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Patient education: Low-potassium diet (Beyond the Basics)

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INTRODUCTION

Potassium is a mineral that is found in many foods. It keeps the heart beating regularly, helps to maintain fluid balance, and allows the nerves and muscles to work properly.

The kidneys are the main organ that controls the correct level of potassium in the blood. People who take certain medicines or who have chronic kidney disease must sometimes, under the direction of their clinician, limit the amount of potassium in their diet to keep their potassium level close to normal.

This article will discuss the normal level of potassium, how it is measured in the blood, and how to eat a low-potassium diet. A discussion of other treatments for chronic kidney disease is available separately. (See "[Patient education: Chronic kidney disease \(Beyond the Basics\)](#)".)

WHY SHOULD I REDUCE POTASSIUM IN MY DIET?

Normally, the level of potassium in your body is balanced by eating foods that contain potassium and getting rid of excess potassium in the urine. However, people who have lost more than one-half their kidney function often cannot get rid of enough potassium in their urine because the kidneys do not work well.

In these people, the level of potassium in the blood can become higher than normal, causing a condition known as hyperkalemia (hyper = high, kal = potassium, emia = in the blood). Eating a lower-potassium diet can lower the risk of developing hyperkalemia.

The potassium level is measured by taking a small sample of blood from a vein. A typical normal range for potassium is 3.8 to 5 mEq/L. A level greater than 6 mEq/L or less than 3 mEq/L is considered dangerous. Blood potassium must be well regulated to prevent serious complications.

Hyperkalemia does not usually cause noticeable symptoms, even at very high levels. At levels above 6 mEq/L, there are usually changes on an electrocardiogram and the patient has nonspecific symptoms of not feeling well. At this level, dangerous complications can develop, including an irregular heart rhythm, severe muscle weakness, paralysis, or even sudden death.

HOW MUCH POTASSIUM DO I NEED?

In general, experts recommend eating a diet that contains at least 4700 mg of potassium per day [1]. People with moderate to severe chronic kidney disease, defined as kidney function (ie, glomerular filtration rate, or "GFR") below 45 mL/min (normal is 100 to 120 mL/min), should eat less than 3000 mg of potassium per day [2]. Further restrictions should be made based on labs and the advice of your clinician. A low potassium diet is defined as a dietary intake of between 2000 to 3000 mg/day.

A registered dietitian or nutritionist can help to create a low-potassium meal plan. An example of one such plan includes ([table 1](#) and [table 2](#)):

- Fruit – One to three servings of low-potassium fruit per day
- Vegetables – Two to three servings of low-potassium vegetables per day
- Dairy and calcium rich foods – One to two servings of low-potassium choices per day
- Meat and meat alternatives – Three to seven servings of low-potassium choices per day (approximately 15 percent of calories)
- Grains – Four to seven servings of low-potassium grains per day

A sample diet plan is provided in the table ([table 1](#)).

HOW DO I CUT DOWN ON POTASSIUM?

- Read the food label ([figure 1](#)). Almost all foods contain some potassium, so the key is to choose foods with a low potassium level, when possible.

- Measure and be aware of the serving size when calculating the amount of potassium in a food; a large serving of a low-potassium food may have more potassium than a small serving of a food with a high level of potassium. Online or smartphone calculators for potassium can be useful in keeping track.
- Drain canned vegetables, fruits, and meats before serving.

Foods with high levels of potassium — Foods that have the highest concentrations of potassium include cantaloupe, watermelons, grapefruit, all dried fruit and fruit juices, avocados, tomatoes, potatoes (plain and sweet), Brussels sprouts, milk, yogurt, lentils, and most nuts (except peanuts). The foods in the table have greater than 200 mg of potassium per serving and should be avoided or eaten in very small portions ([table 3](#)).

A process of "leaching" can reduce the amount of potassium in some vegetables. (See '[Reducing potassium levels in vegetables](#)' below.)

Foods with low levels of potassium — The foods in this table have a low level of potassium (less than 200 mg potassium per serving on average) ([table 2](#)). You can eat low-potassium foods regularly, but limit your portion size since potassium can quickly add up if you eat a large portion.

Reducing potassium levels in vegetables — It is possible to remove some of the potassium in certain vegetables with high potassium levels. Leaching is a process of soaking raw or frozen vegetables in water for at least two hours before cooking to "pull" some of the potassium out of the food and into the water. You should not eat these vegetables frequently because there is still a lot of potassium in the food after leaching.

- Wash and then cut the raw vegetable into thin slices. Vegetables with a skin (eg, potatoes, carrots, beets, rutabagas) should be peeled before slicing.
- Rinse the cut vegetables in warm water.
- Soak the vegetables for at least two hours or overnight. Use a large amount of unsalted warm water (approximately 10 parts water to 1 part vegetables). If possible, change the water every four hours. Drain the soaking water.
- Rinse the vegetables again with warm water.
- Cook vegetables as desired, using a large amount of unsalted water (approximately 5 parts water to 1 part vegetables). Drain the cooking water.

WHERE TO GET MORE INFORMATION

Your health care provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for health care professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Low-potassium diet \(The Basics\)](#)

[Patient education: Dialysis and diet \(The Basics\)](#)

[Patient education: Chronic kidney disease \(The Basics\)](#)

[Patient education: Hemodialysis \(The Basics\)](#)

[Patient education: Preparing for hemodialysis \(The Basics\)](#)

[Patient education: Peritoneal dialysis \(The Basics\)](#)

[Patient education: Hyperkalemia \(The Basics\)](#)

[Patient education: Periodic paralysis syndrome \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Chronic kidney disease \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research upon which they are based.

Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Clinical manifestations of hyperkalemia in adults](#)

[Overview of the management of chronic kidney disease in adults](#)

[Potassium and hypertension](#)

[Treatment and prevention of hyperkalemia in adults](#)

The following organizations also provide reliable health information.

- National Institute of Diabetes and Digestive and Kidney Diseases

(www.niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd/eating-nutrition)

- National Kidney Foundation

(https://www.kidney.org/sites/default/files/02-10-0410_EBB_Potassium.pdf)

(<https://www.kidney.org/atoz/content/potassium>)

[3]

REFERENCES

1. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 - 2020 Dietary Guidelines for Americans. 8th ed. December 2015. <http://health.gov/dietaryguidelines/2015/guidelines/> (Accessed on January 11, 2016).
2. [Cupisti A, Kovesdy CP, D'Alessandro C, Kalantar-Zadeh K. Dietary Approach to Recurrent or Chronic Hyperkalaemia in Patients with Decreased Kidney Function. Nutrients 2018; 10.](#)
3. Nutrition and Your Health: Dietary Guidelines for Americans www.health.gov/dietaryguidelines/dga2005/report/HTML/D7_Fluid.htm (Accessed on December 02, 2013).

GRAPHICS

Sample low-potassium diet

Food	Calories	Sodium content, mg	Potassium content, mg
Breakfast			
English muffin, white	129	242	62
Low-calorie margarine, 2 teaspoons	58	65	4
Puffed corn cereal (non-sweetened), 1.5 cups	135	247	45
Eggs, 2 medium fresh	126	123	118
Coffee, 1.25 cups	3	6	145
Artificial sweetener (Splenda, any amount)	0	0	0
Non-dairy, fat-free coffee creamer, 1 ounce	20	3	0
Snack			
Cheddar cheese (reduced fat), 1 ounce	49	270	19
Apple, 1 medium	72	1	148
Lunch			
White bread, 2 slices	108	234	44
Turkey breast, 3 ounces	119	189	236
Mayonnaise (low fat), 1 tablespoon	25	140	2
Cheddar cheese (reduced fat), 1 ounce	49	270	19
Egg, hard boiled	78	62	63
Lettuce (iceberg; shredded), 1 cup	8	6	80
Cucumber, peeled, 1/2 medium	12	2	137
Water chestnuts, canned & drained, 5 pieces	17	5	54
Salad dressing (Italian, low fat), 1 tablespoon	27	192	4
Snack			
Clementine, 1	35	1	131
Dinner			
Chicken breast (skin removed, baked with breadcrumb coating and no fat), 4 ounces	221	87	287
Green beans, cooked, no salt added, 1 cup	60	46	184

Margarine, low fat, 1 teaspoon	29	33	2
Rice, white, cooked in unsalted water, 1 cup after cooking	234	3	89
Olive oil, 2 teaspoons	40	0	0
Snack			
Oatmeal cookies (reduced fat), 2 small	56	58	22
TOTALS	1710	2285	1895

This sample diet is calorically adequate for people of smaller stature and activity levels. People who are active or larger may require additional nutrients and calories. This diet contains less than 7% of calories from saturated fat, which meets the American Heart Association (AHA) guidelines for that nutrient.

Graphic 82742 Version 7.0

Foods with low levels of potassium

Grains	Foods prepared with white flour (eg, pasta, bread), white rice
Beverages	Non-dairy creamer, fruit punch, drink mixes (eg, Kool-Aid), tea (<2 cups or 16 ounces per day), coffee (<1 cup or 8 ounces per day)
Sweets	Angel or yellow cake, pies without chocolate or high-potassium fruit, cookies without nuts or chocolate
Fruits	Apples (1), apple juice, applesauce, apricots (canned), blackberries, blueberries, cherries, cranberries, fruit cocktail (drained), grapes, grape juice, grapefruit (½), mandarin oranges, peaches (½ fresh or ½ cup canned), pears (1 small fresh or ½ cup canned), pineapple and juice, plums (1 whole), raspberries, strawberries, tangerine (1 whole), watermelon (1 cup), lemons
Vegetables	Alfalfa sprouts, asparagus (6 spears), green or wax beans, cabbage (cooked), carrots (cooked), cauliflower, celery (1 stalk), corn (½ fresh ear or ½ cup), cucumber, eggplant, kale, iceberg lettuce, mushrooms (fresh), okra, onions, parsley, green peas, green peppers, radish, rhubarb, water chestnuts (canned, drained), watercress, spinach (raw, 1 cup), squash (yellow), zucchini, scallions, turnips, turnip greens
Proteins	Chicken, turkey (3 ounces), tuna, eggs, baloney, shrimp (all 1 ounce), unsalted peanut butter (1 tablespoon)
Dairy products	Cheddar or swiss cheese (1 ounce), cottage cheese (½ cup)
Nuts, seeds, and legumes	Macadamia nuts, pecans, cashews, walnuts, almonds, peanuts, sesame seeds, sunflower or pumpkin seeds, chia seeds, flax seeds (all 1 ounce)

Unless noted, one serving is ½ cup (4 ounces). These foods have a low level of potassium (less than 200 mg potassium per serving on average). Be sure to measure the portion sizes of each food and calculate the total amount in each meal to maintain your low-potassium diet (eg, average of 2000 mg potassium per day).

2018 US food label: What's different?

Nutrition Facts	
8 servings per container	
Serving Size	2/3 cup (55g)
Amount Per Serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
<i>Trans</i> Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%
<small>* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

Servings:
Larger,
bolder type

Serving sizes
updated

Calories:
Larger type

Updated
daily
values

New:
Added sugars

Change
in nutrients
required

Actual
amounts
declared

New footnote

=: percent.

Reproduced from: U.S. Food and Drug Administration. *Changes to the Nutrition Facts Label*. Available at: <https://www.fda.gov/food/food-labeling-nutrition/changes-nutrition-facts-label> (Accessed on May 21, 2019).

Graphic 56605 Version 8.0

Foods with high levels of potassium

Grains	Whole-grain breads, wheat bran, granola and granola bars
Beverages	Sports drinks (Gatorade, etc), instant breakfast mix, soy milk, coffee/tea (limit to 16 fluid ounces)
Snack foods/sweets	Fig cookies, chocolate (1.5 to 2 ounces), molasses (1 tablespoon)
Fruits	Apricots, avocado (¼ whole), bananas (½ whole), coconut, melon (cantaloupe and honeydew), kiwi, mango, nectarines, oranges, orange juice, papaya, pears (fresh), plantains, pomegranate (and juice), dried fruits (apricots [5 halves], dates [5], figs, prunes, raisins), prune juice, yams
Vegetables	Bamboo shoots, baked or refried beans, beets, broccoli (cooked), Brussels sprouts, cabbage (raw), carrots (raw), chard, greens (except kale), kohlrabi, olives, mushrooms (canned), potatoes (white and sweet), parsnips, pickles, pumpkin, rutabaga, sauerkraut, spinach (cooked), squash (acorn, butternut, hubbard), tomato, tomato sauce, tomato juice, and vegetable juice cocktail
Dairy products	Milk and milk products, buttermilk, yogurt
Proteins	(3-ounce serving) Clams, sardines, scallops, lobster, whitefish, salmon (and most other fish), ground beef, sirloin steak (and most other beef products), pinto beans, kidney beans, black beans, navy beans (and most other peas and beans, serving size is ½ cup)
Soups	Read label for potassium as many low-sodium soups and bouillon cubes or broth may have added potassium
Condiments	Imitation bacon bits, salt substitutes, or lite salt made with potassium
Nuts, seeds, and legumes	Tofu, lentils, adzuki beans, most legumes, peanut butter, most nuts, and most seeds (including sunflower seeds)

Unless noted, one serving is ½ cup (4 ounces). These foods have more than 200 mg of potassium per serving, and should be avoided or eaten in very small portions if you are limiting potassium.

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