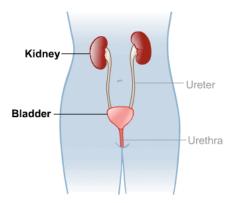


Nutrition & Chronic Kidney Disease

Your kidneys perform many important functions to maintain health, balance fluid and remove waste products from your body. These waste products come from the foods we eat. The kidneys also produce hormones that help to control blood pressure, make red blood cells, and strengthen bones.

Chronic kidney disease (CKD) may be caused by diabetes, high blood pressure, or other disorders, which damage the kidneys and decrease their ability to keep you healthy. As kidney disease gets worse, waste



products and fluid remain in your blood and make you feel sick. Symptoms of kidney disease may include fatigue, frequent headaches, poor appetite, nausea, muscle cramps, swollen hands and/or feet, and dry itchy skin.

CKD is classified into 5 stages, depending on the level of kidney function. Stages 1 - 4 represent the earlier stages of the disease, which can be medically and nutritionally controlled to delay disease progression to Stage 5 or "end stage renal disease." Stage 5 requires dialysis to remove the fluid and waste products that the kidneys are no longer able to remove. Following your doctor's orders, as well as a special diet, may help to slow down the loss of kidney function.

A renal diet limits specific nutrients to decrease the workload of your kidneys, while providing enough calories to maintain a healthy weight. This specialized diet focuses on:

- Protein
- Potassium
- Phosphorous
- Sodium
- Fluid

Vitamins, Minerals, and Herbs: If your diet is limited, you may not be getting enough vitamins and minerals. Also, vitamin C and the B vitamins are lost during dialysis. Your doctor may prescribe a vitamin supplement.

Herbal supplements may not be safe for people with CKD, since your body cannot clear waste products very well. Very little is known about the safety of herbal supplements in kidney disease.

Check with your doctor or dietitian before taking any vitamin, mineral, or herbal supplement.

Protein & Chronic Kidney Disease

Protein is important for building and repairing muscles and tissue, and protecting your body from infections. When you eat protein from food, your body breaks down the protein into a waste product called "urea," which is then removed from your body by the kidneys. Damaged kidneys lose the ability to remove urea and this waste product begins to build up in the blood. High amounts of urea can make you feel tired and weak, decrease your appetite, and cause nausea and vomiting.

Stage 1-4 CKD: If you are in these earlier stages of CKD and not currently on dialysis, your protein intake* may be limited to control the amount of urea in your blood to help slow down the loss of kidney function.

Stage 5 CKD: When you are in the end stage of kidney disease you will need dialysis. A low protein diet is no longer needed because dialysis removes the waste products. You now need a higher protein diet* to keep you healthy and to replace protein that is lost during dialysis.

*Your dietitian will help you decide how much protein you need each day.

Which foods have protein?

Protein comes from two sources: animal foods (such as beef, chicken, fish, and eggs) and plant foods (such as vegetables and grains). Talk to your dietitian about how to include these protein sources in your diet.

- Animal sources of protein are considered complete proteins. This type of protein may be included in your diet. Dairy products are good sources of protein, but are high in phosphorus and potassium.
- Legumes and nuts are high in protein, but these foods are also high in potassium and phosphorous.

High phosphorus and high potassium foods are marked with ** on the list below.

Meat [7-8 grams per portion]	 Beef, veal, lamb, pork (1 oz) Chicken or turkey (1 oz) Wild game (1 oz) Fish or tuna (1 oz) Oysters (6 medium) Shrimp, crab, lobster, scallops (1 oz) Egg (1) or egg whites (2) Egg substitute (1/4 c)
Dairy** [7-8 grams per portion]	 Milk or Lactaid milk (1 cup) Yogurt (1 cup) Cheese (1 oz) Cottage cheese (1/4 cup)
Legumes and Nuts** [7 grams per portion]	 Cooked dried beans (pinto, black, kidney, etc) (½ cup) Cooked dried chick peas, black-eyed peas (½ cup) Cooked lentils (½ cup) Peanut butter (2 Tbsp) Tofu (check label) Nuts (2 oz or ½ cup)
Bread and Grains [2 grams per portion]	 Bread (1 slice) Bagel, hamburger bun, English muffin (½) Dry, ready-to-eat, cereal (¾ cup) Cooked cereal (½ cup) Cooked pasta or rice (½ cup)

The amount of protein you need each day is	grams.
This is equal to portions.	

Potassium & Chronic Kidney Disease

Potassium is a mineral found in many foods. It helps to control nerve and muscle function, which includes the heart. Healthy kidneys balance potassium in the body by filtering out extra potassium in the urine. When the kidneys are not working properly, the amount of potassium in the blood can rise quickly. You may feel weakness, numbness, or tingling if you have high potassium. This can be life-threatening because high potassium can cause irregular heartbeats, resulting in a heart attack.

As your kidney function worsens, you will need to limit high potassium foods. Your doctor will check your potassium levels regularly and decide when it is necessary for you to limit potassium in your diet.

Dialysis will help to remove extra potassium from the blood but you will still need to limit high potassium foods to control potassium levels between treatments. Your dietitian will help you plan your diet so you get the right amount of potassium.

People with kidney disease usually need 2000 – 2500 milligrams of potassium a day

High Potassium Foods

Fruits	Vegetables	Other Foods
 Avocado Banana Dried fruit (e.g. prunes) Guava Kiwi Mango Melon: cantaloupe, honeydew Nectarine Orange Papaya Peach Pomegranate Pumpkin * Any fruit juices made from these fruits 	 Artichoke Beets Bok Choy Broccoli Carrots Greens: beet, chard, kale, spinach Mushrooms (cooked) Parsnips Peas: split, black eyed Potato Tomato Vegetable juice Winter squash: acorn, butternut, hubbard 	 Beans (dried, cooked): black, lima, kidney, pinto, refried Chocolate / Cocoa Coconut (milk or water) Custard/Flan Granola Ice cream Lentils Milk products Molasses Nut butters Nuts and seeds Salt substitutes (i.e. Nu Salt) or "lite" salt
	Yam (or sweet potato)Zucchini	Wheat branYogurt

- Eat a variety of foods in moderation.
- Do not drink or use the liquid from canned vegetables and fruit.
- Keep an eye on serving sizes. Remember that most foods have some potassium. Even a low potassium food, when eaten in large amounts, can provide too much potassium.
- Check the ingredients list on packaged foods. Avoid foods that have ingredients with "potassium" in the name (such as potassium chloride).

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Phosphorus & Chronic Kidney Disease

Phosphorus is a mineral that works with calcium to strengthen bones. Extra phosphorus in the blood is filtered out by the kidneys. Unhealthy kidneys do not remove phosphorus very well. When your blood phosphorus levels get too high, calcium can be pulled out of your bones and make your bones weak. A high phosphorus level can lead to calcium-phosphate deposits in your heart, blood vessels, eyes, lungs, and skin.

Symptoms of high phosphorus:

- itching
- muscle aches and cramps
- bloodshot eyes
- lumps under the skin (from calcium deposits)

Your doctor may prescribe a phosphorus binder, which will bind with the phosphorus in the food you eat to prevent it from being absorbed into your blood. Dialysis treatments can remove some phosphorus from the blood, but not enough. Limiting foods high in phosphorus and taking phosphorus binders will help to control your blood phosphorus level. Avoid high phosphorus foods, unless otherwise instructed by your dietitian.

Dietary phosphorus is usually limited to 800 – 1000 milligrams a day.

High Phosphorus Foods

Protein Foods	Vegetables	Dairy	Grains	Other Foods
 Dried beans Egg yolk Lentils Nut butters Nuts & seeds Organ meats Sardines Shrimp 	 Artichoke Broccoli Brussels sprouts Corn Peas Soy beans 	 Cheese Cottage cheese Cream soup Custard Eggnog Ice cream Milk Milkshake Pudding Yogurt 	 Biscuits* Bran+ Bran cereal+ Brown rice+ Corn bread Oatmeal+ Pancakes* Waffles* Wheat germ+ Whole grains+ (bread, pasta) 	 Beer Bottled iced teas Brewer's yeast Caramel Chocolate/ cocoa Cola Dr. Pepper Dried fruits Macaroni & cheese Pizza Prunes

*Commercial baking mixes are high in phosphorus. Making these foods from scratch will lower the phosphorus content.

+Phosphorus from grains is not absorbed as easily other phosphorus containing foods. Talk to your dietitian about whether or not it is safe for you to consume these whole grains.

- If you are prescribed a phosphorus binder, remember to take it will meals and snacks.
- Use non-dairy creamers and milk substitutes (such as Mocha Mix) in place of milk.
- Whole grains like brown rice, wheat bread and wheat pasta have more fiber, and the phosphorus they contain may be safer to eat.
- Instead of cola or Dr. Pepper, drink lemon-lime soda, grape soda, cream soda, or root beer.
- Use sour cream or cream cheese in place of cheese.
- Instead of dried beans or peas, choose green beans or wax beans.



Sodium & Chronic Kidney Disease

Sodium is a mineral found in salt and many foods. In the body, sodium helps to maintain fluid balance and control blood pressure. In foods, sodium is used as a preservative and flavor enhancer. For these reasons, sodium is added to many processed, packaged, and canned foods.

Normally your kidneys filter extra sodium out of the blood. When the kidneys are damaged, they cannot get rid of the extra sodium. Too much sodium in the blood causes the body to hold to water, which can make your hands, feet, and legs swell. Extra fluid can also increase blood pressure, or collect in your lungs and make it difficult to breathe. Eating foods high in sodium will make you thirsty, causing you to drink too much fluid.

Limiting your sodium intake will help to control your blood pressure, as well as your thirst and fluid intake.

People with kidney disease usually limit sodium to 1500 – 2000 milligrams a day.

High Sodium Foods

Salt, Salt seasonings, & Condiments	 Celery salt Garlic salt "Lite" salt Onion salt Seasoning salt Table salt 	 Baking soda / baking powder Bouillon cubes Chili sauce Lemon pepper Meat tenderizer Monosodium glutamate (MSG) Worcestershire sauce 	 Barbeque sauce Ketchup Mustard, prepared Relishes Salad dressings Soy sauce Steak sauce
Snack foods	 Chips: corn, potato, tortilla Crackers 	PopcornPretzels	Salted nutsSunflower seeds
Cured or preserved foods	 Bacon Beef jerky Bologna Capers Corned beef Deli meats 	 Ham Hot dogs Lox & herring Olives Pastrami Pickles 	 Salami Salt pork Sardines Sauerkraut Spam
Processed foods	 Baking mixes (e.g. Bisquick, muffin mix) Buttermilk Cheese, cottage cheese Canned beans 	 Canned soups Canned vegetables Frozen meals Instant oatmeal Rice, stuffing or noodle mixes 	 Pasta sauces Ramen noodles or Cup-O-Noodles Vegetable juice

1 teaspoon of table salt = 2400 milligrams of sodium

- DO NOT USE salt substitutes because they are high in potassium.
- Avoid sports drinks (e.g. Gatorade, Powerade).
- Read food labels and choose foods lowest in sodium. If salt is listed in the first 5 ingredients, the food item is probably too high in sodium.
- Choose fresh meats, vegetables, and fruits instead of canned or processed foods.
- Cook with herbs and sodium-free spices rather than salt.
- Limit dining out. Most fast food and restaurant foods will be high in sodium. When
 eating out, avoid soup, ask for gravies and sauces on the side, and for meat/fish
 to be prepared without salt.

Fluid Control

The kidneys normally remove excess fluid from your body. In the later stages of kidney disease, your kidneys cannot remove as much fluid. Too much fluid in the body can cause swollen hands, feet and legs, stress on the heart and lungs, or increased blood pressure. Dialysis will remove the extra fluid that your kidneys are unable to eliminate through urine. Your weight will be recorded before and after each dialysis treatment. Sudden weight gain may mean that you are drinking too much fluid and/or eating too much sodium. Too much fluid can make dialysis treatments unpleasant, causing cramping, nausea, and vomiting.

Fluid restriction will vary for each individual and depends on the amount of urine produced, weight gain between dialysis treatments, and swelling. Your doctor will determine your fluid needs.

What counts as a fluid?

Any food that is liquid or that will melt at room temperature must be counted as a fluid.

Beverages	Foods
 Alcohol (beer, liquor or wine) 	 Ice cubes
 Cocoa 	Ice cream*
 Coffee or tea 	 Gelatin
 Juice 	 Milkshakes
 Milk 	 Popsicles
 Soda 	 Sherbet*
 Water 	 Soup

*1 ½ cup serving = 8 ounces of fluid

*Gravy, syrup, jelly, custard, and puddings are not considered fluids.

*All canned fruit and cooked vegetables should be drained before eating.

Tips for Controlling Thirst:

The best way to control thirst is by following your sodium restriction.

- $\checkmark\,$ Gum, hard candies, or mints can help to reduce thirst.
- ✓ Use small cups for beverages. Know how much fluid your favorite cup holds.
- \checkmark Try cold (low potassium) fruits, such as frozen grapes.
- \checkmark Sucking on lemon slices may help to produce saliva and moisten a dry mouth.

 \checkmark Take your medications with meals. Try swallowing pills with applesauce rather than liquids. (Check with your doctor before changing medication times)

- $\checkmark\,$ Try to stay active so that you do not think about liquids as much.
- \checkmark Rinse your mouth with mouthwash or water (but do not swallow).
- \checkmark Stay cool, especially in warm weather, to reduce your thirst.

 $\checkmark\,$ If you have diabetes, maintain good blood glucose levels. High blood glucose will increase your thirst.

1 Tbsp = ½ ounce = 15 milliliters (ml) ¼ cup = 2 ounces = 60 ml ½ cup = 4 ounces = 120 ml 1 cup = 8 ounces = 240 ml

Your fluid allowance is ______ liter(s) a day.

Renal Grocery List

This list combines all of the appropriate foods for a renal diet. Remember to eat these food items in moderation, and follow a balanced diet with foods from all food groups. If you are concerned about your weight, diabetes or heart disease, your specific needs may be different. Check with your renal dietitian or doctor about how to tailor this grocery list.

If you have diabetes, limit carbohydrate portions of starches, fruit, and sweets. Foods or food groups that contain carbohydrates are marked with a (*).

Starches*

Whole grain versions of these foods may be okay to eat. Talk to your dietitian about whether whole grains are okay for you.

- Bagels (plain)
- Bread (white, French, sourdough, rye)
- Breadsticks (plain)
- Cereals, ready-toeat (Rice Krispies, Puffed Rice, Rice Chex, Cornflakes)
- Cereals, cooked (Cream of Wheat or Rice, Farina, Malt-o-Meal)

- Couscous
- Crackers (unsalted, graham or animal crackers)
- Croissant
- Dinner rolls
- English muffins
- Grits
- Hamburger/hotdog buns

- Melba toast
- Pita bread
- Pasta & noodles
- Pita bread
- Popcorn, unsalted
- Pretzels, unsalted
- Rice, white
- Rice cakes
- Tortillas, flour

Dairy Substitutes

- Nondairy creamer*
- Mocha Mix
- Nondairy dessert topping
- (e.g. Cool Whip)
- Rice milk, unfortified*
- Almond milk, unfortified*
- Soy milk, unfortified*

Dairy Substitutes

- Alfalfa or bean sprouts
- Asparagus
- Bamboo shoots (canned)
- Beets (canned)
- Bell peppers
- Cabbage
- Cauliflower
- Celery
- Cucumber
- Dandelion greens

- Eggplant
- Endive/escarole
- Green beans
- Hominy
- Jalapenos
- Jicama
- Leeks
- Lettuce
- Mushrooms (raw)
- Okra

- Onions
- Radishes
- Seaweed kelp
- Spaghetti squash
- Summer squash
- (e.g. crookneck, spaghetti)
- Tomatillos
- Water chestnuts (canned)
- Wax beans

Fruits*

Meat / Protein

- Beef
- Chicken
- Egg whites
- Fish
- Lamb

- Pork (fresh) Tofu (soft)
- Tuna (low sodium)
- Turkey
- Shellfish
- Wild game

Beverages

- Apple juice*
- Cranberry juice*
- Cream soda*
- Fruit punch*
- Ginger ale*
- Grape juice*
- Grape soda*
- Horchata*

- Kool-Aid or Hi-C*
- Lemonade*

- Lemon-lime soda* (e.g. Sprite, 7-Up)
- Limeade*
- Mineral water
- Mountain Dew*
- Nectars* (apricot, peach, pear)

- Orange soda*
- Pineapple juice*
- Root beer*
- Sunny Delight* citrus punch
- Tea

Fats

- Butter or margarine
- Cream cheese
- Mayonnaise
- Miracle Whip
- Sour cream
- Vegetable oils
- (Canola or olive oil)

Sweets*

- Apple butter
- Cake (sponge, angel, pound, spice, yellow, lemon)
- Candy corn
- Chewing gum
- Cinnamon drops
- Cookies (sugar, shortbread, gingersnap, lemon cream)

- Cotton candy
- Doughnuts (without nuts or chocolate)
- Fruit ice
- Gelatin
- Gumdrops
- Hard candy
- Honey
- Jam/jelly
- Jellybeans
- Maple syrup

- Marmalade
- Marshmallows
- Peppermints
- Pie (apple, cherry, lemon)
- Popsicles (fruit-flavored)
- Rice Krispie treats
- Red licorice
- Sorbet
- Sugar
- Vanilla wafers
- Vanilla cupcakes

Seasonings

- Allspice
- Basil
- Bay leaf
- Black pepper
- Caraway seed
- Cardamom
- Chili powder
- Chives
- Cilantro
- Cinnamon
- Cloves
- Coriander
- Crushed red pepper flakes
- Cumin
- Curry powder

- Dill
- Extracts (vanilla, almond, peppermint)
- Fennel
- Garlic (fresh or powder)
- Ginger
- Horseradish (root or powder)
- Lemon or lime juice
- Liquid smoke
- Mint
- Mrs. Dash
- Mustard, dried
- Nutmeg
- Onion (fresh, powder, flakes)

- Oregano
- Paprika
- Parsley
- Pimento
- Poultry seasoning
- Rosemary
- Saffron
- Sage
- Savory
- Sesame seeds
- Tabasco
- Tarragon
- Thyme
- Turmeric
- Vinegar

Kidney Disease Resources

Internet



Books and Cookbooks

- Coping with Kidney Disease: A 12-Step Treatment Program to Help You Avoid Dialysis Mackenzie Walser and Betsy Thorpe. Wiley. 2004. ISBN 0471274232
- Kidney Health Gourmet Diet Guide and Cookbook 3nd Edition. Nina Kolbe. Morris Press. 2011. ISBN 9780615234380
- The Vegetarian Diet For Kidney Disease: Preserving Kidney Function with Plant-Based Eating Joan B. Hogan. Basic Health Publications. 2010. ISBN 9781591202660
- Renal Diet Cookbook: The Low Sodium, Low Potassium, Healthy Kidney Cookbook. Susan Zogheib. Rockridge Press. 2015. ISBN 9781623156619