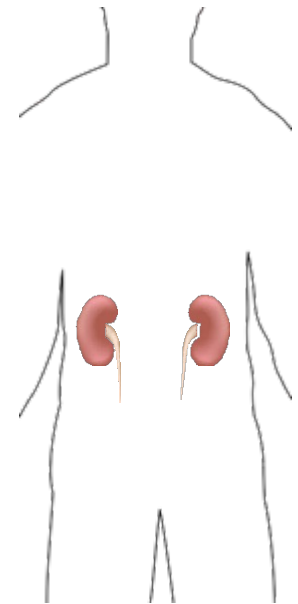


Kidney Health after Cancer Treatment

The kidneys are vital organs responsible for filtering out waste products from the blood, controlling blood pressure, and stimulating red blood cell production. Treatment for childhood cancer can sometimes damage the kidneys. It is important to understand how the kidneys function so that you can keep your kidneys as healthy as possible.

How do the kidneys work?

The kidneys are two bean-shaped organs, each approximately the size of an adult fist, located below the rib cage near the middle of the back. The kidneys filter about 200 quarts of blood each day, removing harmful waste products and excess water, and returning important elements (such as calcium, sodium and potassium) to the blood. Filtering occurs in tiny units inside the kidneys, known as nephrons. Each kidney has approximately one million nephrons. After the blood is filtered by the nephrons, the excess water and waste products become urine. The urine flows from the kidneys to the bladder through tubes called ureters. The bladder then stores the urine until it is full, at which time the waste is emptied from the body through the urethra.



How is kidney function measured?

Kidney function is measured by calculating a glomerular filtration rate, or GFR. The GFR is a measure of how much blood your kidneys can filter each minute. The GFR is calculated using blood test results and information like your age, sex and height. A GFR of greater than 90 mL/min/1.73 m² is considered normal. If your GFR is below 90 mL/min/1.73 m², your provider may order additional tests such as a urinalysis to see if there is protein or blood in your urine.

What treatments for childhood cancer can cause kidney problems?

Certain treatments used for childhood cancer can sometimes cause kidney problems. There may also be other risk factors present that can increase the chance of kidney problems. If you have any of the following risk factors, you should take extra care to keep your kidneys healthy:

Radiation involving the kidneys, including:

- Kidney (renal or flank) radiation
- Abdominal radiation
- Total body irradiation (TBI)

Certain medications that can cause kidney damage, including:

- Cisplatin
- Carboplatin
- Ifosfamide
- Certain antibiotics used to treat bacterial and fungal infections, such as tobramycin, gentamicin, and amphotericin
- Certain medications used to treat graft-versus-host disease, such as cyclosporine and FK-506 (tacrolimus)

Other risk factors that may increase the chance of kidney problems include:

- **Nephrectomy** (surgical removal of a kidney)—see the related Health Link: [Single Kidney Health](#)
- Hematopoietic cell transplant (HCT)

- **Medical conditions that may affect the kidney**, such as high blood pressure, diabetes, or a tumor involving the kidney
- **History of urinary tract problems**, such as frequent urinary tract infections, back-flow of urine into the kidney (reflux), or other urinary tract abnormalities
- **Cystectomy** (removal of the bladder)—this increases the risk of chronic urinary tract infections and other kidney problems

What are the signs and symptoms of a kidney problem?

- Swelling, especially of the feet and ankles (edema)
- Low red blood count (anemia)
- High blood pressure (hypertension)
- People who have signs of serious kidney problems, such as edema, low red blood count, and hypertension, may also have other symptoms, including fatigue, nausea and vomiting, drowsiness, itchy skin, or headaches

What follow up is recommended?

- **Have a medical check-up at least yearly.** This should include a blood pressure check.
- **Have blood test for kidney function (BUN and creatinine) and electrolytes (blood salts and minerals) at your first long-term follow up visit** (at least 2 years after completing cancer treatment). Depending on the treatment you received and the results of this lab work, your provider may recommend labs to assess your kidney function at regular intervals.
- If you had a **cystectomy** (bladder removal), you should also have an evaluation by an urologist (urinary tract specialist) at least once a year.

What can I do to keep my kidneys healthy?

- Drink plenty of water, especially when playing sports, while out in the sun, and during hot weather.
- Call your healthcare provider immediately if you have symptoms of a urinary tract infection (burning when you urinate, urinating more frequently than usual, and/or feeling an urgent sensation to urinate).
- Use non-steroidal anti-inflammatory drugs with caution. These include pain or fever medicines (over-the-counter and by prescription) that contain aspirin, ibuprofen, or naproxen. These medications have been known to cause kidney damage (analgesic nephropathy), especially when taken in high doses or over long periods of time (more than 10 days). If you require long-term medications for management of pain, be sure to discuss options with your healthcare provider, and to choose medications that are safe for your kidneys.

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Additional health information for childhood cancer survivors is available at
www.survivorshipguidelines.org

Note: Throughout this *Health Links* series, the term “childhood cancer” is used to designate pediatric cancers that may occur during childhood, adolescence, or young adulthood. Health Links are designed to provide health information for survivors of pediatric cancer, regardless of whether the cancer occurred during childhood, adolescence, or young adulthood.

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