

The PRINE Kidney Diet

How to Eat to Protect
Your Kidneys and
Avoid Dialysis



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The PRINE Kidney Diet

Nutrition is essential to the therapy for Chronic Kidney Disease (CKD). A sound nutritional philosophy can help slow the progression of CKD towards end-stage renal disease (ESRD), which is defined as the need for dialysis or transplantation. Eating right can help you to avoid the potentially severe complications of the electrolytes the kidneys regulate.

Furthermore, good nutritional habits can help you to control two of the most significant risk factors for CKD: Diabetes and Hypertension. By maintaining the proper diet, you can better manage your blood sugar and decrease your blood pressure. This can help preserve your kidney function and reduce your need for prescription medications.

This booklet is meant to help guide you to make the best food choices for overall health and keep you and your kidneys working as well as they can. This information is a general guide. Since each case is different, your dietitian or Nephrologist will need to supplement this guide and work with you to develop a meal plan which matches your specific goals.



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Overview and Diet Prescription

When your kidney function slows, your nutritional status can be adversely affected. This is partly because the kidneys are the filtering system in our bodies. Some nutrients may be excreted less effectively, so you need to limit them in your diet. Some people also lose extra protein in the urine, and others can develop a decrease in appetite, leading to protein malnutrition.

Below is a general diet prescription. However, this may be modified by your dietitian and Nephrologist to meet your specific needs.

This might be overwhelming, but remember that this is to help guide you to eat for the healthiest kidneys possible.

Calories	30-35 kcal/kg
Protein	~0.8 g/kg
Sodium	2000 mg
Potassium	2000 mg



Tips

1

To figure out your weight in kilograms, divide your weight in pounds by **2.2**.

Example: Protein needs for a 150 pound person: $150/2.2 = 68.2$.

Take that number and multiply by 0.8 → 55 grams protein per day.

2

You may need to use your Ideal Body Weight (IBW) to calculate nutrient needs if you are overweight or underweight.

For women - 100 lbs for first 5 feet + 5 lbs for each inch over 5 feet (medium frame)

Protein

Protein is essential for your body's growth and is used to build and maintain body mass. It also helps you fight infection. Your protein needs may be similar to someone without kidney disease. But excessive protein can cause a strain on your kidneys and hasten deterioration. Therefore, we suggest eating enough protein for your needs but being mindful of keeping an upper limit of intake.

Furthermore, when the kidneys aren't working well, a waste product called **urea** can build up in the blood. This may cause unpleasant side effects like decreased appetite, nausea, changes in taste, and fatigue. Nevertheless, it is crucial to get enough protein, especially from high biological value (HBV) sources such as those below—but not too much, which would cause kidney stress.

Serving guide

1 ounce	Poultry, fish, beef, veal, pork (fresh or frozen)
¼ cup	Canned salmon, tuna, Cottage cheese, Fresh shellfish: crab, oyster, lobster, clams
1 large	Egg (or 2 egg whites or ¼ cup substitute)
5 large	Shrimp
½ cup	Tofu



Tips

1

High sodium protein sources

Limit these and refer to sodium page: Cheese, bacon, canned tuna, luncheon meats, processed fast and convenience meats, pizza, smoked salmon.

2

High phosphorus protein sources

Limit these and refer to phosphorus page: Beans, peanut butter, nuts, seeds, soymilk.

3

1 serving = 1 ounce = 7 grams protein

Don't Pass the Salt!

Salt or sodium chloride is a mineral that assists in regulating the water content of your body. The typical American diet has several times the body's daily requirement. Excess salt can cause fluid retention, which in turn can expand your blood volume. This can lead to high blood pressure and swelling.

You DO NOT need any extra salt in your diet. The desire for salt in foods is actually an acquired taste. You can tame your taste buds by using the tips below.

Experts recommend sodium intake of less than 2,000 mg/day

1 tsp of salt = 2,300 mg of sodium chloride!
So the first step is to give up the salt shaker. However, many foods contain hidden sources of sodium, and most of the salt Americans consume is added to foods during processing. That is why a good rule of thumb is to choose foods with less than 140 mg of sodium per serving.



High sodium foods to avoid

Salted snack foods:

popcorn, nuts, pretzels, potato and other chips

Condiments:

soy sauce, BBQ sauce, steak sauce, anything with salt in its name (garlic, sea, onion), gravy, sauce mixes

Cured, canned, smoked, or processed meats and fish:

anchovies, ham, lunch meats, lox, sausage, bacon, hot dogs

Canned entrees and soups:

bouillon, broth, consommé

Cheese:

regular processed and spreads, pizza

Boxed convenience foods:

Instant rice or noodle, stuffing or casserole mixes

Fast Food:

commercial hamburgers, pizza, tacos, Chinese food

Pickles:

relishes, olives, and other pickled vegetables

More Helpful Sodium Tips



When eating out, ask for sauces on the side and **go easy on the condiments.**



Choose **low-sodium meats.** Opt for ground beef instead of sausage, roast turkey/ roast beef instead of luncheon / smoked meats.

Use **herbs and spices** to provide flavor to food instead of salt:



Allspice, basil, cayenne pepper, cinnamon, cumin, curry, dill, fennel, garlic, ginger, lemon juice, dry mustard, nutmeg, onion, oregano, paprika, parsley, rosemary, saffron, savory, sesame, tarragon, thyme



Cook noodles, rice, and hot cereals **without adding salt.**



Buy fresh foods

Including fruits, veggies, meats, poultry, fish, legumes, eggs, milk, yogurt, and unprocessed grains.



Look for frozen meals with **less than 600 mg sodium** per serving.



Buy low sodium and no-salt added products.

There is a plethora on the marketplace including low-sodium soups, cheeses, canned fish, vegetables or vegetable juices, unsalted crackers/popcorn/ snack foods.



Sodium substitutes are NOT an option if you need to limit potassium intake.

Many salt substitutes (such as Mrs Dash) contain potassium in place of sodium.

Potassium

Potassium is another mineral that helps your muscles and nerves work. If the potassium in your blood gets too high, it may cause a disturbance in the muscles or nerves. The most serious is the cardiac muscle, leading to an irregular heart rhythm that could even become fatal. Medications and food work together to balance your blood potassium which should typically be in the range of **3.5-5.0**.

If yours is elevated, which can happen as the kidney function decreases or as the consequence of certain medications or kidney-related conditions, choose these lower potassium fruits/vegetables:

low potassium

Fruits

Apples/apple juice/applesauce
Apricots (canned)/apricot nectar
Berries
Cranberry juice
Fruit cocktail
Grapes/grape juice
Grapefruit/ grapefruit juice
Honeydew melon
Lemons and limes
Mangoes
Papayas
Pears
Peaches
Plums
Pineapple
Rhubarb
Tangerines
Watermelon

Vegetables

Alfalfa sprouts
Bell peppers
Bamboo shoots (canned)
Broccoli (fresh)
Cabbage
Carrots
Cauliflower
Celery and onions (raw)
Corn
Cucumber
Eggplant
Green beans
Kale
Lettuce
Mushrooms (fresh)
Okra
Summer squash (cooked)



Reduce Potassium

Follow these instructions to reduce the amount of potassium and sodium in potatoes (white and sweet) and other vegetables such as carrots, beets, and squash.

- 1** Peel vegetables and slice to 1/8 inch thickness.
- 2** Place slices in cold water until all vegetables are peeled to avoid darkening.
- 3** Rinse in warm water for a few seconds.
- 4** Soak for a minimum of 2 hours in warm water. Use ten times the amount of water to the amount of vegetables.
- 5** Rinse again in warm water for a few seconds.
- 6** Cook for 5 minutes. Use five times the amount of water to the amount of vegetables.

In some cases, you may need to be on a very low-potassium diet and be asked to avoid higher-potassium foods. Alternatively, you may choose tiny portions of higher potassium foods, such as a slice of tomato on a sandwich or ½ cup of soaked potatoes. Soaked potatoes can be used in dishes such as mashed potatoes, potato salad, scalloped potatoes, and French fries.

high potassium

Fruits

- Apricots (fresh)
- Bananas
- Cantaloupe
- Dates
- Nectarines
- Kiwi
- Prunes/prune juice
- Oranges/orange juice
- Raisins

Vegetables

- Acorn and butternut squash
- Avocado
- Baked beans
- Beet and other greens
- Broccoli (cooked)
- Brussels sprouts (cooked)
- Chard
- Chile peppers
- Mushrooms (cooked)
- Potatoes
- Pumpkin
- Spinach (cooked)
- Split peas
- lentils, beans
- Sweet potatoes, yams
- Vegetable juice
- Tomatoes/tomato juice/tomato sauce

Many other fruits and vegetables contain moderate amounts of potassium and therefore, you should watch your portion sizes and eat only about 4 servings/day if your blood potassium is high:

**1 serving = ½ cup fresh
fruit/vegetable = ¼ cup dried fruit**



Phosphorus

Phosphorus is an essential mineral found in the body. The vast majority of phosphorus is located in the bone. Phosphorus is closely linked with calcium and is very important for bone strength. With later-stage CKD, the kidneys do not clear phosphorus well and it can accumulate in the blood. High phosphorus can cause bone disturbance, cardiovascular disease, itchy skin and joint pain.

Phosphorus is naturally found in protein-rich foods like meat, fish, nuts, beans and dairy products. It is also added to many processed foods, so it is essential to read food labels and look for words with 'phosphate' or 'phos' in the ingredients.

Your doctor may have also prescribed a phosphate binder to take with meals to help reduce the amount in your blood. This is often needed during the later stages of kidney disease when the kidney's capacity to handle dietary phosphorous intake becomes overwhelmed.

high

- Meat, poultry, fish - 2-3 ounces
- Dairy foods
 - Milk, ice cream - 1 cup
 - Cheese - 1 ounce
 - Yogurt, pudding - ½ cup
- Beans, lentils, nuts- ½ cup
- Nut butters - 1 ounce
- Bran and whole grain foods
- 1 slice bread, ½ bun, ½ cup cooked rice, cereal, oatmeal
- Colas - 1 cup
- Chocolate - 1.5 ounces

low

- Fresh fruits and vegetables
- Rice milk (un-enriched)
- White breads
- Rice/pasta
- Corn/rice cereals
- Light colored sodas



Tips

- 1** Take your binder with your first bite of food to optimize its effectiveness and minimize stomach upset.
- 2** If you need to restrict phosphorus, stick to these serving sizes and try to only have **1-2 servings** of the foods per day.



Blood Glucose Control

Diabetes continues to be the most common cause of chronic kidney disease in America. Whether you've had diabetes for years or have been told by your doctor that your fasting blood glucose is high, it is crucial to monitor your carbohydrate intake. In addition, new research shows that a high sugar intake can contribute to increased blood pressure.

We still need carbohydrates for energy, so you cannot completely cut these foods from your diet! The key is to watch your portions and choose more 'complex' carbohydrates such as bread, cereals, starchy veggies, beans, and fruits instead of 'simple' sugars such as sweets, fruit juice, and regular soda.

Foods that contain carbohydrates include:

- Bread, crackers, cereal
- Pasta, rice, grains
- Starchy vegetables such as corn, peas, and potatoes
- Beans and legumes
- Milk, soy milk, yoghurt
- Fruits and fruit juices
- Sweets such as cakes, cookies, ice cream, jam, jelly, syrup



Tips

Consume a 'consistent carbohydrate' diet. This means having the same amount of carbohydrate at each meal. Your dietitian can give you specifics, but for the average person, this means 4 servings of carbohydrates at each meal, with 1-2 as snacks.

1 serving = 15 g of carbohydrate

Meal example with 4 carbohydrate servings:
2 slices toast with 2 eggs, apple, 8 oz yogurt

Foods high in fiber might be beneficial for blood glucose control (i.e. whole grain bread, beans, etc.); however, many are also high in phosphorus.

Choose carbohydrates lower in fiber for phosphorus control.

Keep your blood glucose stable throughout the day by staying consistent with carb intake.

The DASH Diet

DASH is an acronym for **Dietary Approaches to Stop Hypertension**.

It is one of the most talked about specific diets in medicine and deserves special mention here since it effectively lowers blood pressure. Most patients with CKD have hypertension, so I often recommend my patients follow these guidelines.

The DASH diet emphasizes foods high in potassium and low in sodium. Our ancestors were hunters and gatherers, and their diets were very high in potassium from fruits and vegetables. Similarly, there was no processed food, and the sodium content was minimal. The typical American diet has flipped the historic potassium-to-sodium ratio. The principles of the DASH diet aim to get us back to the basics of our ancestors who did not suffer from hypertension.

In addition, the DASH diet encourages lean sources of protein (seafood, poultry, lean meat and low-fat dairy) which contains low amounts of saturated fat and cholesterol. Reducing saturated fat in your diet can help reduce your risk for cardiovascular disease.

For more information on the DASH diet, visit the National Heart Lung and Blood Institute's [website](#).



6-8

servings per day of whole grains

4-5

servings per day of fruit

2-3

servings per day of fats and oils

2-3

servings per day of low-fat or fat-free dairy products

6

or less servings per day of meat

4-5

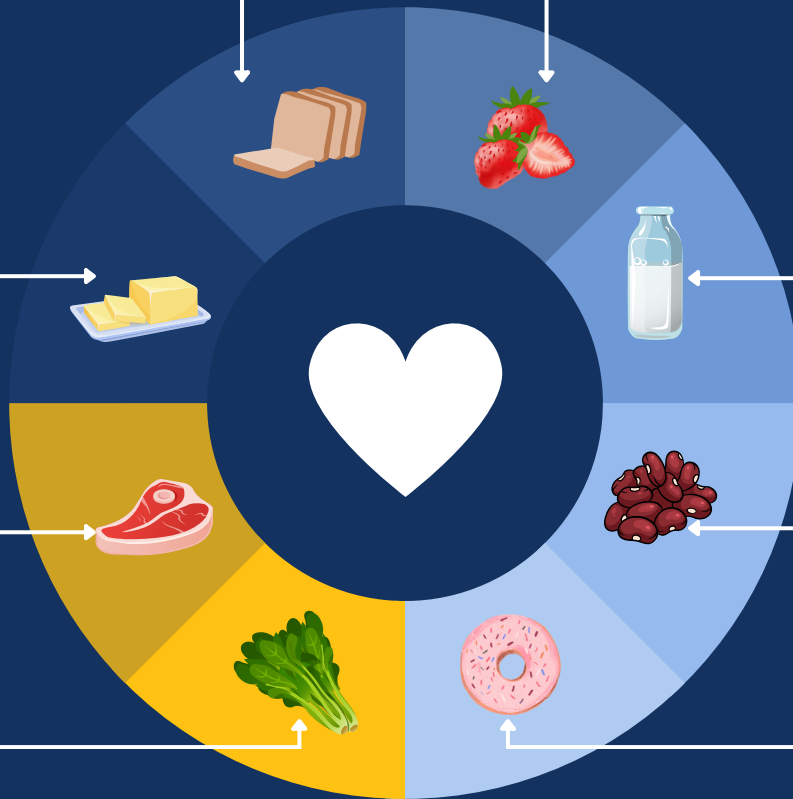
servings per week of nuts, seeds, beans, and peas

4-5

servings per day of vegetables

5

or less servings per week of sweets



Food Group	Daily Serving
Grains	6-8
Meats, poultry, and fish	6 or less
Vegetables	4-5
Fruit	4-5
Low-fat or fat-free dairy products	2-3
Fats and oils	2-3
Sodium	2,300 mg*
	Weekly Servings
Nuts, seeds, dry beans, and peas	4-5
Sweets	5 or less

Disclaimer

Although we agree with this advice generally, as noted above in our potassium section, too much potassium in people with later-stage kidney disease can have severe consequences. The DASH diet is more appropriate for earlier-stage kidney disease and should be discussed with your nutritionist and Nephrologist.

Minerals

In a restricted diet with kidney disease, it may be difficult to consume and maintain normal levels of these minerals in your body. Do not take any supplements without checking with your Nephrologist.



Calcium

You might not get the calcium you need in a diet low in phosphorus that restricts dairy products. Also, with kidney disease, your body doesn't absorb as much calcium from the gut, leaving your blood level low. When this happens, your body may take calcium from your bone to compensate. It is particularly important in women because of bone health and the prevention of osteoporosis. Therefore, your doctor might recommend a higher dietary intake of calcium or a supplement.

Calcium-rich foods

Milk, yoghurt, cheese, pudding, ice cream, rhubarb, spinach, broccoli, almonds, tofu, canned salmon or sardines (with bones), fortified cereal, bread, or juice.

Conversely, too much calcium can be a problem as well. This may be especially true during the latter stages of CKD when phosphorus excretion is limited and when one is using vitamin D supplementation. This, however, is more of a concern during the later stages of CKD and should be discussed with your Nephrologist.





Iron

When kidney function declines, so does the production of a hormone called **erythropoietin**. Erythropoietin is needed with an adequate amount of iron to stimulate Red Blood Cell (RBC) production. RBCs carry oxygen throughout our bodies and allow us to use energy from food. Anemia is when you have a low level of red blood cells. Anemia can lead to fatigue and contribute to heart problems. This is usually treated with a combination of medication, diet and supplements under your physician's care.

Iron-rich foods

beef, turkey, shellfish, fortified cereals/breads/pastas, beans.



Zinc

Your body may excrete more zinc with kidney disease than usual causing your blood level to be low. Zinc is a trace mineral but has many functions including assisting enzymes in digestion. It is also essential for growth and reproduction, skin integrity and important for a healthy immune system.

When your level is low, you might experience loss of appetite, weight loss, change in senses, slow healing of wounds, among other things. Consuming a diet rich in zinc might not be enough to keep your blood level steady and supplementation may be necessary.

Zinc-rich foods

oysters, shellfish, brewer's yeast, wheat bran, pine nuts, pecans.



Poor appetite

With progressive CKD, you may ultimately develop a condition called uremia. This condition, found at the later stages of kidney disease, involves a buildup of waste products in the blood, causing, among other symptoms, a loss of appetite. Also, you may develop an altered taste sensation, and the foods you once loved may no longer taste the same. This, plus the need to have restrictions on your diet, can result in not getting enough nutrients.

Getting enough calories and protein is vital for your health. Therefore, you should work with your dietitian to figure out how you will do so. Sometimes, a kidney-friendly milkshake supplement is encouraged as well. Here are some tips to ensure good nutrition with a poor appetite:



1 Less is more
Small, frequent meals might be easier to consume than less frequent larger meals throughout the day. Plan ahead for times you need to eat and stick to those times.

2 Check the smell
You might be sensitive to food odors, so minimizing foods with a strong smell could be helpful. Cold foods may be more appetizing.

3 Make it pretty
The pleasurable physical appearance of food might enhance your appetite. Try not to eat on the go but rather sit down and enjoy a plated meal.

4 Eat what you love
Choose foods you love within the limitations of your diet. If your intake is inferior, your diet may be liberalised by your Nephrologist or dietitian.

5 Spice it up
Adding herbs, seasonings, and spices can improve the aroma and taste of food.

6 Calorie-rich
You can get in extra calories by adding:









- Fat sources including low-salt butter, sour cream, salad dressings, vegetable oils, and non-dairy creamers.
- Beverages such as apple juice, lemonade, root beer, and low phosphorus sodas such as Sprite, root beer, and ginger ale.*
- Candies and sweets including sucking/gummy candies, lollipops, popsicles, sorbet, syrup, honey, sugar.*

*If you have diabetes, choose these sweeter foods in moderation

Portion Control



Successful nutrition plans and diets rely a lot on monitoring your portion sizes and consuming foods in moderation. Use this handy chart below when measuring out foods is inconvenient.

FOOD	SERVING SIZE	GUIDE	
FRUITS, VEGETABLES	1/2 cup fresh	tennis ball	
CHICKEN, FISH, MEAT	3 ounces	palm	
GRAINS	1/2 cup cooked grains	1 slice bread	
PASTA, RICE	1/2 cup cooked	fist	
SALAD DRESSING	1 tablespoon	size of your thumb, tip to the top joint	
POTATOES	1 small (3-ounce) baked potato or 1/2 cup mashed potatoes	small mouse	
CHEESE	1 ounce	4 dice stacked	
NUTS	1 ounce	child's handful	

Dining Out

When you have food restrictions, dining outside your home can be an overwhelming experience, and many people tend to avoid it altogether. However, this is not necessary. You do not need to give up these enjoyable social occasions. Instead, use these tips to stick to your meal plan as best you can!

1

Set yourself up for success

Many menus are available online; it helps to take a look beforehand to decide what you will have. That way, you are more mindful of your restrictions and are more likely to stick to the kidney diet.

2

Choose smart

Instead of cured foods like deli meats, choose fresh lean meats to minimize sodium intake. Order grilled, baked or broiled items instead of fried or sauteed to minimize saturated fat content. Refer to this guide to choose fruits or vegetables lower in potassium when indicated.

3

Be assertive

Most sodium in meals comes from hidden sources during preparation and with added sauces or seasonings. Ask that your dish be prepared with little or no salt and request sauces on the side.

4

Portion Distortion

Restaurant serving sizes are often much larger than what we actually need. Try getting an appetizer for yourself and sharing an entrée with a dining partner. Or you might find it helpful to ask for a "doggy bag" to pack up excess portions even before you start eating. You do not need to finish every crumb on the plate.

5

Phosphate Binder

Eating out is not an excuse to forget your phosphate binder when necessary for phosphorus control. Plan to carry them in a small pill box or your wallet.



Tips by cuisine



CUISINE	KIDNEY OFFENDERS	HOW TO DINE
 <p>AMERICAN</p>	<p>Portion size is the biggest issue here – anything in excess can provide you with more sodium, potassium, or phosphorus than you need. French fries alone are high in potassium and sodium.</p>	<p>Refer to the portion control page in this packet and the tips above. Have a chicken sandwich or hamburger (without cheese) and a side salad.</p>
 <p>MEXICAN</p>	<p>This menu is usually high in low-quality protein, sodium, phosphorus, and potassium. This comes from cheese, beans, guacamole and sauces.</p>	<p>Pick from the à la carte menu items such as meat tacos with plain rice and fajitas, where you have more control over what goes into your meal.</p>
 <p>ITALIAN</p>	<p>Many sauces and cheeses are mixed in with Italian foods, making them higher in sodium and phosphorus.</p>	<p>Choose pasta with red or white sauce, salad and bread. With pizza, stick to one slice without meat or extra cheese and add a salad.</p>
 <p>ASIAN</p>	<p>Salt, salt and more salt. Also, many dishes are prepared with lots of vegetables which can add to the potassium content.</p>	<p>Ask for sauces on the side and order plain rice. Skip the soups. Choose lower-potassium vegetable dishes. Do not add soy sauce.</p>

Reading Food Labels



When you must restrict certain nutrients in your diet, becoming a food label expert is very important. With CKD, you typically need to monitor sodium, potassium, and phosphorus. You should also limit saturated and trans fat intake. Read the food labels in the supermarket and on the go to make the best choices for your kidneys.

Tips

- The serving size is often different from servings per container. On the label on the left, there are two servings per container. So if you consumed the entire container, you must multiply all nutrition info by two.
- This food also contains a 20% daily value (DV) for sodium, considered HIGH. Use the quick guide to % DV to determine if your food has too much sodium.
- The footnote gives you an idea of the amount of fat, saturated fat, sodium, carbohydrate, and fiber you should eat on a 2,000- and 2,500-calorie diet, respectively. This label is meant for the average consumer, not someone with kidney disease, so consult with your dietitian on the number of calories & nutrients you need per day.

① **Start Here** →

② **Check Calories**

③ **Limit these Nutrients**

④ **Get Enough of these Nutrients**

⑤ **Footnote**

Nutrition Facts	
Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Calories 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g

⑥ **Quick Guide to % DV**

- **5% or less is Low**
- **20% or more is High**

For more help reading food labels, visit the [U.S. Food and Drug Administration](https://www.fda.gov/food/reading-food-labels) website.

Sample nutrition facts label, with instructions from the U.S. Food and Drug Administration

Ingredient List

Pay attention to the ingredient list for potassium and phosphorus. The closer the ingredient is to the beginning of the list, the larger its percentage in the product.

1

Look for words with 'phosphorus' or 'PHOS' in the ingredient list. Many prepackaged foods have added phosphorus as a preservative.

2

Often times, potassium is used as a substitute for sodium in packaged foods as mentioned on the potassium page. Look for 'potassium chloride' on the list and if you see it, choose another product.



A final word

I hope you have enjoyed this booklet and it has provided value. Proper nutrition is of great importance to the patient with chronic kidney disease. We have tried to touch on many essential aspects, but we also realize that each person's situation is different, and some guidelines may not apply to everyone.

As mentioned before, the recommendations included here should be discussed with your nephrologist or primary care physician. In addition, the help of a registered dietician can be invaluable to tailor the diet to your specific needs.

Acknowledging once again that this is not an all-inclusive resource, we recommend the following resources for further information on this topic:

- The National Kidney Foundation
- The American Association of Kidney Patients (AAKP)
- Cooking for David: A Culinary Dialysis Cookbook.

For more individualized recommendations we offer virtual nutrition consultations. You can call or reach us online.



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