FREE GUIDE · BLOOD TESTING

The 5 blood markers your GP doesn't usually test

What your standard blood results aren't telling you, and what to do about it.

CHARMAINE SHEPHERD

Charmaine Shepherd
IFM Certified Functional Medicine Practitioner,
acupuncturist and biomedical scientist
4 Albyn Place, Edinburgh · and online

A NOTE FROM CHARMAINE

You've done everything right

You went to your GP. You asked for blood tests. You waited for the results, and the answer came back: normal.

And yet you still feel exhausted. Your mind is foggy. You wake up tired however long you sleep. Your weight won't shift. Your hormones feel off. Something isn't right, and you know it. **You are not imagining it.**

The gap between "normal" and optimal

NHS blood panels are designed to detect disease, such as anaemia, diabetes or an underactive thyroid at a level that can be diagnosed. They aren't designed to pick up the early stages of dysfunction, or the subtle imbalances behind the symptoms you live with.

Reference ranges describe where most of the population sits. But population average isn't the same as optimal health. Many people whose results are technically "in range" have real, measurable problems.

What functional medicine looks for

I use narrower target ranges, based on research into where markers sit when people feel and function well. I also test markers the standard panel doesn't include. In this guide I share five of the most commonly missed: what each one is, why the standard test can miss the full picture, what optimal looks like, and what you can do.

> *The goal is not to find out what disease you have. It's to understand why your body isn't functioning the way it should, and what we can do about it.*

The five markers at a glance

Marker	Typical NHS approach	Functional target I use
Ferritin	Labs often report from 13 to 15 µg/L; below 30 µg/L indicates deficiency[1]	50 to 80 µg/L
Vitamin D (25-OH)	Below 25 nmol/L is deficient[2]	100 to 150 nmol/L
Thyroid: TSH, free T4, free T3	TSH first; free T4 if TSH is abnormal[3]	TSH 0.5 to 2.0 mIU/L, with free T4 and free T3
hs-CRP	Standard CRP "normal" below 5 mg/L	Below 1.0 mg/L
Fasting insulin, HOMA-IR	Not routinely tested	Insulin 3 to 8 mIU/L; HOMA-IR below 1.5

Ranges vary between laboratories: always read your result against the range on your own report. — Charmaine

1. Newcastle upon Tyne Hospitals, adult haematology guidelines for GPs: https://www.newcastle-hospitals.nhs.uk/wp-content/uploads/2021/02/GP-Adult-haematology-guidelines-v11.pdf
2. NHS: Vitamin D: https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/
3. NICE NG145: Thyroid disease, assessment and management: https://www.nice.org.uk/guidance/ng145

MARKER 01

Ferritin

The iron storage marker behind so much exhaustion

Ferritin is the protein your body uses to store iron. Serum iron shows what's circulating at a given moment; ferritin shows how full your reserves are. Think of it as the fuel tank, not the fuel line.

Iron is essential for haemoglobin, which carries oxygen to every cell. It's also needed for thyroid hormone conversion, energy production in your cells, and making dopamine and serotonin, which regulate mood, motivation and focus.

Why it's often missed

Lab ranges often start at around 13 to 15 µg/L for women, so a result of 20 can be reported as normal. In practice, many people with ferritin below 50 µg/L have significant fatigue, hair thinning, poor concentration and low mood. Ferritin isn't always included in a routine panel unless anaemia is suspected, so stores can run low for years. It also rises with inflammation, so read it alongside CRP.

TYPICAL NHS APPROACH

Below 30 µg/L

indicates deficiency; lab ranges often start at 13 to 15 µg/L[1]

FUNCTIONAL TARGET I USE

50 to 80 µg/L

where symptoms often ease and energy returns

Common signs of imbalance

- Persistent fatigue, especially in the afternoon
- Hair thinning or increased shedding
- Brain fog and difficulty concentrating
- Restless legs at night
- Low mood or poor motivation
- Breathlessness on mild exertion
- Brittle or spoon-shaped nails

What to do if yours is low

- ✓ **Eat haem iron** from red meat, liver and seafood, which is absorbed far better than iron from plants.
- ✓ **Pair iron with vitamin C** to boost absorption from plant foods.
- ✓ **Separate iron blockers:** keep tea, coffee, calcium supplements and antacids at least an hour away from iron-rich meals.
- ✓ **Supplement only after testing,** ideally with a gentle form such as ferrous bisglycinate. Too much iron is harmful.
- ✓ **Find the cause:** heavy periods, poor absorption (often a gut issue, including coeliac disease) or increased demand. New iron deficiency in men or after menopause needs GP investigation.

1. Newcastle upon Tyne Hospitals, adult haematology guidelines for GPs: https://www.newcastle-hospitals.nhs.uk/wp-content/uploads/2021/02/GP-Adult-haematology-guidelines-v11.pdf

MARKER 02

Vitamin D (25-OH)

The hormone-like nutrient behind immunity, mood and hormone balance

Vitamin D behaves more like a hormone than a vitamin. It binds to receptors in almost every tissue, including the brain, immune system, gut, thyroid, ovaries and heart, and helps regulate immunity, mood, calcium balance, muscle function and sex hormone production.

Low vitamin D is very common in the UK. Limited sunshine, indoor lifestyles and darker skin, which needs more sun to make vitamin D, mean many adults are low without knowing it.

Why it's often missed

The NHS treats levels below 25 nmol/L as deficient, with 25 to 50 nmol/L possibly inadequate for some people.[2] Research in integrative medicine suggests many people do better higher than this, particularly for immunity, mood and hormone health. So a result of 52 nmol/L may be reported as adequate when it's on the low side for good function.

TYPICAL NHS APPROACH

Below 25 nmol/L

deficient; 25 to 50 nmol/L may be inadequate

FUNCTIONAL TARGET I USE

100 to 150 nmol/L

reached with a dose based on testing

Common signs of imbalance

- Frequent infections or slow recovery
- Low mood or winter blues
- Bone aches, joint pain or muscle weakness
- Fatigue and low energy
- Poor sleep quality
- Autoimmune or inflammatory flares
- Brain fog

What to do if yours is low

- ✓ **Sunlight:** short, regular midday sun on bare arms and legs from late March to September, without burning. From October to early March, UK sunlight isn't strong enough to make vitamin D.[2]
- ✓ **Supplement:** the NHS advises everyone to take 10 micrograms (400 IU) a day in autumn and winter. Higher doses should be based on a test result; adults shouldn't take more than 100 micrograms (4,000 IU) a day unless advised by a clinician.[4]
- ✓ **Choose D3** (cholecalciferol), the form most people absorb best.
- ✓ **Consider vitamin K2** at higher doses, which helps direct calcium to the bones.
- ✓ **Eat oily fish and eggs,** though food alone rarely corrects a low level.
- ✓ **Retest after about three months** and adjust the dose.

2. NHS: Vitamin D: https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/

4. NHS inform: Vitamin D: https://www.nhsinform.scot/healthy-living/food-and-nutrition/eating-well/vitamin-d/

MARKER 03

Thyroid: TSH, free T4 and free T3

Why TSH alone can miss the full picture

Your thyroid sets your metabolic rate, temperature, heart rate, mood, thinking, gut movement and reproductive function. It mainly makes T4, a storage form converted into the much more active T3 in the liver, gut and other tissues. TSH is the pituitary gland's signal asking the thyroid to work harder: it rises when output is low.

Why it's often missed

NHS testing usually starts with TSH, and adds free T4 if TSH is abnormal.[3] That's a sensible screen, but it doesn't show how well you convert T4 into T3. Some people have a normal TSH but low free T3, with classic symptoms, and are told their thyroid is fine. Thyroid antibodies (TPO and TgAb), which identify Hashimoto's thyroiditis, aren't routinely tested either, so autoimmune thyroid disease can go unrecognised for years.[5]

TYPICAL NHS APPROACH

TSH	0.4 to 4.5 mIU/L
Free T4	12 to 22 pmol/L
Free T3	3.1 to 6.8 pmol/L

Ranges vary between laboratories

FUNCTIONAL TARGET I USE

TSH	0.5 to 2.0 mIU/L
Free T4	15 to 22 pmol/L
Free T3	4.5 to 6.5 pmol/L

Plus TPO and TgAb antibodies

Common signs of imbalance

- Persistent fatigue however much you sleep
- Feeling cold, especially hands and feet
- Weight gain or difficulty losing weight
- Brain fog, slow thinking and poor memory
- Hair thinning, including the outer eyebrows
- Constipation or slow digestion
- Low mood
- Dry skin and brittle nails

What to do if your results are suboptimal

- ✓ **Ask for the full panel:** TSH, free T4, free T3 and thyroid antibodies. You may need a private test to get all of these.
- ✓ **Support T4 to T3 conversion** with selenium (Brazil nuts are a good source), zinc and adequate iron. Don't take iodine supplements without testing, particularly with Hashimoto's.
- ✓ **Look after your gut:** some T4 to T3 conversion happens in the gut, and gut inflammation can affect thyroid health.
- ✓ **If Hashimoto's is present,** some people's antibodies fall when they remove gluten, ideally after coeliac testing and with guidance.

3. NICE NG145: Thyroid disease, assessment and management: https://www.nice.org.uk/guidance/ng145
5. British Thyroid Foundation: Thyroid function tests: https://www.btf-thyroid.org/thyroid-function-tests

MARKER 04

hs-CRP

High-sensitivity C-reactive protein: your inflammation thermometer

C-reactive protein (CRP) is made by the liver in response to inflammation. The high-sensitivity test detects much lower levels: the kind of inflammation that smoulders quietly for years, gradually affecting tissues and hormones and raising the risk of heart disease, type 2 diabetes, dementia and autoimmune conditions.

Chronic, low-grade inflammation is a common driver of fatigue, joint pain, brain fog and low mood: symptoms often put down to age or stress.

Why it's often missed

Standard CRP isn't sensitive enough to pick up low-grade inflammation, and is usually ordered only when infection is suspected. For heart risk, the American Heart Association uses hs-CRP bands: below 1 mg/L low risk, 1 to 3 mg/L average and above 3 mg/L high.[6] I use the low-risk band as the preventive target. A single high result can reflect a recent infection, so it's worth repeating.

TYPICAL NHS APPROACH

Below 5 mg/L

"normal" on a standard CRP test

FUNCTIONAL TARGET I USE

Below 1.0 mg/L

low cardiovascular and metabolic risk

Common signs of imbalance

- Generalised fatigue and low energy
- Joint pain, stiffness or aches
- Brain fog and poor concentration
- Gut issues, bloating or pain
- Frequent illness or slow recovery
- Skin conditions such as eczema or psoriasis
- Mood instability or low-grade depression
- Gum disease

What to do if yours is raised

- ✓ **Eat Mediterranean-style:** oily fish, olive oil, vegetables, pulses and colourful, polyphenol-rich foods, with less ultra-processed food and sugar.
- ✓ **Consider omega-3:** fish oil (often 2 to 3 g EPA and DHA daily) has good evidence for lowering hs-CRP. Check first if you take blood thinners.
- ✓ **Support the gut lining:** gut permeability can drive body-wide inflammation.
- ✓ **Protect sleep and manage stress:** both directly affect inflammatory markers.
- ✓ **Find hidden drivers:** gum disease, hidden infections, food reactions, environmental exposures and excess abdominal fat.

6. American Heart Association, Circulation: C-reactive protein and heart risk: https://www.ahajournals.org/doi/10.1161/01.cir.0000093381.57779.67

MARKER 05

Fasting insulin & HOMA-IR

Catching insulin resistance before it becomes diabetes

Insulin moves glucose into your cells to be used as fuel. When cells become resistant to insulin's signal, the pancreas makes more and more to compensate. Blood glucose can look normal while insulin creeps up, sometimes for ten years or more before diabetes is diagnosed.

Raised fasting insulin is linked with tiredness after meals, sugar cravings, weight gain around the middle, hormone disruption including PCOS, raised triglycerides, brain fog and higher heart risk.

Why it's often missed

NHS screening uses fasting glucose and HbA1c, which become abnormal later in the process. Fasting insulin is rarely tested, although it's a much earlier signal. HOMA-IR is a simple calculation from fasting insulin and fasting glucose that estimates insulin resistance.

TYPICAL NHS APPROACH

Not routinely tested

glucose and HbA1c used instead

FUNCTIONAL TARGET I USE

Insulin 3 to 8 mIU/L

HOMA-IR below 1.5

Common signs of imbalance

- Energy crashes and sugar cravings after meals
- Weight gain, especially around the abdomen
- Tiredness after carbohydrate-heavy meals
- Afternoon brain fog
- Irregular periods or PCOS
- Raised triglycerides or low HDL
- Darkened skin at neck or armpits
- Skin tags

What to do if yours is raised

- ✓ **Cut back refined carbohydrates** and added sugar; build meals around whole foods, fibre and protein.
- ✓ **Start the day with protein** to steady blood sugar for the rest of the day.
- ✓ **Strength train** two or three times a week: muscle is one of the most powerful levers for insulin sensitivity.
- ✓ **Consider a shorter eating window** of 8 to 10 hours, if it suits you.
- ✓ **Targeted supplements** such as magnesium, chromium, inositol (especially in PCOS) and berberine have evidence. Berberine interacts with several medicines, so take advice.
- ✓ **Address stress:** cortisol raises blood glucose and promotes insulin resistance.

YOUR NEXT STEP

What these markers mean for you

Reading this guide is the first step. The next is knowing what your own markers look like, and what they mean for you.

In my consultations I run an advanced blood panel that includes all five of these markers, and more, read against functional target ranges rather than population averages, and in the context of your symptoms, history, lifestyle and goals.

My results tracker

Marker	Date	Result	Lab range	Functional target	Date	Result
Ferritin				50—80 µg/L		
Vitamin D				100—150 nmol/L		
TSH				0.5—2.0 mIU/L		
Free T4				15—22 pmol/L		
Free T3				4.5—6.5 pmol/L		
hs-CRP				below 1.0 mg/L		
Fasting insulin				3—8 mIU/L		
HOMA-IR				below 1.5		

Upcoming online workshops

An accessible, evidence-led way to explore these topics, and a natural first step before a consultation: **The Menopause Journey**, **Brain Health**, **The Nervous System** and **Breathwork**. See dates at charmaine-shepherd.com/events.

Want to know what your markers really mean?

I offer advanced functional blood analysis as part of my 1:1 consultations. Start with a free 20-minute discovery call, by phone or video.

Book your free call: charmaine-shepherd.com/book · 0131 235 1232

> *You deserve to feel well, not just "in range". With warmth, Charmaine*

BEFORE YOUR APPOINTMENT

Questions to take to your GP

- [ ] Could my ferritin be checked, with transferrin saturation and CRP?
- [ ] What is my vitamin D level, and what dose do you suggest?
- [ ] Could free T4, free T3 and thyroid antibodies be added to my TSH?
- [ ] Has my HbA1c or fasting glucose changed over the last few years?
- [ ] Could I have copies of my results, including the reference ranges?

About Charmaine

Charmaine Shepherd is an IFM Certified Functional Medicine Practitioner, acupuncturist and biomedical scientist with over 20 years of clinical experience and more than 3,000 patients seen. She works at 4 Albyn Place, Edinburgh, and online by video.

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Important: this guide is for general education and isn't medical advice, diagnosis or treatment. Target ranges described here reflect a functional medicine approach and published research; they don't replace an individual assessment. Please speak to your GP or a qualified practitioner before starting supplements or changing any treatment, and seek medical advice promptly about new or worrying symptoms. © 2026 Edinburgh Health Limited.