

## **KEY**

### **How does the urinary system work?**

Your body takes nutrients from food and uses **them** to maintain all bodily functions including energy and self-repair. After your body has taken what it needs from the food, waste products **are** left behind in the blood and in the bowel. The urinary system works with the lungs, skin, and intestines—all of **which** also excrete wastes—to keep the chemicals and water in your body balanced. Adults eliminate about a quart and a half of urine each day. The amount depends **on** many factors, especially the amounts of fluid and food a person consumes and how **much** fluid is lost through sweat and breathing. Certain types of medications **can** also affect the amount of urine eliminated.

The urinary system removes a type of waste called urea from your blood. Urea is produced **when** foods containing protein, such as meat, poultry, and certain vegetables, are broken **down** in the body. Urea is carried in the bloodstream to the kidneys.

The kidneys are bean-shaped organs about the **size** of your fists. They are near the middle of the back, **just** below the rib cage. The kidneys remove urea from the blood through tiny filtering units called nephrons. Each nephron consists of a ball formed of small blood capillaries, called a glomerulus, and a small tube called a renal tubule. Urea, **together** with water and other waste substances, forms the urine as it passes **through** the nephrons and down the renal tubules of the kidney.

From the kidneys, urine travels down two thin tubes called ureters to the bladder. The ureters are **about** 8 to 10 inches long. Muscles in the ureter walls constantly tighten and relax to force urine downward away from the kidneys. **If** urine is allowed to stand still, or back up, a kidney infection can develop. Small amounts of urine are emptied into the bladder from the ureters about every 10 **to** 15 seconds.

The bladder is a hollow muscular organ shaped **like** a balloon. It sits in your pelvis and is held in place by ligaments attached to **other** organs and the pelvic bones. The bladder stores urine **until** you are ready to go to the bathroom **to** empty it. It swells into a round shape when it is full and gets smaller when empty. If the urinary system is healthy, the bladder can hold **up** to 16 ounces (2 cups) of urine comfortably **for** 2 to 5 hours.

Circular muscles called sphincters help keep urine from leaking. **The** sphincter muscles close tightly like a rubber band around the opening of the bladder into the urethra, the tube **that** allows urine to pass outside the body.

Nerves in the bladder tell you when it is time to urinate, or empty your bladder. As the bladder first fills with urine, you may notice a feeling that you need to urinate. The sensation to urinate becomes stronger as the bladder continues to fill and reaches **its** limit. **At** that point, nerves from the bladder send a message to the brain that the bladder is full, and **your** urge to empty your bladder intensifies.

When you urinate, the brain signals the bladder muscles to tighten, squeezing urine **out** of the bladder. At the same time, the brain signals the sphincter muscles to relax. **As** these muscles relax, urine exits the bladder through the urethra. When all the signals occur in the correct order, normal urination occurs.

<http://kidney.niddk.nih.gov/kudiseases/pubs/yoururinary/>