VITALS VAULT

A VITALS VAULT FIELD GUIDE

Read your inflammation blood tests in 15 minutes

For anyone tired of vague "inflammation" claims who wants to know what each marker shows and what it cannot

8

CHAPTERS

15 minutes

Every claim is tied to a named study.
References are on the last page.

Educational only. Not medical advice.

THIS GUIDE IS FOR YOU IF

- You keep seeing "inflammation" online and cannot tell what is real.
- You have a report listing hs-CRP, ferritin, ESR or a white cell count.
- You want to know what each marker measures and what can move it.
- You want better questions for a clinician, not a self-diagnosis.

HOW TO USE IT

Read the line at the top of each chapter first, then the studies. Chapters stand alone. Use the tracking page in the last chapter with your own results, ideally from tests taken under similar conditions. Nothing here is a diagnosis or medical advice.

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CHAPTER 1

Helpful versus lingering inflammation

THE ONE THING TO REMEMBER

Short bursts of inflammation heal you; a quiet, lasting low level is what these blood markers try to catch.

Inflammation is the immune system's response to injury or infection. A cut swells, a cold brings a fever, then it settles. That is acute [short-term] inflammation, and it heals. Chronic [lasting months or years] inflammation is usually silent and can wear on healthy tissue. Think of a smoke alarm. Ringing during a fire is its job. Ringing all day with no fire is a fault worth checking.

WHAT A STUDY FOUND

About 160,000 people were followed for deaths. Those with CRP above 10 mg/L had a hazard ratio [relative death risk] of 2.7 for death from any cause and 3.16 for cancer death. Limit: observational, and a very high CRP often just means a recent infection.

Proctor et al., Glasgow Inflammation Outcome Study, 2015

Marker	What it is	Timing note
hs-CRP	Protein the liver makes during inflammation	Rises and falls faster than ESR
ESR	How fast red cells settle in a tube	Rises 24 to 48 hours after an insult
Ferritin	Main iron storage protein	Acute-illness rise peaks in 3 to 5 days
White cells	Count of immune cells in blood	Rise with infection, stress, exercise
Fibrinogen	Liver protein that clots blood	Also rises with smoking and stress

COMMON BELIEF

“I would feel it if I had chronic inflammation.”

WHAT THE EVIDENCE SAYS

A clinician's review of the evidence says no symptom reliably signals chronic low-grade inflammation. It is usually silent, which is why people turn to blood markers, even though each marker is imperfect.

BEFORE YOU READ ON

- [ ] I know which of these markers are on my report
- [ ] I know the date my blood was drawn
- [ ] I know if I was ill or training hard that week

CHAPTER 2

hs-CRP: how to read one result, then two

THE ONE THING TO REMEMBER

A single hs-CRP result is a snapshot; two readings at least two weeks apart tell you more.

CRP is a protein your liver makes when inflammation is present. The hs stands for high-sensitivity, meaning the test can read low levels. A standard CRP is like a thermometer marked only above fever; hs-CRP adds the marks in the normal zone. A normal standard CRP does not rule out low-level inflammation, which is why heart-risk questions use hs-CRP.

Cut-off (mg/L)	Meaning	Where it comes from
Under 1	Normal	AACE/ACE categories (Jellinger 2017)
1 to 3	Intermediate cardiovascular risk	AACE/ACE categories
Above 3	High cardiovascular risk	AACE/ACE categories
Men 0 to 0.55	One group's narrower view	Not a standard range
0.65	Suggested for metabolic syndrome	345 Japanese adults; CRP runs lower there

2 wks

For heart-risk use, two hs-CRP readings at least two weeks apart are advised, because one person's level varies from day to day.

WHAT A STUDY FOUND

A meta-analysis pooled 14 studies and 83,995 people. Higher hs-CRP went with higher death from any cause and from cardiovascular disease, especially at 1 mg/L or above. Limit: association, not cause, and thresholds differ by population.

Li et al., meta-analysis of 14 studies, 2017

WHAT A STUDY FOUND

In 14,719 healthy women, median CRP was 0.68 mg/L with no metabolic syndrome features, 3.01 with three and 5.75 with all five. CRP above 3.0 plus three or more features carried higher cardiovascular risk over 8 years. Limit: women only, observational.

Ridker et al., 2003

COMMON BELIEF

"My CRP is low, so I have no inflammation."

WHAT THE EVIDENCE SAYS

Low CRP does not rule it out. Standard CRP misses low levels, and other markers can flag inflammation when CRP looks normal. No single marker closes the question.

THINGS THAT CAN NUDGE A CRP RESULT

- [ ] Cold, infection or injury in the past two weeks
- [ ] Hard exercise in the hours before the draw
- [ ] Gum, joint or other flare-ups
- [ ] Fasting is not needed for CRP; note the time of day

CHAPTER 3

The white cell count and its ratios

THE ONE THING TO REMEMBER

A total white cell count is a broad signal; the ratio of two cell types adds detail.

White blood cells are the immune cells in your blood. Neutrophils [first-responder cells that fight bacteria] and lymphocytes [cells that build targeted defenses] make up 75 to 90 percent of the count. A total count is like a headcount of a building. The differential, the breakdown by cell type, tells you who is inside. The total is a non-specific marker: infection, injury, stress, exercise and smoking all raise it.

The neutrophil-to-lymphocyte ratio (NLR) is neutrophils divided by lymphocytes. It can flag system-wide inflammation even when the total count is normal. Stress hormones push neutrophils up and lymphocytes down, so NLR can jump after trauma or surgery. In hospital studies, a high NLR leans toward bacterial infection and a low one toward viral.

Marker (k/cumm)	Standard lab range	One group's narrower view
Total white cells	3.8 to 10.8	3.8 to 6.0
Neutrophils	1.50 to 7.8	1.90 to 4.20
Lymphocytes	0.85 to 3.9	1.44 to 2.54
NLR (no unit)	1.00 to 3.00	1.00 to 1.70

WHAT A STUDY FOUND

In 8,711 adults aged 45 and over, average NLR was 1.76, higher in men, older people, smokers and people with diabetes. Survival was best below 1.6 and worst above 2.41. Limit: one Dutch cohort, observational, and cut-offs vary between studies.

Fest et al., Rotterdam Study, 2018 and 2019

WHAT A STUDY FOUND

In a 44-year study, death risk was lowest at white cell counts of 3.5 to 6. Above 10 it doubled and below 3.5 it tripled. Limit: association only; infection, exercise and stress change counts, so repeats and context matter.

Ruggiero et al., Baltimore Longitudinal Study, 2007

2.24

Average NLR in Rotterdam participants whose CRP was above 10 mg/L, versus 1.76 overall (Fest 2018).

COMMON BELIEF

"A normal white cell count means nothing is going on."

WHAT THE EVIDENCE SAYS

NLR can flag inflammation when the total is normal. Also, the study bands (about 5.6 to 7.1) sit inside the standard range, so "normal" is wide.

CHAPTER 4

Ferritin and ESR as inflammation signals

THE ONE THING TO REMEMBER

Ferritin mainly shows iron storage but also rises with inflammation; ESR is slow and vague. Both need company.

Ferritin is the main iron storage protein; 1 ng/mL in the blood roughly reflects 8 mg of stored iron. Picture a stockroom sheet that also adds extra lines during an emergency. Ferritin is an acute-phase reactant [rises during illness], so infection, inflammation, cancer and acute illness can raise it without iron overload. Because of this, transferrin saturation [how full iron carriers are] is often measured too.

ESR, or sed rate, measures how fast red blood cells clump and settle in a tube. Clumping speeds up when proteins such as fibrinogen rise. ESR is mainly used to follow inflammatory autoimmune and joint conditions. Method, protein levels and red cell size and number all change it, so it is neither very sensitive nor very specific.

Marker	Standard lab range	One group's narrower view
Ferritin	16 to 232 ng/mL	45 to 79 ng/mL
ESR, men	0 to 15 mm/hr	0 to 5 mm/hr
ESR, women	0 to 20 mm/hr	0 to 10 mm/hr

WHAT A STUDY FOUND

In people with peripheral artery disease, higher ferritin went with higher hs-CRP, IL-6 and TNF-alpha, and with worse disease and mortality. Above 100 ng/mL went with more cardiovascular disease and type 2 diabetes. Limit: one disease group; the 70 to 79 "best" band comes from one analysis.

DePalma et al., FeAST trial analysis, 2021

WHAT A STUDY FOUND

A retrospective study of screening for infected artificial joints found an ESR cut-off of 10 mm/hr or more avoided the misses of the older 30 mm/hr cut-off. The CRP cut-off was 5 mg/L. Limit: this applies to joint-infection screening, not to general check-ups.

Bingham et al., 2020

30 **ng/mL. Below this, ferritin matched iron-poor bone marrow in healthy students (100% sensitive, 89% specific). Inflammation can push ferritin up and hide a low store.**

COMMON BELIEF

"A high ferritin means too much iron."

WHAT THE EVIDENCE SAYS

It can, but ferritin also rises with infection, inflammation, liver disease, alcohol use and more. It is not a stand-alone diagnosis. A clinician looks for the cause, and trends over time help.

CHAPTER 5

Other markers and their limits

THE ONE THING TO REMEMBER

Fibrinogen, homocysteine and IL-6 each add a clue, but none stands alone and IL-6 is not a routine test.

Fibrinogen has two jobs, like a nurse who also works the front desk. It helps blood clot, and it rises with inflammation. It is also raised by smoking, significant stress, vigorous exercise, estrogen or oral contraceptive use, infection, trauma and fatty liver. Low values can occur with liver disease or malnutrition.

Homocysteine is a by-product of how the body processes the amino acid methionine. When it is not cleared, it can build up. The most common cause of a high level is low vitamin B6, B12 or folate. It also rises with age and kidney problems, and runs higher in men. Smoking and some medicines raise it too.

IL-6 is a messenger protein [a cytokine] that tells the liver to make CRP and fibrinogen. It varies with time of day, obesity and illness. It is not a routine test, and a clinician's review calls such specialty tests less validated. Two large labs print different reference ranges, so a result from one lab may not match another.

Marker	Standard range	What can move it
Fibrinogen	175 to 425 mg/dL	Smoking, stress, infection, fatty liver
Homocysteine	Up to 10.3 umol/L	B vitamin status, age, kidneys, smoking
IL-6	0 to 13 or 1.8 or less pg/mL	Depends on the lab; also time of day

WHAT A STUDY FOUND

A pooled analysis of 31 studies followed 154,211 people with no known heart disease or stroke. Each 100 mg/dL rise in fibrinogen went with at least 1.8 times higher risk of coronary heart disease and stroke. Limit: observational, and the figure is per 100 mg/dL step.

Danesh et al., fibrinogen meta-analysis, 2005

WHAT A STUDY FOUND

In a cohort study, deaths rose significantly once homocysteine passed 9.8 umol/L. People under that level had lower hs-CRP and IL-6 and longer telomeres [protective caps on chromosomes]. Limit: observational; it does not show that lowering homocysteine lowers events.

Pusceddu et al., Ludwigshafen Risk and Cardiovascular Health Study, 2020

COMMON BELIEF

“A lower homocysteine is always better.”

WHAT THE EVIDENCE SAYS

One review flags very low levels too, but it rests on that single article. Targets online, such as below 7, are one group's view; the standard upper limit is 10.3.

CHAPTER 6

Everyday things studies link with these markers

THE ONE THING TO REMEMBER

Sleep, belly fat, activity and gum health are linked with these markers, but links are not proof of cause.

Think of these markers as a weather report for the whole body, not one room. In a national US survey, people with CRP above 3.8 mg/L had higher blood pressure, blood fats and diabetes rates, and lower diet quality and activity (Liu 2020). Higher ESR has been linked with higher BMI, low activity, smoking and heavy alcohol use. Fat stored deep around organs is described as more inflammatory than fat under the skin.

WHAT A STUDY FOUND

Thirteen healthy young men slept 4 hours a night for 5 nights, compared with 6 controls. CRP rose about 50% and IL-6 about 2-fold. After two recovery nights, CRP had doubled and IL-6 had not fallen. Limit: very small, young men, short run.

Van Leeuwen et al., PLoS One, 2009

Exercise has two sides. One hard session raises IL-6 and CRP for about an hour, so a draw straight after a workout can mislead. In inactive people, regular activity is linked with lower inflammation, partly through signals muscle releases. A clinician's review found no clear evidence that more helps people already active.

Link	Markers involved	How firm is it
Short sleep	CRP, IL-6	One small trial; reviews call it a two-way link
Excess body fat	CRP, ESR	Association in large surveys
Inactivity	CRP, ESR	Association; exercise trials are small
Smoking	CRP, ESR, IL-6, white cells	Association
Gum disease	CRP	Treatment lowered unexplained high CRP in some

WHAT A STUDY FOUND

An umbrella review [a review of reviews] pooled 14 meta-analyses and 9.89 million people. In 32 of 45 pooled analyses, more ultra-processed food went with higher risk of an adverse outcome. None were rated high quality. It did not measure inflammation markers. Limit: observational.

Lane et al., BMJ, 2024

CHAPTER 7

Popular claims the evidence does not support

THE ONE THING TO REMEMBER

Many online inflammation claims outrun the evidence; the fair answer is often "unproven", not "false".

Some of these claims hold a grain of truth. We separate what studies show from what is marketing. Where a view comes from one clinician's review of the evidence, we say so.

COMMON BELIEF

"Superfoods lower inflammation."

WHAT THE EVIDENCE SAYS

One clinician's review found no clear experimental evidence that large amounts of any single food reduce it. Fiber and plant compounds from whole foods are fine; the claim about one miracle food is the weak part.

COMMON BELIEF

"A food sensitivity blood test shows what inflames me."

WHAT THE EVIDENCE SAYS

The same review says over-the-counter IgG food sensitivity tests have no evidence of validity. True food allergy is a different test (IgE) and needs an allergist.

COMMON BELIEF

"Gluten inflames everyone."

WHAT THE EVIDENCE SAYS

Harm is clear in celiac disease. In other people, human trials showing gluten raises inflammation are lacking. A few small studies show more gut leakiness. Evidence is conflicting.

WHAT A STUDY FOUND

About 10,000 heart-attack survivors with hs-CRP above 2 mg/L got a drug that blocks one inflammation signal, interleukin-1 beta. Major cardiac events fell about 15% at the two higher doses over under 4 years, but infections, including sepsis, rose. Limit: a drug trial in survivors, not a result about foods.

CANTOS trial investigators

COMMON BELIEF

"Lower is always better for every inflammation marker."

WHAT THE EVIDENCE SAYS

People over 100 can carry higher IL-6 and IL-8 without the usual chronic diseases, and blocking one pathway raised infections in the trial above. Inflammation is a balance.

CHAPTER 8

Your tracking page and questions

THE ONE THING TO REMEMBER

Your own numbers, measured the same way over time, tell you more than any range on a page.

Ranges differ by lab and by group, and healthy people vary. That is why a trend in your own results, from the same lab and similar conditions, is more useful than one number against a table. Note what else was going on each time. Then bring the page to a clinician.

WHAT A STUDY FOUND

In 413 healthy adults aged 21 to 66, average NLR was 1.65, but individuals ranged from 0.78 to 3.53. Limit: one population and one lab method, so your own range may differ.

Forget et al., 2017

MY RESULTS (VALUE AND DATE)

hs-CRP (mg/L) _____

ESR (mm/hr) _____

Ferritin (ng/mL) _____

White cell count (k/cumm) _____

Neutrophils and lymphocytes _____

NLR (neutrophils divided by lymphocytes) _____

Fibrinogen (mg/dL) _____

Homocysteine (umol/L) _____

WHAT ELSE WAS GOING ON

Illness or injury in the past two weeks

Hard exercise in the past day

Sleep the week before

Lab name and reference range used

ASK YOUR CLINICIAN

- Was my hs-CRP drawn when I was well, and should we repeat it in a few weeks?
- Could a recent illness, workout or poor sleep have moved any of my markers?
- Could inflammation be raising my ferritin, and should transferrin saturation be checked?
- Do my white cell and NLR numbers fit the rest of my report?
- Does the lab range on my report match the lab used for my earlier tests?

THE WHOLE GUIDE ON ONE PAGE

If you remember nothing else

1. Acute inflammation heals you. Chronic low-grade inflammation is usually silent, so people use blood markers.
2. hs-CRP reads low levels; one result is a snapshot, so repeat two weeks apart.
3. White cells and the neutrophil-to-lymphocyte ratio add detail, but they move with infection, stress and exercise.
4. Ferritin mainly shows iron storage and rises with inflammation. ESR is slow and vague. Read them together.
5. Fibrinogen, homocysteine and IL-6 add clues. None stands alone, and IL-6 is not a routine test.
6. Sleep, body fat, activity and gum health are linked with these markers. Links are not proof of cause.
7. Superfoods, food sensitivity tests and "lower is always better" claims outrun the evidence.
8. Track your own results from the same lab, note the context, and bring questions to a clinician.

WHAT THIS GUIDE CANNOT DO

This guide cannot tell you why your own markers are high or low, whether you have inflammation that needs care, or what any single result means for you. These markers are non-specific: they cannot show where inflammation is or what is causing it. Ranges differ by lab and by group, and most findings here are links, not proof. Only a clinician who knows your history can interpret your results.

A FREE NEXT STEP

Read the short free page on our site about the blood markers that track inflammation and recovery. When you have your own results, use the tracking page in this guide to record them over time.

vitalsvault.com/lab-check

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This guide is educational. It is not medical advice and not a diagnosis, and it does not replace a clinician who knows your history. Study findings describe groups of people and may not apply to you.