Phosphorus: the where and why

Phosphorus is commonly found in foods such as dairy, organ meats, fish, poultry, eggs, whole grain products, nuts, and is unusually high in processed foods. Healthy kidneys help your body keep a balance of phosphorus and other minerals you need by filtering out what you don?t need.

When kidneys aren?t working well, phosphorus can build up, causing a condition known as hyperphosphatemia (hi-per-foss-fuh-TEE-mee-uh). If not treated, it can lead to serious health problems . (1) Your phosphorus level should be within the range of 3.5-5.5 mg/dL.2 Check with your dietitian or doctor if you don?t know your phosphorus level. A simple blood test will let you know what your levels are.

The chart below from the National Kidney Foundation Shows basic ways to substitute high phosphorous foods for low alternatives.

High phosphorus foods and alternatives

The chart below from the National Kidney Foundation Shows basic ways to substitute high phosphorous foods for low alternatives.

INSTEAD OF HIGH PHOSPHORUS FOODS		**TRY LOW PHOSPHORUS FOODS**	
FOOD	**Phosphorus (mg)**	**FOOD**	**Phosphorus (mg)**
8 oz milk	230	8 oz nondairy creamer OR 4 oz milk	100, 115
8 oz cream soup made with milk	275	8 oz cream soup made with water	90
1 oz hard cheese	145	1 oz cream cheese	30
1/2 cup ice cream	80	1/2 cup sherbet OR 1 popsicle	0
12 oz can cola	55	12 oz can of ginger ale OR lemon soda	3

1/2 cup lima or pinto beans	100	1/2 cup mixed vegetables OR green beans	35
1/2 cup custard OR pudding made with milk	150	1/2 cup custard OR pudding made with nondairy creamer	50
2 oz peanuts	200	1 1/2 cup light salt low-fat popcorn	35

Looking for hidden phosphorus

The following ingredients add phosphorous to foods:

- Sodium polyphosphate3
- Sodium tripolyphosphate
- Phosphoric acid
- Disodium phosphate
- Monosodium phosphate
- Potassium tripolyphosphate
- Sodium acid pyrophosphate
- Sodium hexametaphosphate
- Tetrasodium pyrophosphate
- Trisodium triphosphate

Certain buzz words such as ?enhanced meat? found mainly in poultry products may contain hidden phosphorous. Another good rule of thumb is to avoid items that have additional fluid such as a brine added to them. In general brown colas contain high levels of phosphorous while clear drinks tend to have less. If you have a question and can?t tell by the label contents, ask your dietitian. Sometimes phosphorus is listed on labels as a more complex combination of ingredients. The following is a list of terms that means phosphorous is found in that food.

The effects of too much phosphorus

Symptoms of hyperphosphatemia may include cramps, numbness or tingling, itchy skin, bone pain, or joint pain. However, you may not experience any symptoms at all. It?s important that you work with your Renal Dietitian and monitor your blood levels regularly.

If high phosphorus levels are not treated, they can lead to:

- Sore, weak, and brittle bones
- Painful calcification (mineral buildup in your vessels and valves causing heart damage and failure.
- Recent studies show that increased phosphorus levels can cause calcium buildup in your vessels and valves causing heart damage and failure. (4)

Dialysis alone can?t get rid of the extra phosphorus. That?s why dietitians encourage patients to reduce the amount of phosphorus in their meals and sometimes prescribe medication like phosphate binders to help the body eliminate excess phosphorus.

Phosphate binders and how they work

Phosphate binders attach to the phosphorus in your food like a magnet to keep it from being absorbed by your body. The bound phosphorus can then be eliminated through the bowels. Some phosphate binders are chewable, while others are swallowed. It?s important to take your medication during your meals or immediately after eating. This lets the medicine bind to the phosphorus before food is absorbed by your digestive system, if too much time passes between when you eat and when you take your medication, the medication won?t work properly. You may not feel differently after taking your medication, but even if you cannot feel your binder working, you should still take your medication as directed. If you take your binder as prescribed, over time you should see an improvement of your phosphorus levels. Speak with your health care provider about what choice is best for you, how many pills to take each day, when to take them, and what to expect from treatment.

Phosphate Binder Options

Phosphate binders tend to fall within a few categories.

- Aluminum-based binders were the earliest binders that were used with the most common being aluminum hydroxide. Aluminum based binders though aren?t used much anymore, because of the toxic impact that aluminum has on the body. Examples of aluminum-based binders are Alu-Cap and Amphojel (aluminum hydroxide)
- Calcium-based binders are a group of binders that includes calcium acetate and calcium carbonate. They tend to not work as well as aluminum-based binders, but don?t have the toxicity issues of the early aluminum binders. Since these binders contain calcium, you will need to make sure you are not accidentally raising your calcium levels too much. Examples of calcium-based binders are PhosLo® (calcium acetate) and Tums (calcium carbonate).
- Aluminum and Calcium-free binders as the name implies don?t contain calcium or aluminum and are often made of sevelamer or seelamer carbonate. Examples of commonly prescribed aluminum and calcium-free phosphate binders are Fosrenol®, (lanthanum carbonate), Renagel® (sevelamer) and Renvela (sevelamer carbonate) (5)

Ask your physician if a binder is the right for you.

Ways to remember your medication

It is not unusual for people with kidney disease to forget their medication. When you are taking several kinds of medicine throughout the day, it can be tough to stay on top of all of

them.

If you?re missing doses because you forget, try these tips:

- Use a watch with an alarm.
- Give your schedule to a caregiver or family member who can act as a double check.
- Set a notice on your email calendar or cell phone.
- Use a daily pill organizer box.
- Keep your medicine in a place where you can see it, but where children can?t reach.
- Use a calendar or daily planner to check off your medications as you take them each day.
- Work with someone on your health care team to create a chart you can post at home.
- List all your medications on it and check them off when you take them.

1. Hruska K, Lund R, Matthew S, Pratt R, Qui P. *Kidney International*. July 2008: (74)2 148-157
2. *Phosphorus and your CKD Diet*. National Kidney Foundation. www.kidney.org/atoz/content/phosphorus.cfm [1]
3. Leon J, Sarathy-Sayre S, Sullivan C. *Managing the Hidden Phosphorus in Foods: Beneficial Across all Stages of Kidney Disease.* American Association of Kidney Patients. http://www.aakp.org/aakp-library/Hidden-Phosphorus/ [2]
4. Kuhlmann, M. Management of hyperphosphatemia.Hemodialysis International 206; 10. 338-345.
5. Clinical Practice Guidelines: Guideline 5 Use of Phosphate Binders in CKD. National Kidney Foundation. http://www.kidney.org/professionals/kdoqi/guidelines_bone/guide5.htm [3]

Links
[1] http://www.kidney.org/atoz/content/phosphorus.cfm
[2] http://www.aakp.org/aakp-library/Hidden-Phosphorus/
[3] http://www.kidney.org/professionals/kdoqi/guidelines_bone/guide5.htm