What are vital signs?
Vital signs are measurements of the body’s most basic functions. The four main vital signs routinely monitored by medical professionals and health care providers include the following:

- Body Temperature
- Pulse Rate
- Respiration Rate (rate of breathing)
- Blood pressure (Blood pressure is not considered a vital sign but is often measured along with the vital signs.)

Vital signs are useful in detecting or monitoring medical problems. Vital signs can be measured in a medical setting, at home, at the site of a medical emergency or elsewhere.

What is body temperature?
The normal body temperature of a person varies depending on gender, recent activity, food and fluid consumption, time of day, and, in women, the stage of the menstrual cycle. Normal body temperature can range from 97.8 degrees F to 99 degrees F for a healthy adult. A person’s body temperature can be taken in any of the following ways:

- **Orally.** Temperature can be taken by mouth using with the classic glass thermometer, or the more modern digital thermometers that use an electronic probe to measure body temperature.
- **Rectally.** Temperatures taken rectally (using a glass or digital thermometer) tend to be .5 to .7 degrees F higher than when taken by mouth.
- **Axillary.** Temperatures can be taken under the arm using a glass or digital thermometer. Temperatures taken by this route tend to be .3 to .4 degrees F lower than those temperatures taken by mouth.
- **By ear.** A special thermometer can quickly measure the temperature of the ear drum, which reflects the body’s core temperature (the temperature of the internal organs)
- **By skin.** A special thermometer can quickly measure the temperature of the skin on the forehead.

Body temperature may be abnormal due to fever (high temperature) or hypothermia (low temperature). A fever is indicated when body temperature rises about one degree or more over the normal temperature of 98.6 F, according to the American Academy of Family Physicians. Hypothermia is defined as a drop-in body temperature below 95 degrees F.

About glass thermometers containing mercury
According to the Environmental Protection Agency, mercury is a toxic substance that poses a threat to the health of humans, as well as to the environment. Because of the risk of breaking, glass thermometers containing mercury should be removed from use and disposed of properly in accordance with local, state, and federal laws.

Contact your local health department, waste disposal authority, or fire department for information on how to properly dispose of mercury thermometers.

What is the pulse rate?
The pulse rate is a measurement of the heart rate, or the number of times the heart beats per minute. As the heart pushes blood through the arteries, the arteries expand and contract with the flow of the blood. Taking a pulse not only measures the heart rate, but also can indicate the following:

- Heart Rhythm
- Strength of the pulse

The normal pulse for a healthy adult ranges from 60 to 100 beats per minute. The pulse rate may fluctuate and increase with exercise, illness, injury, and emotions. Females ages 12 and older, in general, tend to have faster
heart rates than do males. Athletes, such as runners, who do a lot of cardiovascular conditioning, may have heart rates near 40 beats per minute and experience no problems.

**How to check your pulse**

As the heart forces blood through the arteries, you feel the beats by firmly pressing on the arteries, which are located close to the surface of the skin at certain points of the body. The pulse can be found on the side of the neck, on the inside of the elbow, or at the wrist. For most people, it is easiest to take the pulse at the wrist. If you use the lower neck, be sure not to press too hard, and never press on the pulses on both sides of the lower neck at the same time to prevent blocking blood flow to the brain. When taking your pulse:

- Using the first and second fingertips, press firmly but gently on the arteries until you feel a pulse.
- Begin counting the pulse when the clock’s second hand is on the 12
- Count your pulse for 60 seconds (or 15 seconds and then multiply by four to calculate beats per minute).
- When counting, do not watch the clock continuously, but concentrate on the beat of the pulse.
- If unsure about your results, ask another person to count for you.

If you doctor has ordered you to check your own pulse and you are having difficulty finding it, consult your doctor or nurse for additional instructions.

**What is the respiration rate?**

The respiration rate is the number of breaths a person takes per minute. The rate is usually measured when a person is at rest and simply involves counting the number of breaths for one minute by counting how many times the chest rises. Respiration rates may increase with fever, illness, and with other medical conditions. When checking respiration, it is important to also note whether a person has any difficulty breathing. Normal respiration rates for an adult person at rest range from 12 to 16 breaths per minute.

**What is blood pressure?**

Blood pressure, measured with a blood pressure cuff and stethoscope by a nurse or other health care provider, is the force of the blood pushing against the artery walls. Each time the heart beats, it pumps blood pressure unless an electronic blood pressure monitoring device is used. Electronic blood pressure monitors may also measure the heart rate, or pulse.

Two numbers are recorded when measuring blood pressure. The higher number, or systolic pressure, refers to the pressure inside the artery when the heart contracts and pumps blood through the body. The lower number, or diastolic pressure, refers to the pressure inside the artery when the heart is at rest and is filling with blood. Both the systolic and diastolic pressures are recorded as “mm Hg” (millimeters of mercury). This recording represents how high the mercury column in an old-fashioned manual blood pressure device (called a mercury manometer) is raised by the pressure of the blood. Today, your doctor’s office is more likely to use a simple dial for this measurement.

High blood pressure, or hypertension, directly increases the risk of coronary heart disease (heart attack) and stroke (brain attack). With high blood pressure, the arteries may have an increased resistance against the flow of blood pressure for adults is defined as:

- 140mm HG or greater systolic pressure
  - Or
- 90 mm HG or greater diastolic pressure

In an update of NHLBI guidelines for hypertension in 2003, a new blood pressure category was added called prehypertension:

- 120mm HG – 139 mm HG systolic pressure
  - Or
- 80 mm HG – 89 Hg Diastolic pressure
The NHLBI guidelines now define normal blood pressure as follows:

- Less than 120 mm HG systolic pressure
- And
- Less than 80 mm HG diastolic pressure

These numbers should be used as a guide only. A single elevated blood pressure measurement is not necessarily an indication of a problem. Your doctor will want to see multiple blood pressure measurements over several days or weeks before making a diagnosis of hypertension (high blood pressure) and initiating treatment. A person who normally runs a lower than usual blood pressure may be considered hypertensive with lower blood pressure measurements than 140/90.

Why should I monitor my blood pressure at home?

For people with hypertension, home monitoring allows your doctor to monitor how much your blood pressure changes during the day, and from day to day. This may also help your doctor determine how effectively your blood pressure medication is working.

What special equipment is needed to measure blood pressure?

Either an aneroid monitor, which has a dial gauge and is read by looking at a pointer, or digital monitor, in which the blood pressure reading flashes on a small screen, can be used to measure blood pressure.

About the aneroid monitor

The aneroid monitor is less expensive than the digital monitor. The cuff is inflated by hand by squeezing a rubber bulb. Some units even have a special feature to make feature to make it easier to put the cuff on with one hand. However, the unit can be easily damaged and become less accurate. Because the person using it must listen for heartbeats with the stethoscope, it may not be appropriate for the hearing-impaired.

About the digital monitor

The digital monitor is automatic, with the measurements appearing on the small screen. Because the recordings are easy to read, this is the most popular blood pressure measuring device. It is also easier to use than the aneroid unit, and since there is no need to listen to heartbeat through the stethoscope, this is a good device for hearing impaired patients. One disadvantage is that the body movements or an irregular heart rate can change the accuracy. These units are also more expensive than the aneroid monitors.

About finger and wrist blood pressure monitors

Tests have shown that finger and/or wrist blood pressure devices are not as accurate in measuring blood pressure as other types of monitors. In addition, they are more expensive than the other monitors.

Before you measure your blood pressure

- Rest for three to five minutes without talking before taking a measurement.
- Sit in a comfortable chair, with your back supported and your legs and ankles uncrossed.
- Sit still and place your arm, raised level with your heart, on a table or hard surface.
- Wrap the cuff smoothly and snugly around the upper part of your arm. The cuff should be sized to fit smoothly, while still allowing enough room for one fingertip to slip under it.
- Be sure the bottom edge of the cuff is at least one inch above the crease in your elbow.

It is also important, when taking blood pressure readings, that you record the date and time of day you are taking the reading, as well as the systolic and diastolic measurements. This will be important information for your doctor to have. Ask your doctor or another health care professional to teach you how to use your blood pressure monitor correctly. Have the monitor routinely check for accuracy by taking it with you to your doctor’s office. It is also important to make sure the tubing is not twisted when you store it and keep it away from heat to prevent cracks and leaks.

Proper use of your blood pressure monitor will help you and your doctor in monitoring your blood pressure.