Cleveland Clinic

Heart Rate Monitor

Heart rate monitors are devices that can detect and track your heart or pulse rate continuously. Most of these devices are wearable, and many are highly accurate. While these devices can be valuable tools in monitoring your health, they aren't as accurate as approved medical devices, and you shouldn’t use them in place of medical care.

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Overview

An example of a wrist-worn heart rate monitor.

What are heart rate monitors?

Heart rate monitors are devices that detect and measure your heart or pulse rate. Thanks to advances in technology, these devices are small, wearable and many use sensors that are very accurate. However, while these devices are excellent for personal use, they're no substitute for medical devices that are much more accurate.

Why do people use heart rate monitors?

Heart rate monitors are very popular features in wearable devices like smartwatches and fitness trackers. Many of these devices also connect wirelessly to smartphones and computers. That allows users easy access to review their heart rate data. Heart rate monitors see common use for the following purposes:

- Tracking heart rate during exercise.
- Monitoring stress and activity levels during the day.
- Tracking sleep quality at night.
- Monitoring your vital signs at home, especially if you have certain health conditions or concerns.

Who can use these devices?

Heart rate monitors in wearable devices are available to anyone who wants

Test Details

How do these devices work?

Your pulse and heart rate are two different ways to track your heart's activity. Your heart rate is how many times your heart beats per minute. Your pulse rate is how many times per minute your arteries expand because of your heart beating.

There's usually no difference between your heart rate and your pulse rate (or the difference is very small). However, certain health conditions, medications or circumstances can make the pulse in your arms harder to detect. That can interfere with the way these devices work.

The term "heart rate monitor" refers to devices that can detect either your heart rate or your pulse rate. These devices use two different approaches:

detection capabilities can detect and track that current.

- **Optical (photoplethysmography)**: These devices use infrared light to see the expansion of your arteries as your heart pumps blood through them. These devices track your pulse rate, and some can also estimate the oxygen levels in your blood.

Common types of devices:

- **Chest-band devices**. These devices use electrical detection to track your heart rate. They detect electrical activity through a band that wraps around your chest. For most of these devices to work as designed, the band must be wet, or you need to use a conductive gel where the sensors touch your skin. Water or conductive gel improves electrical conduction, so it's easier for the device to detect your heart's electrical current.
- **Wrist- or forearm-worn wearables**: There are two major arteries in your forearm and wrist. The radial artery runs toward your thumb, and the ulnar artery runs toward the pinky and ring fingers. These two arteries provide plenty of blood flow to the skin at the surface of your wrist and forearm. These wearables have light-emitting diodes (LEDs) and sensors that rest against the skin in that area. The sensor uses LED light to detect the tiny expansions of the blood vessels underneath the skin's surface.
- **Smart rings**: These are devices you wear on one of your fingers like a piece of jewelry. They also use optical detection to track your heart rate and other vital signs. These devices are still very new, and there's

- **Pulse oximeters**. These devices, many of which clip onto a finger, also use the optical detection method. These track pulse rate and blood oxygen levels. They're common in hospital settings, but you can also get portable, battery-powered versions of these devices for personal use.
- **Smartphones**. Various smartphone apps across the different platforms offer the ability to measure your pulse rate. Some of these use optical detection to find your pulse rate by holding your finger to the camera lens, with the camera's flash used to illuminate the blood vessels under your skin. Others use the camera itself, pointed at your face, to detect your pulse rate based on visible — but undetectable with your eyes — changes in your skin.

Are these devices accurate?

Device accuracy generally depends on the device's type of detection and the user's activity while wearing the device.

- **Chest-band devices**: Because they use electrical detection, chest-band monitors are the most accurate, especially when used properly. That's because they measure your heart rate directly — rather than your pulse rate — which gives them higher accuracy regardless of whether you're resting, running, cycling or using various exercise devices.
- **Wrist- or forearm-located wearables**: These tend to be very accurate when you're resting or walking. Many of these devices are also very accurate if you're running or cycling. Using your arms for exercise

- **Smart rings**: These devices are very new, so there aren't many commercially available yet. Still, available research already indicates these are very accurate while you're resting. More research is necessary to show if they're accurate for exercise and other activities.
- **Pulse oximeters**: In medical settings, these attach or stick to your finger with adhesive and help healthcare providers with certain types of tests. Pulse oximeters found in non-medical settings aren't usually suitable for use during exercise.
- **Smartphones**: Smartphone apps that have you touch the camera lens as part of the measurement tend to be more accurate than the apps that use the camera to scan your face. However, they're still prone to errors because the phone and its camera weren't designed for this purpose.

How do I use these devices?

Depending on the type of device, you may need to use them differently. Some you wear around your wrist or forearm. Others are rings you wear on a finger. The chest-strap devices have their sensors in the strap. Depending on the mode, some connect with a cable or wirelessly to a device that you can clip onto your clothing or you can carry in a pocket, and many of the newer models use wireless connections to your phone or another device. To learn the best way to use your device and get the most accurate results, be sure to read the instruction manual completely. Most of these devices also have websites with user forums, where you can ask questions and share information about how these devices can best help you.

What are the risks of using heart rate monitors?

The risks of using heart rate monitors are very minimal. For the most part, the greatest concern is an allergy you might have to some of the materials that make up the band or the device itself.

However, just because these devices are safe to use doesn't mean they're a substitute for officially approved medical devices. If you have health concerns that need monitoring, the safest and most accurate devices are those that have approval from the U.S. Food & Drug Administration (or from the appropriate regulatory agency in your country). That approval means these devices meet strict quality and accuracy standards and that they're ideal for medical use.

Results and Follow-Up

What type of results do you get, and what do the results mean?

Depending on the device you're using, the results might have slightly different meanings.

- **Electrical-detection devices**: These are the only devices that truly detect your heart rate. That's because they are picking up the electrical activity of your heart itself.
- **Optical-detection devices**: These devices detect your pulse rate, not your heart rate.

Regardless of whether or not they measure your heart rate or your pulse rate, the results try to convey the same thing: How many times your heart beats per minute. Depending on the device, they may also measure and display other metrics, like heart rate variability. Some also use apps that offer you that data in ways that you can tailor to your uses and needs.

When should I know the results of the test?

These devices track your heart or pulse rate while you wear them. Seeing your results should be as easy as looking at the device itself or the

When should I call my healthcare provider?

You should call your healthcare provider if you notice that your heart rate is unusually fast or slow. For adults, that means slower than 60 beats per minute (bradycardia) or faster than 100 beats per minute while you're resting (tachycardia).

You should also call your healthcare provider if you experience any symptoms of an irregular heart rhythm (arrhythmia), especially heart palpitations. This symptom is the ability to feel your heart beating without trying, and it's usually an unpleasant feeling. It can also feel like your heart is pounding, flip-flopping or skipping beats.

When to go to the hospital

You should go to the hospital if you have any symptoms of a heart attack or other serious heart problem. Those include the symptoms of arrhythmias, heart palpitations, or the following:

- Chest pain (angina).
- Shortness of breath (dyspnea).
- Feeling lightheaded or dizzy.
- Fainting or passing out (syncope).

A note from Cleveland Clinic

Heart rate monitors are a useful and accessible tool to help you track your heart's activity. Depending on the device you pick, you can access a wide

especially if you think you might have a problem. You can also talk to your healthcare provider about recommendations on how you can use these devices to benefit you and how you can work smarter — not just harder — on taking care of yourself.

Medically Reviewed

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References