

FILTERING THE FACTS: KIDNEY DISEASE & NUTRITIONAL CONSIDERATIONS

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Did you know that 1 in 10 Canadians are living with kidney disease? That's about 4 million people.¹ Given the natural reduction in kidney function as we age, we know that kidney disease is often more prevalent in those greater than 60 years of age, compared to the general population.² Research estimates that over 50% of seniors over the age of 75 are believed to have kidney disease.²

How do the kidneys work?

- The kidneys are 2 bean-shaped organs responsible for filtering and removing waste products, regulating fluid and electrolyte balance along with blood pressure and red blood cell production.³
- Each kidney contains about a million functional units called nephrons. Nephron contains a tiny filtering unit called the glomerulus. As blood enters the kidneys, it is filtered and remaining fluid flows towards the blood through tubules, where many substances like sodium, potassium, and water are either removed or added back to the blood based on the body's needs. The final waste products are removed as urine.³



Key functions of the kidneys:⁴

- 1. Filter and eliminate waste products:** The body produces many waste products as a result of daily functioning. These waste products are filtered and eliminated by the kidneys.
- 2. Regulate fluid balance:** The body maintains ideal fluid balance by retaining or removing water as necessary.
- 3. Regulate blood pressure:** In addition to the impact fluid balance has on regulating blood pressure, the kidneys also produce a hormone called renin, which is responsible for blood pressure regulation.
- 4. Regulate electrolyte balance:** Electrolytes are minerals in the body that support chemical reactions and maintain fluid balance inside and outside of your cells. The kidneys maintain the ideal balance of electrolytes.
- 5. Regulate red blood cell production:** The kidneys produce an important hormone called erythropoietin, which stimulates bone marrow to produce red blood cells that carry oxygen from the lungs to all parts of the body.
- 6. Regulates Vitamin D and Calcium:** The kidneys activate Vitamin D in the body so that we can absorb Calcium and Phosphorus, which helps build and maintain healthy bones.

What is Kidney Disease?

Kidney disease is characterized as a variety of conditions that may damage the filtering units of the kidneys, ultimately impacting the ability to remove waste products and excess fluids from the body. The severity of kidney disease can range from mild to severe, to complete kidney failure.^{4,5}

Kidney disease is categorized as either Acute Kidney Injury (AKI) or Chronic Kidney Disease (CKD) – dependent on the onset, causes and symptoms. Treatment and nutritional goals will also vary based on a patient's diagnosis.^{4,5}

Acute Kidney Injury (AKI)	Chronic Kidney Disease (CKD)
<ul style="list-style-type: none">• Onset is sudden with rapid deterioration but usually reversible• Common causes include damage to the kidneys and functional units, urinary tract obstruction and pre-renal disease	<ul style="list-style-type: none">• Onset is gradual (over months to years)• Causes include diabetic complications, hypertension, polycystic kidney disease or a nephrotoxin exposure

CKD is also categorized from stage 1 to 5, dependent on the degree of loss in kidney function. The stage of CKD is determined by a variety of biometric values along with the risk of kidney failure.

Nutritional Considerations for Kidney Disease

Nutritional management is geared towards monitoring and maintaining the following:⁴

- Optimal nutritional status
- Control of blood pressure
- Electrolyte balance
- Bone and heart health
- Uremic symptoms (high levels of urea in the blood): Nausea, vomiting, fatigue, weight loss, muscle cramps and more

Nutrition management of kidney disease will vary based on age, medical history, medications, kidney function, treatment options (ie. hemodialysis) and more. It is important to always consult a registered dietitian to develop a specific nutrition care plan for individual needs.



Below are the primary nutrients of concern for managing kidney disease:

1. Protein: Protein is an essential macronutrient, responsible for healthy weight and muscle maintenance, wound healing, and immune function. However, the metabolism of protein in the body leads to waste products such as ammonia, urea, uric acid and creatinine – all of which are excreted by the kidneys.⁶ These waste products can build up in the blood when not filtered out by the kidneys causing a variety of symptoms and causing damage to the kidneys.⁶ Protein recommendations are based on individual needs, stage of CKD and other interventions, however due to the waste products that can accumulate in the blood, a lower protein diet may be recommended.⁶



2. Sodium: Sodium is an important mineral and electrolyte necessary for maintaining healthy fluid balance throughout the body, along with normal muscle and nerve function.⁷ As mentioned, the kidneys function to balance electrolytes and therefore a decrease in kidney function impacts the ability to remove excess sodium from the blood.^{7,8}



3. Phosphorous: Phosphorous is a mineral important for bone health, energy metabolism and tissue repair.⁹ With impaired function of the kidneys, excess phosphorus cannot be properly filtered from the blood. As a result, excess phosphorus can lead to complications such as weakening of bones, calcium deposits in blood vessels, lungs, heart or eyes. Phosphorous is found in many protein-rich foods or as an additive found in fast foods or ready to eat foods.^{7,9}



4. Potassium: Potassium is a mineral important for nerve and muscle health. Similar to other minerals discussed, impaired kidney function may lead to increased levels of potassium in the blood, which can be dangerous. High potassium foods include bananas, oranges, potatoes, avocado, and beans, among others. Potassium may also be used as an additive in salt substitutes used in foods like deli meats or low sodium marketed products.⁸



5. Fluid: Decreased kidney function may impact the body's ability to properly maintain fluid balance. Therefore, fluid restrictions and use of medication may be a part of the nutrition care plan. Fluid balance is important, as excess fluid in the body may lead to swelling of the hands, legs and face along with high blood pressure and shortness of breath.⁸



For a quick reference of foods that can be used when developing Renal Menus, here is our complimentary **Renal Menu Resource Attachment** that you can print out and post within your production and serving areas.

References:

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