ❑ Understand the quality of the cat's appetite at home
- ❑ Achieve or maintain ideal body condition and preserve muscle condition
- ❑ Evaluate the cat for medical contributors to appetite (nausea, vomiting, anemia, hypokalemia)
- ❑ Recommend a slow transition over several weeks when making dietary modifications
- ❑ Consider appetite stimulants or a feeding tube if needed
- ❑ Monitor key laboratory parameters to ensure the cat's appetite remains stable

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Feeding management for dogs with chronic kidney disease and proteinuria

Aulus Cavalieri Carciofi, BVSc, MSc, PhD

Ariel de Castro, BVSc, MSc Candidate

São Paulo State University, Jaboticabal, São Paulo, Brazil

Feeding management is a key point in chronic kidney disease (CKD) patients' survival and quality of life. Diet selection should be based on the International Renal Interest Society (IRIS) recommendations regarding the disease stage, serum phosphorus and degree of proteinuria.¹ The adjustment of diet nutrient profile to compensate for the metabolic alterations in dogs with CKD, and strategies to ensure adequate food and energy intake are essential to patient management.

Energy-dense diets allow patients to obtain their energy needs in a smaller amount of food, minimizing gastric distention, nausea, and emesis,² preventing muscle catabolism, weight loss, and uremia. Supplying calories at 95 to 110 kcal of ME per kg^{0.75} (resting energy requirements x 1.4–1.6) per day is a good starting point, and body weight and condition must be reassessed frequently to adjust energy supply to a healthy body weight.

Restriction of dietary phosphorus to maintain serum phosphorus concentration below 1.5 mmol/L (but not less than 0.9 mmol/L; < 4.6 mg/dL but > 2.7 mg/dL) is beneficial to patients with CKD.² If serum phosphorus remains high even after dietary restriction, IRIS (2023) recommends the use of enteric phosphate binders to effect, mixed with each meal.

Reduction in protein intake has long been recommended to control clinical signs of uremia, proteinuria, anemia, polyuria, and polydipsia. Significant protein restriction, however, is controversial as protein intake influences lean body mass and diet palatability, and protein malnutrition is associated with patient morbidity and mortality.³ Reduced protein intake, while continuing to meet amino acid requirements and basic protein needs, in combination with moderate sodium, supplementation with EPA and DHA, and medical management of hypertension (if needed) composes an integrated management to control proteinuria.⁴

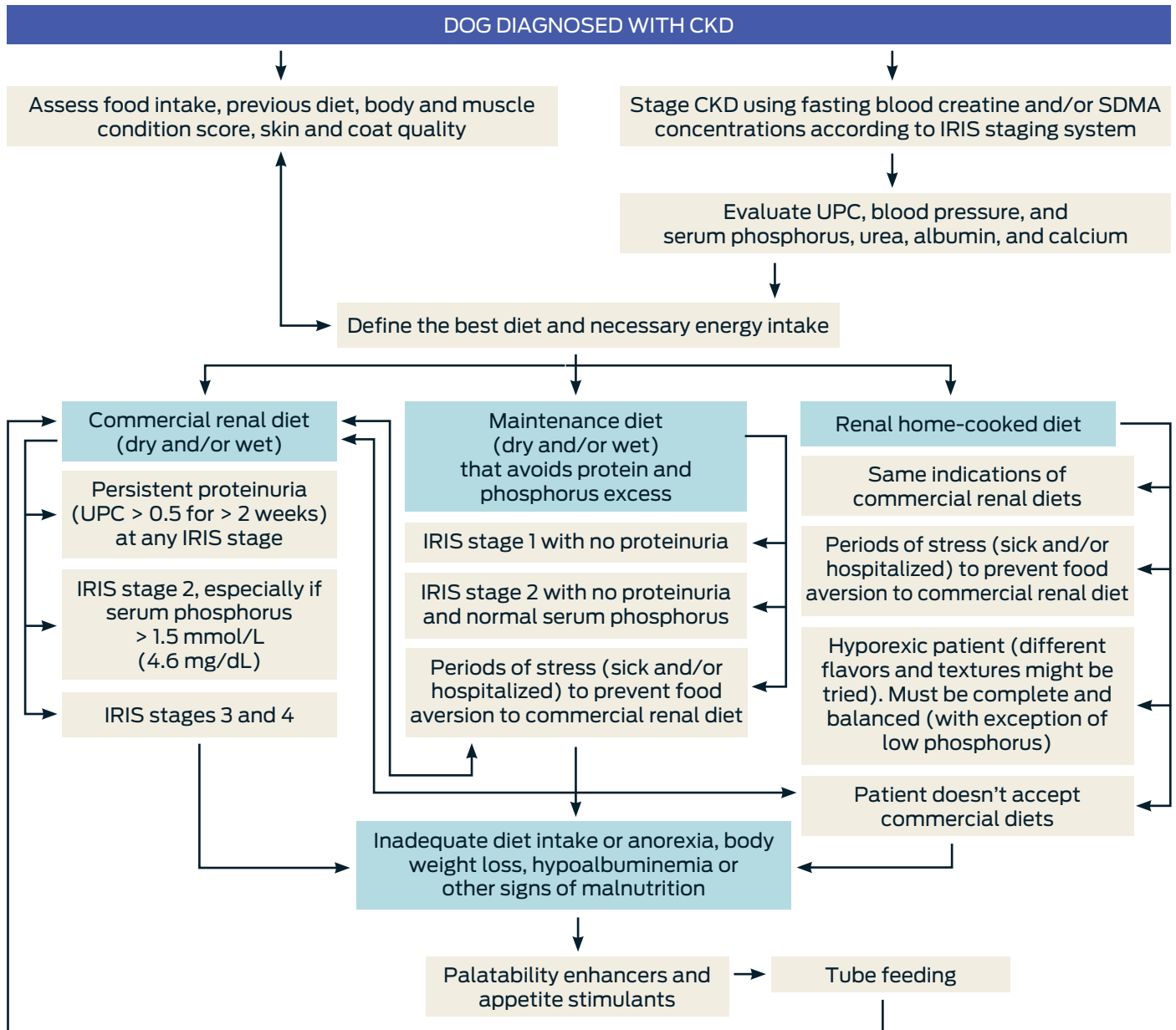
Of Note

- Dogs with CKD and proteinuria should receive a diet and feeding plan based on their IRIS stage to cover energy and nutrient requirements.
- Treats can be a significant contributor to total protein and phosphorus intake.
- If food intake is inadequate, ideas for increasing food intake include palatability enhancers appropriate for CKD or proteinuria, appetite stimulants, and feeding tubes.

Despite the potential nutritional benefits, commercial renal diets should never be offered to a patient when hospitalized or sick and any diet changes should be gradually made over the course of 2 weeks to avoid food aversion. If the patient is receiving a large quantity of treats with high phosphorus and protein content (e.g., meat, dairy), modification of the treats alone may sufficiently decrease the dog's phosphorus and protein intake.

Patients with CKD usually present with episodes of hyporexia or anorexia, depending on IRIS stage. Active monitoring of food intake, body weight, and body and muscle condition scores is necessary for early recognition of a possible deterioration in the nutritional status. Increasing diet palatability by adding warm water or a wet renal diet to dry diets and using appetite stimulants can help increase food intake.⁴ However, feeding tube intervention must be considered for patients who do not voluntarily eat after efforts to manage nausea and vomiting, or after the use of palatants and/or appetite stimulants.

Figure 1. Nutritional Recommendations for Dogs with CKD and Proteinuria (from the Purina Institute Handbook of Canine and Feline Clinical Nutrition, used with permission):



Feeding tubes are very useful tools and can be used not only to provide food but also fluids and medications, helping to maintain or even improve the patient’s body weight and hydration status and reducing intravenous or subcutaneous fluid administration needs.

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Strategies to Improve Renal Diet Acceptance in Cats

Hsiao-Wei (Vicky) Tu, PhD

Nestlé Purina PetCare, St. Louis, Missouri, USA

Chronic kidney disease (CKD) is a common disease primarily affecting senior cats.¹ Clinical studies have demonstrated that veterinary therapeutic renal diets can reduce the workload of damaged kidneys and serve as an effective intervention. Medical problems associated with feline CKD such as nausea often affect appetite, and strategies for diet acceptance are often needed for these cats.²

To encourage cats' food consumption and help owners adhere to the veterinary diet recommendations, we studied feeding strategies with the aim to enhance appetite and to provide cats with CKD a pleasurable eating experience (**Figure 1**).

Our observation showed that while dry food was available, cats with CKD continued to eat wet food throughout the day, even after the wet food became dry and cold. Purina studies showed that feeding wet food more frequently (3 times a day vs. once a day) increased wet food intake while maintaining dry food intake. Therefore, it is recommended to feed cats with CKD a small amount of wet food multiple times per day to keep the food fresh and more attractive. In addition, feeding wet and dry food side by side (but not mixed together) increased the amount of wet food consumed, compared to feeding wet and dry food separately at different times of the day. Finally, we found that cats with CKD appreciate options. Presenting a variety of diets simultaneously, such as providing both wet and dry options, stimulates more food intake compared to offering one type of food at a time.

There is a difference in opinion about the temperature of the food and consumption by cats with CKD. Some veterinarians suggest pet owners warm the food for additional attractive aromas,³ while others believe the enhanced smell may cause cats with CKD to feel nauseous

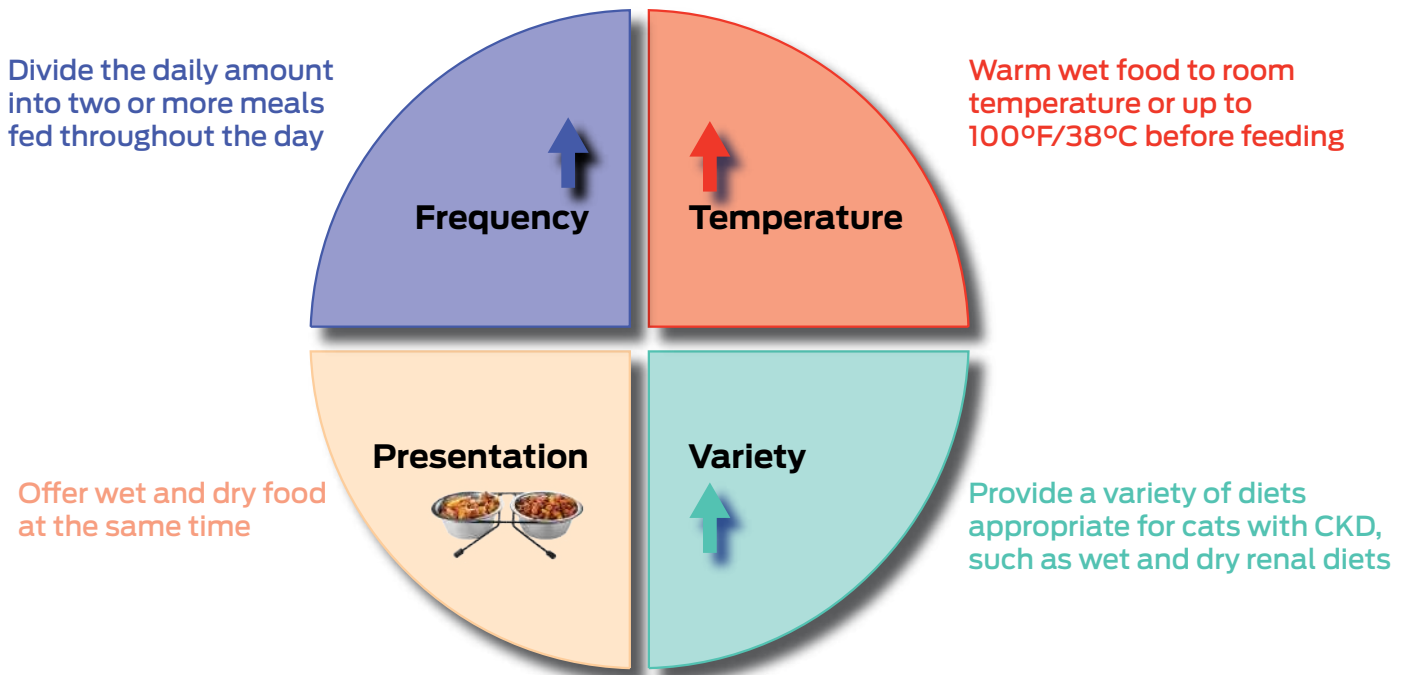
Of Note

- Feed multiple small meals a day consisting of both wet and dry food; if not feasible, at least feed small amounts of wet food multiple times a day to keep it fresh and moist.
- If possible, offer a small portion of each variety of foods, such as both wet and dry veterinary therapeutic renal diets. Warming wet food to the cat's body temperature before feeding can stimulate appetite by enhancing food aroma.

and eat less (personal communication). Purina studies have demonstrated that cats with CKD had significantly decreased interest in cold wet food, which is notable considering the recommendation is to store leftover food in the refrigerator. Thus, we recommend warming up wet food to room temperature (around 70°F/21°C) or slightly higher (up to 100°F/38°C) before feeding to stimulate appetite. This feeding strategy is especially effective for classic pâté diets. Alternatively, mixing pâté diets with warm water and stirring to ensure the texture is homogenous can elevate the temperature to improve palatability, but also provide hydration. It is important to ensure that the temperature is not too hot and is evenly distributed throughout the portion (i.e., no "hot spots"), especially if using a microwave.

Overall, these strategies are based on our understanding of specific eating habits and feeding behavior of cats with CKD. They can be easily adopted at home to help increase daily calorie intake and improve their mealtime enjoyment.

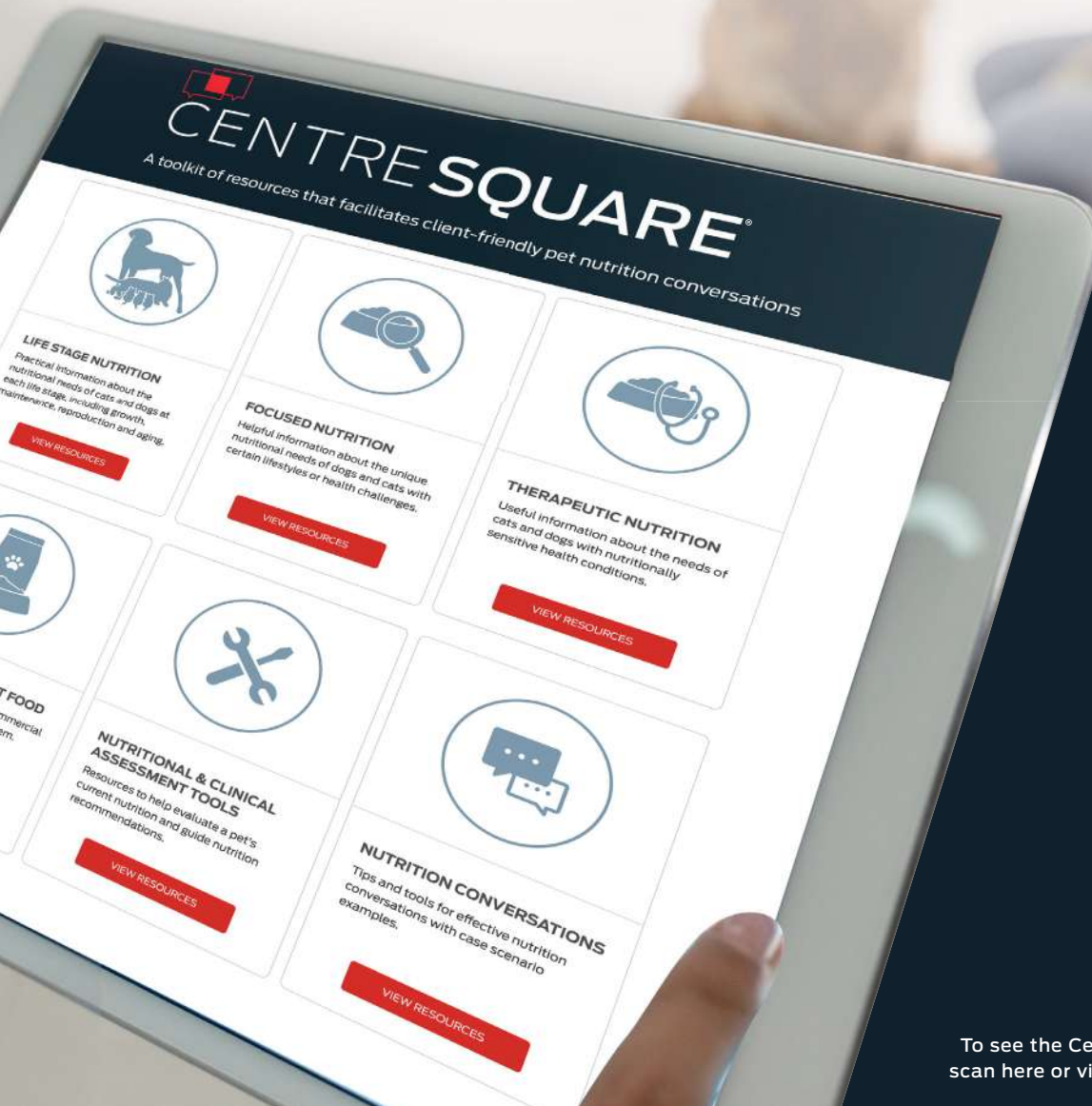
Figure 1. Strategies for encouraging appetite in cats with CKD.



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