

The Kidney Diet

How to Eat in Order to Protect Your Kidneys and Avoid Dialysis

Nutrition is an essential part of 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 serious complications of the electrolytes the kidneys regulate. Furthermore, good nutritional habits can help you to control two of the biggest risk factors for CKD: Diabetes and Hypertension. By choosing to maintain the proper diet, you can better control your blood sugar and decrease your blood pressure. This can help you to preserve your kidney function as well as possibly leading to less of a need for prescription medications.

This e-Book is meant to help you guide you to make the best food choices for overall health and to keep you and your kidneys working as well as they can. This information is a general guide. Since each person is unique, 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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Table of Contents

Overview	3
Protein	4
Salt	5
Potassium	7
Phosphorous	9
Glucose	10
DASH Diet	11
Minerals	12
Multivitamin	14
Poor Appetite	14
Portion Control	16
Dining Out	17
Food Label Reading Tips	19
Conclusion	21

Overview and Diet Prescription

When your kidney function slows, your nutritional status can be greatly affected. This is in part due to the fact that the kidneys are the filtering system in our bodies. Some nutrients may not be excreted as effectively, so you need to limit them in your diet. Some also lose extra protein in the urine and others can develop a decrease in appetite which can lead to protein malnutrition.

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

(This might be overwhelming but keep in mind that this is just to help guide you to eat for the healthiest kidneys possible.)

My Daily Goals

Your target should be approximately...

Calories: 30-35 kcal/kg

Protein: ~0.8 g/kg

Sodium: 2000 mg

Potassium: 2000 mg

* 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.*

*If you are overweight or underweight, you may need to use your Ideal Body Weight (IBW) to calculate needs.
For women - 100 lbs for first 5 feet + 5 lbs for each inch over 5 feet (medium frame)

Protein

Protein is essential for our bodies for growth and is used to build and maintain body mass. It also helps you fight infection. Your needs for protein 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 very 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 very important to get enough protein, especially from high biological value (HBV) sources as below, but not too much which would cause stress to the kidneys.

1 serving = 1 ounce = 7 grams protein

Serving Size	Food Choice
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

***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.**

****High phosphorus protein sources- Limit these and refer to phosphorus page: Beans, peanut butter, nuts, seeds, soymilk.**

“Don’t Pass the Salt”

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



1 tsp of salt = 2,300 mg of sodium chloride!

Experts recommend sodium intake of

less than 2,000 mg/day.

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 it is important to read food labels whenever possible and ask questions when dining out about preparation. A good rule of thumb is to choose foods which have less than 140 mg sodium per serving.

Limit these foods that are known for their high sodium content:

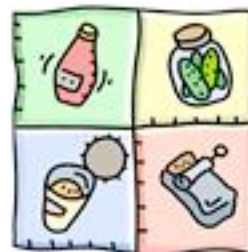
- **Salted snack foods:** popcorn, nuts, pretzels, potato and other chips
- **Condiments:** soy sauce, BBQ sauce, steak sauce, anything with salt in its name (garlic, sea, onion), gravy, sauce mixes
- **Cured, canned, smoked, or processed meats and fish:** anchovies, ham, lunch meats, lox, sausage, bacon, hot dogs
- **Canned entrees and soups:** bouillon, broth, consomme
- **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**

Helpful Sodium Tips

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

2. 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



3. Buy fresh foods including fruits, veggies, meats, poultry, fish, legumes, eggs, milk, yogurt, and unprocessed grains.

4. 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.

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

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

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

8. 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 and this can lead to an irregular heart rhythm and even could become fatal. Medications and food work together to balance your blood potassium which should typically be in the range 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:**

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)

In some cases you may need to be on a very low potassium diet and you will be asked to avoid higher potassium foods. Other times, you may choose very small portions of these **higher potassium foods** such as a slice of tomato on a sandwich or ½ cup soaked (see next page) potatoes.

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

Steps to Reduce Potassium in Vegetables

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 10 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 5 times the amount of water to the amount of vegetables.

Soaked potatoes can be used in dishes such as mashed potatoes, potato salad, scalloped potatoes, and French fries.



Phosphorus

Phosphorus is an essential mineral found in the body. The vast majority of phosphorus is found in the bone. Phosphorus is closely linked with calcium and is very important for bone strength. With later stage CKD, phosphorus is not cleared well by the kidneys and 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 important to read food labels and look for the words with 'phosphate' or 'phos' in the ingredients.

Your doctor may have also prescribed a phosphate binder for you 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 capacity of the kidney to handle dietary phosphorus intake becomes overwhelmed.

TIP: Take your binder with your first bite of a food to optimize its effectiveness and minimize stomach upset.

Foods higher in phosphorus:

- 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



If you need to restrict phosphorus, stick to the serving sizes above and try to only have 1-2 servings of the foods above per day.

Lower phosphorus foods include: Fresh fruits and vegetables, rice milk (un-enriched), white breads/rice/pasta, corn/rice cereals, light colored sodas

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 important to monitor your carbohydrate intake.

In addition, new research shows that a high sugar intake can also contribute to increased blood pressure. We still need carbohydrates for energy so you can not completely cut these foods out of your diet! The key is to watch your portions and choose more 'complex' carbohydrates such as breads, cereals, starchy veggies, beans, and fruits instead of 'simple' sugars such as sweets, fruit juice, and regular soda.

Foods that contain carbohydrate include:

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



Tips for blood glucose control:

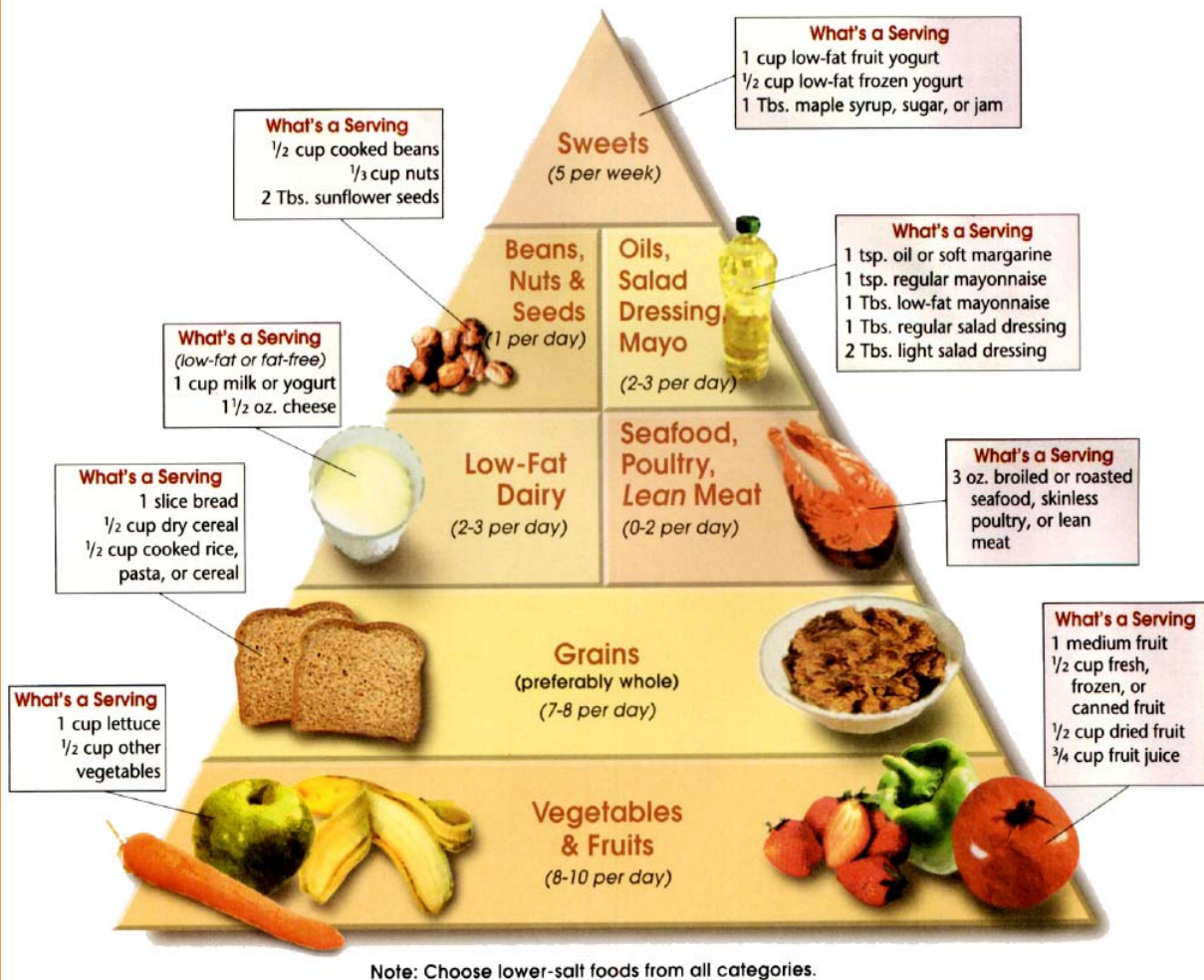
Consume a '**consistent carbohydrate**' diet. This means having the same amount of carbohydrate at each meal. Your dietitian can give you specifics but for the average person this means 4 servings of carbohydrate at each meal, with 1-2 at snacks.

1 serving = 15 g of carbohydrate

*Meal example with 4 carbohydrate servings: 2 slices toast with 2 eggs, 1 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 **D**ietary **A**pproach to **S**top **H**ypertension. It is one of the most talked about specific diets in medicine and deserves special mention here since it is effective in lowering blood pressure. The majority of 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. Now, 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.

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 to be discussed with your nutritionist and Nephrologist.

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. By reducing saturated fat content in your diet, you 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 at http://www.nhlbi.nih.gov/hbp/prevent/h_eating/h_eating.htm

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 consent from your Nephrologist.**

Calcium

In a diet low in phosphorus which restricts dairy products, you might not get the calcium you need. 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 also particularly important in women because of bone health and the prevention of osteoporosis. Therefore, your doctor might recommend higher dietary intake of calcium or a supplement.



Calcium-rich foods: *Milk, yogurt, 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, erythropoetin. **Erythropoetin** 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 include: Beef, turkey, shellfish, fortified cereals/breads/pastas, beans.

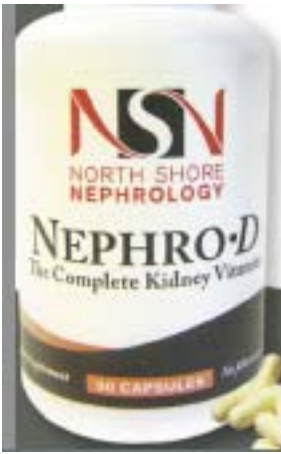
Zinc

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 include: Oysters, shellfish, Brewer's yeast, wheat bran, pine nuts, pecans

Nephro-D Multivitamin



If you have been unable to get enough vitamins and minerals in your diet and your Nephrologist tells you your blood level is low, you might benefit from a multivitamin (MVI) supplement. However, taking a standard MVI from the drugstore has excess minerals which could actually be more damaging to your kidneys. The Nephrologists at North Shore Nephrology developed it's own multivitamin which is safe and contains only the nutrients you need. Nephro-D is the only kidney vitamin formula which contains Vitamin D which is usually low in chronic kidney disease. It also contains more Thiamine, a B vitamin, which has been showed to slow the progression of kidney disease.

For more information or to order, please contact North Shore Nephrology at 516-365-5570 or e-mail: info@nsneph.com.

Poor Appetite

With progressive CKD you can ultimately develop uremia. Uremia is a condition found at the later stages of kidney disease in which a buildup of waste products occurs in the blood and you may in addition to other symptoms, experience a loss of appetite. Also, some develop an altered taste sensation and the foods you once loved may no longer taste the same to you. This paired with the need to have restrictions in your diet can result in not getting enough nutrients you need. Getting enough calories and protein is vital for your health and therefore, you might need to 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. **Small, frequent meals** might be easier to consume than less frequent larger meals throughout the day. Plan ahead times you need to eat and stick to those times.
2. You might be sensitive to food odors so **minimizing foods with a strong smell** could be helpful. Cold foods may be more appetizing.
3. 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. **Choose foods you love** within the limitations of your diet. If your intake is really poor, your diet may be liberalized by your Nephrologist or dietitian.
5. Addition of herbs, seasonings, and spices can **improve the aroma and taste** of food.
6. You can **get in extra calories** by adding:
 - a) Fat sources - low salt butter, sour cream, and salad dressings, vegetable oils, non-dairy creamers.
 - b) Beverages - apple juice, lemonade, root beer, and low phosphorus sodas such as Sprite, root beer, gingerale*.
 - c) Candies and sweets - sucking/gummi 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	 <p style="text-align: right;">tennis ball</p>
Chicken, Fish, Meat	3 ounces	 <p style="text-align: right;">palm</p>
Grains	1/2 cup cooked grains	 <p style="text-align: right;">1 slice bread</p>
Pasta, Rice	1/2 cup cooked	 <p style="text-align: right;">fist</p>
Salad Dressing	1 tablespoon	 <p style="text-align: right;">size of your thumb, tip to the top joint</p>
Potatoes	1 small (3-ounce) baked potato or 1/2 cup mashed potatoes	 <p style="text-align: right;">small mouse</p>

Cheese	1 ounce	 4 dice stacked
Nuts	1 ounce	 child's handful

Dining Out

Dining outside of your home can be an overwhelming experience when you have food restrictions and many people tend to avoid it altogether. However, this is not necessary. Dining out is often an enjoyable social aspect of life. Use these tips to stick to your meal plan as best you can!



1. **Set yourself up for success** - Many menus are available online and if possible, 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 which are lower in potassium when indicated.
3. **Be assertive** - Most of the sodium in meals comes from hidden sources during preparation and with added sauces or seasonings. Ask

that your dish be prepared with little of 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 entree with a dining partner. Or you might find it helpful to ask for a "doggy bag" so that you can 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 with you in a small pill box or in your wallet.

Tips by cuisine:

Cuisine	Kidney Offenders	How to Dine
American	PORTION SIZE is the biggest issue here - anything in excess can provide you with more sodium, potassium, and/or phosphorus than you need. French fries alone are high in potassium and sodium.	Refer to the portion control page in this packet and tips above. Have a chicken sandwich or hamburger (without cheese) and a side salad.
Mexican	This menu is usually high in low-quality protein, sodium, phosphorus, and potassium. This comes from cheese, beans, guacamole and sauces.	Pick from the a la carte menu items such as meat tacos with plain rice and fajitas where you have more control over what goes into your meal.
Italian	Many sauces and	Choose pastas with red

	cheeses are mixed in with Italian foods which make them higher in sodium and phosphorus.	or white sauce, salad and bread. With pizza, stick to one slice without meat or extra cheese and add a salad.
Asian	Salt, salt and more salt. Also many dishes are prepared with lots of vegetables which can add to the potassium content.	Ask for sauces on the side and order plain rice. Skip the soups. Choose lower potassium vegetable dishes. Do not add soy sauce.

Food Label Reading Tips

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

Nutrition Facts Label

- 1.** *The serving size is often different from servings per container. In the below label, there are two servings per container so if you consumed the entire container, you'd have to multiply all nutrition info by two.*

- 2.** *This food also contains 20% daily value for sodium which is considered HIGH. Use the quick guide to percentages to determine if your food has too much sodium.*

Sample Label for
Macaroni and Cheese

Start Here

**Limit these
Nutrients**

**Get Enough
of these
Nutrients**

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 1.5g	
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

**Quick Guide
to % DV**

**5% or less
is low
20% or more
is high**

The footnote gives you an idea of the amount of fat, saturated fat, sodium, carbohydrate, and fiber you should be eating on a 2,000 calorie 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 amount of calories & nutrients you need per day.

Ingredient List

Most of the time, you will have to look at the ingredient list for potassium and phosphorus. The closer the ingredient is to the beginning of the list, the larger percentage it is present 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.*

For more help on reading food labels, visit this website:

<http://www.fda.gov/Food/LabelingNutrition/ConsumerInformation>.

Conclusion

I hope you have enjoyed this e-Book. Proper nutrition is of great importance to the patient with chronic kidney disease. We have tried to touch on many of the important aspects, but we also realize that every situation is different and some of the guidelines may not be applicable to everyone. As mentioned previously, 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, I would like to recommend for further information on this topic the [National Kidney Foundation](#) , the [American Association of Kidney Patients \(AAKP\)](#) and [Cooking for David: A Culinary Dialysis Cookbook](#).

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