

LEVEL 1 · AWARENESS · DIAGNOSTICS, BIOMARKERS & TRACKING

What a Biomarker Is — and What It Isn't

A biomarker is a stand-in for something you actually care about. Forgetting that it is a stand-in is how medicine has repeatedly harmed people while watching the numbers improve.

By **Shaaf Hussain** · Author & Founder | Level 1 · Awareness | Educational — not medical advice

<https://longevitydecoded.net/what-a-biomarker-is-article.html>

WHAT YOU'LL UNDERSTAND BY THE END

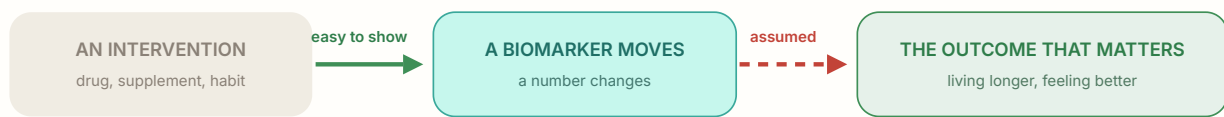
What a biomarker is standing in for, why moving a number is not the same as helping a person, and the two cases that made this lesson unavoidable.

You do not want a particular cholesterol value. You want to not have a heart attack. You do not want a specific blood sugar reading. You want to keep your eyesight and your kidneys.

The numbers are **proxies**. They are measurable now, whereas the thing you actually care about takes decades to happen and cannot be observed in a fifteen-minute appointment. That trade is reasonable and necessary. It is also the source of most bad health reasoning.

THE STRUCTURE

The chain, and its weak link



The second arrow is the one that gets assumed — and sometimes it is simply wrong.

Almost every overstated health claim lives on that dashed line.

Two arrows. Only one of them is usually tested.

Showing that something moves a number is comparatively easy: a modest study, a few weeks, a measurable change. Showing that it prevents disease requires thousands of people followed for years, at enormous expense.

So the first arrow gets demonstrated and the second gets *assumed*. Usually the assumption holds. Sometimes it does not — and when it fails, it can fail badly.

WHEN THE ASSUMPTION BROKE

Two cases that should be famous

SUPPRESSING THE ABNORMAL BEATS

Extra heartbeats after a heart attack are associated with higher risk of dying. Drugs existed that reliably suppressed them — the biomarker improved, exactly as intended. When a large trial finally tested whether patients actually lived longer, the answer was the reverse: **the treated group died at a higher rate than those on placebo**. The trial was stopped early. The number had improved while the people did worse.

RAISING THE “GOOD” CHOLESTEROL

HDL is associated with lower cardiovascular risk, so a drug that raised it substantially looked extremely promising. In the trial, cardiovascular events and deaths **increased**. The program was abandoned. Being associated with good outcomes is not the same as causing them — and a drug can move a marker by a route that does not carry the benefit the association implied.

Neither of these was fraud or carelessness. They were reasonable inferences from real associations, and they were wrong. That is the point: the dashed arrow is not a formality.

THE QUESTION TO ASK

How to use this

When you meet a health claim, locate it on the chain. Almost all of them are claims about the first arrow, presented as though they were about the second.

- **“Lowers inflammation”** — usually means a marker moved. Whether that prevents anything is a separate question with a separate answer.
- **“Improves biological age”** — means a score built from other markers changed. Whether it changes how long or how well you live is unknown.
- **“Increases NAD+ levels”** — a real measurement, and a genuinely open question as to what follows from it.

None of this means biomarkers are useless. They are how medicine acts before damage is done, and some are extremely well validated — blood pressure and ApoB have been tested against real outcomes many times over. The skill is knowing which arrow a given claim has actually demonstrated, and treating the other one as an open question rather than a completed one.

WHAT THE EVIDENCE ACTUALLY SAYS

HUMAN EVIDENCE

Antiarrhythmic drugs that suppressed post-infarction ectopic beats increased mortality in a large randomized trial, despite improving the marker.

HUMAN EVIDENCE

A drug that substantially raised HDL cholesterol increased cardiovascular events and deaths in trial, contradicting the observational association.

HUMAN EVIDENCE

Some biomarkers — blood pressure and ApoB among them — have been validated against hard outcomes across many randomized trials.

MECHANISM

Surrogate endpoints are used because outcome trials are slow and expensive; this is a practical necessity rather than a scientific preference.

NOT SUPPORTED

That improving any given biomarker necessarily improves health, in the absence of outcome data for that specific intervention.

CONNECTED SYSTEMS

Where this connects

DIAGNOSTICS, BIOMARKERS & TRACKING

The Study That Confirms Itself

CARDIOVASCULAR HEALTH

Cholesterol Isn't One Thing

THE WHOLE LESSON IN ONE LINE

A biomarker stands in for an outcome you cannot measure yet — and because the link between the two is usually assumed rather than tested, moving a number is not the same as helping a person.

Educational content only — not medical advice, diagnosis, or treatment. This lesson explains how measurements behave, for a non-specialist audience. It does not interpret anyone's results and cannot tell you whether a value of yours is a problem. Test results must be read by a clinician alongside your symptoms, history and examination — a number without that context is not a diagnosis. Never start, stop or change a medication on the basis of an article. Discuss any changes to your health, medications, or supplements with a licensed professional who knows your situation.

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