

# AI-00848 Ejection Fraction

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**How is EF ejection fraction measured? Explain the genesis of the EF and evolutions.**

There are a couple ways doctors can measure your ejection fraction (EF), which is a percentage of how much blood your left ventricle pumps out with each beat. Here are the most common methods:

- **Echocardiogram (echo):** This is the most widely used test. It uses sound waves to create images of your heart, allowing doctors to measure the ventricle's size and how much blood it holds.
- **Other tests:** Some other tests can also measure EF, including cardiac catheterization, MRI scans, nuclear medicine scans, and CT scans. These are typically used when an echo isn't suitable for some reason.

**EF calculation:** EF is a calculated value based on the ventricle's volume. Doctors use a formula that considers the amount of blood pumped out (stroke volume) divided by the total amount of blood in the ventricle before a contraction (end-diastolic volume). This is then multiplied by 100 to express it as a percentage.

**EF history:** The concept of EF has been around for a while, but the specific ways to measure it have evolved over time. Early measurements relied on X-ray imaging with limitations in accuracy. Echocardiography, with its non-invasive approach, revolutionized EF assessment, making it a more accessible and reliable tool.

**Can EF be synthesized or derived from heart rate, perceived effort during exercise. The point I'm getting at is if I just learned my EF after an echo test and I kept a mental note of that number and I go out riding on a bike and gets a good higher intensity HR, can I infer that my EF is healthy? I don't have an access to**

**an expensive Echo test or Cath lab, is there a relative EF based on my perceived effort and heart rate?**

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Unfortunately, **EF cannot be reliably derived from just heart rate and perceived exertion during exercise.** Here's why:

- **Independent factors:** Heart rate and perceived exertion are influenced by many things besides your heart's pumping ability. These include fitness level, hydration, fatigue, medications, and even emotions. Someone with a strong heart (high EF) might have a lower heart rate for a given exercise intensity compared to someone with a weaker heart (lower EF).
- **Specificity:** EF is a specific measure of the left ventricle's pumping function. Heart rate and perceived exertion are more general indicators of overall exertion.

**Echo Importance:** While an EF test isn't cheap, it's a valuable tool for assessing heart health, especially if you have risk factors for heart disease. There's no substitute for a proper diagnosis.

**Alternatives:** However, there are ways to gauge your exercise response that can be helpful, though not a replacement for EF:

- **Talk to your doctor:** Discuss safe exercise guidelines based on your health history.
- **Start slow and progress gradually:** If you're new to exercise, begin slowly and gradually increase intensity and duration to avoid overexertion.
- **Listen to your body:** Pay attention to how you feel during exercise. Discomfort, tightness, or pain are signs to slow down or stop.
- **Focus on perceived exertion:** The Borg Rating of Perceived Exertion (RPE) scale is a simple tool to gauge exertion. It uses a 0-10 scale (easy to very hard) to help you stay within a safe zone.

Remember, these are general tips, and consulting your doctor is crucial for personalized recommendations