

Breathing Economy, the *hidden* endurance advantage



CardioHUB.uk

Turning VO^2_{max} into Usable Performance

The big idea

VO^2_{max} sets your **aerobic ceiling**. Breathing Economy determines how close you can operate to that ceiling — and for how long.

Two athletes can have the same VO^2_{max} , yet very different race performances. The difference is often how efficiently they breathe at high intensity.

What is Breathing Economy?

Breathing Economy describes how much ventilation (air moved in and out of the lungs) is required to absorb a given amount of oxygen.

In simple terms:

Better Breathing Economy = Less breathing for the same oxygen uptake

This is commonly assessed using:

- VE (minute ventilation)
 - VO_2 (oxygen uptake)
 - VE/ VO_2 ratio
 - Breathing frequency
 - Tidal volume
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Why it matters for performance

Improved breathing economy does not usually increase VO^2_{max} itself. Instead, it improves how effectively you can **use** your VO^2_{max} .

Better breathing economy leads to:

- Lower oxygen cost of breathing
 - Less respiratory muscle fatigue
 - More oxygen available for working muscles
 - Lower perceived breathlessness
 - Later ventilatory limitation
 - Higher sustainable pace or power
 - Improved time to exhaustion at high intensity
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The performance model

Performance = $VO_2\text{max}$ × Fractional Utilisation × Sustainability

Breathing Economy strongly influences:

- Fractional utilisation of $VO_2\text{max}$
- How long you can sustain high % $VO_2\text{max}$
- Ventilatory threshold behaviour

Same $VO_2\text{max}$. Very different outcomes.

Who benefits most?

Master athletes (40+)

$VO_2\text{max}$ naturally declines with age. Breathing economy remains highly trainable.

You may not be able to raise the $VO_2\text{max}$ ceiling dramatically — but you can **dramatically improve** how efficiently you use what you have.

Athletes who have plateaued

When $VO_2\text{max}$ stops improving, breathing economy becomes a powerful new performance lever.

Endurance & health-focused individuals

Ventilatory efficiency is a key marker in cardiopulmonary performance and exercise tolerance.

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What we measure at the Barefoot Physio, in a non-stressful private environment

Your test assesses how efficiently your breathing supports oxygen uptake, including:

- Ventilation (VE)
- Oxygen uptake (VO_2)
- VE/VO_2 (breathing economy)
- Breathing frequency
- Tidal volume
- Heart rate response

This allows us to identify whether breathing mechanics are limiting sustainable performance.

What training can improve

Targeted breathing economy interventions can:

- Reduce unnecessary ventilation
- Improve breathing pattern
- Increase tidal volume efficiency
- Reduce rapid shallow breathing
- Lower respiratory muscle oxygen demand

Result:

Same engine. Better transmission.

The takeaway after your test

We provide an AI analysis of your breathing metrics. The report will show how your breathing economy compares to the norm for your particular event, and how best to *improve* it.
