VITALS VAULT

A VITALS VAULT FIELD GUIDE

Always tired? Walk into your appointment ready

For adults tired all the time: the blood-test clues clinicians check, what each shows, and a page to fill in.

8

CHAPTERS

20 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 feel tired most days and do not know which blood tests to ask about.
- You were told your labs are 'normal' but you still feel off.
- You want to walk into an appointment with a filled-in page, not a blank mind.
- You want to know what each test can show, and what it cannot.

HOW TO USE IT

Read one chapter at a time. Each opens with the one thing to remember. Tick, write and ask in the boxes as you go. Keep the sleep and energy log for seven days, then copy your numbers onto the last page and take it to your appointment. Nothing here is a diagnosis or a reason to start or stop anything.

WHAT IS INSIDE

01 Tired is a symptom, not a diagnosis

02 Iron and ferritin: low iron with a normal blood count

03 B12, folate, vitamin D and other blamed nutrients

04 Thyroid: TSH, what it misses, and why it can mislead

05 Blood sugar and insulin: what the tests do and do not show

06 Sleep: apnea signs, short sleep, and your markers

07 Inflammation and recent illness: CRP, ESR and ferritin

08 Take it with you: the one-page appointment sheet

CHAPTER 1

Tired is a symptom, not a diagnosis

THE ONE THING TO REMEMBER

Tiredness has many causes, and a blood test can only check some of them.

Tired is like a smoke alarm [a warning, not a diagnosis]. It tells you something is off, not what. Reviews of thyroid and iron problems both note that their symptoms overlap with anemia [too few healthy red blood cells], depression, chronic fatigue and other conditions. So the symptom alone cannot name the cause, and a blood test can only check some of the possible ones.

Some situations need a clinician the same day, not a lab order. This list is general safety advice, not a finding from the studies in this guide. If tiredness comes with any item below, seek urgent care first.

SEEK URGENT CARE FIRST IF TIRED PLUS

- [ ] Chest pain, fainting, or severe shortness of breath
- [ ] Black, tarry, or bloody stools
- [ ] Sudden weakness, numbness, or trouble speaking
- [ ] Thoughts of harming yourself
- [ ] Confusion, high fever, or a stiff neck

Possible cause	Overlap with tiredness	Chapter
Iron shortage	Fatigue, poor focus, weak exercise tolerance	2
B12 or folate shortage	Fatigue, low mood, memory trouble	3
Low magnesium	Fatigue, weakness, loss of appetite	3
Underactive thyroid	Fatigue, feeling cold, hair loss, low mood	4
Poor sleep or sleep apnea	Fatigue, daytime sleepiness, low mood	6

COMMON BELIEF

“Adrenal fatigue explains why I am always tired.”

WHAT THE EVIDENCE SAYS

The article that describes it says it is not adrenal insufficiency, a rare disease where the glands fail to make cortisol and which can be serious. Major endocrine societies do not recognize adrenal fatigue as a diagnosis. Its stages come from integrative sources, not diagnostic criteria.

WHAT A STUDY FOUND

In 160 young adults, early 'adrenal fatigue' questionnaire scores went with higher cortisol, and more moderate or vigorous activity went with lower scores. It was one questionnaire at one point in time, so it shows an association, not a cause or a diagnosis.

Alghadir and Gabr, cross-sectional study, 2015

ASK YOUR CLINICIAN

- Which of my symptoms could come from more than one cause?
- Which causes worry you most, and which can a blood test check?
- What would make my tiredness urgent rather than routine?

CHAPTER 2

Iron and ferritin: low iron with a normal blood count

THE ONE THING TO REMEMBER

Your iron stores can run low long before hemoglobin drops, so a normal blood count does not clear iron.

Ferritin [your stored iron] works like a savings account. Hemoglobin [the protein that carries oxygen] is the cash in your pocket, and it drops only after the savings are gone. In textbook staging, ferritin falls below 30 ng/mL first, while serum iron and hemoglobin still look normal. Low ferritin can bring fatigue, weakness, hair loss and depression even with a normal blood count (Al-Jafar 2017).

Result	What it can show	Catch
Ferritin	Low stores; under 30 ng/mL is a common cutoff	Rises with infection or inflammation, so can look normal
Transferrin saturation [iron carriers' fullness]	Under 20% fits iron shortage; normal is about 30%	Needed beside ferritin when inflammation is possible
Hemoglobin	Low means anemia	A late sign; can stay normal despite low iron
MCV [cell size] and RDW [size spread]	Small cells (MCV under 80 fL), wider size spread	Can stay in range early; mixed shortages can average out

98%

Ferritin below 41 ng/mL caught about 98% of iron-deficiency anemia cases and cleared about 98% of people without it, when no infection or inflammation was present (Asif 2016).

COMMON BELIEF

"Normal hemoglobin means my iron is fine."

WHAT THE EVIDENCE SAYS

Hemoglobin is a late, non-specific marker and can be normal despite an iron shortage. Low ferritin is the most reliable first marker. But inflammation can push ferritin up, so clinicians also look at transferrin saturation.

WHAT A STUDY FOUND

A review found iron shortage without anemia is even more common than anemia, which affects about 20% of the world. Hemoglobin is normal, ferritin is low. Linked symptoms include fatigue, poor exercise tolerance, poor concentration, irritability and restless legs. The review calls the evidence for symptom benefit from correcting it mixed.

Balendran and Forsyth, Australian Prescriber, 2021

Ferritin has a catch: it also rises with infection and inflammation. With inflammation, the review's cutoff becomes under 100 ug/L with transferrin saturation under 20%. Iron runs low from low intake, pregnancy, poor absorption (such as celiac disease) or blood loss (heavy periods, blood donation, the gut). Blood loss can signal serious disease, so the cause always needs a clinician's look.

ASK YOUR CLINICIAN

- **Can you check ferritin and transferrin saturation, not only hemoglobin?**
- **If my ferritin is low, what do you think is the cause?**
- **Inflammation can raise ferritin. Should we read it beside CRP?**
- **Do I need to be checked for blood loss or poor absorption?**

CHAPTER 3

B12, folate, vitamin D and other blamed nutrients

THE ONE THING TO REMEMBER

A normal B12 can still hide a shortage, and the sources here do not show that low vitamin D causes everyday tiredness.

B12 and folate [a B vitamin] both help build red blood cells and nerves, and each needs the other. B12 is the tricky one. Most people with a B12 shortage do not have anemia, and nerve harm can happen without the usual blood changes. Folic acid [the man-made form of folate] can fix anemia while B12 nerve damage continues (Reynolds 2016).

45%

Serum B12 alone may miss up to 45% of people who are deficient, so researchers advise combining two to four markers (Fedosov 2015).

Marker	What it shows	Limit
Serum B12	Total B12 in the blood	Can look normal while cells are short
Active B12 (holotranscobalamin)	B12 the body can use	Low value can reveal a shortage total B12 misses
MMA [a B12 shortage marker]	Rises when cells lack B12	Also rises when kidneys clear poorly
Homocysteine [another B12-linked marker]	Rises with B12 shortage	Also moved by folate, B6, smoking, alcohol
Serum folate	Recent folate intake	Can look high while cells are short, if B12 is low

WHAT A STUDY FOUND

People with serum folate below 7 ng/mL had lower albumin, prealbumin, hemoglobin and B12 than people near 15 ng/mL, even with a BMI above 25. So poor nutrition can sit alongside a larger body. This is an association, and 15 ng/mL is stricter than the usual lower limit of 5.5.

Kozman et al., 2020

Magnesium and other nutrients get blamed too. A review of nutrients needed to make energy lists fatigue among the signs of outright shortage of iron, several B vitamins, vitamin C and magnesium, and says marginal shortage may also cause problems (Tardy 2020). But those lists come from deficient states, not everyday tiredness. Only 1 to 2% of magnesium sits outside cells, so a blood level can look normal while cells run short.

COMMON BELIEF

"My low vitamin D must be why I am tired."

WHAT THE EVIDENCE SAYS

None of the sources here link vitamin D to everyday tiredness. They say that apart from bone health, no studies have set optimal levels, a causal role for low vitamin D has not been shown, and supplement trials have not shown consistent benefit. 'Deficient' also differs by group: about 12, 20 or 30 ng/mL.

ASK YOUR CLINICIAN

- Do any medicines I take lower B12, folate or magnesium?
- Can you add a second B12 marker, such as MMA or active B12?
- If my vitamin D is low, how much does that explain my symptoms?

CHAPTER 4

Thyroid: TSH, what it misses, and why it can mislead

THE ONE THING TO REMEMBER

TSH is the usual first thyroid test, but illness, medicines, age and lab differences can all move it.

TSH [the thyroid's instruction signal] works like a thermostat. When thyroid hormone runs low, the pituitary [a gland at the brain's base] raises TSH. So high TSH with low free T4 [usable thyroid hormone] points to the thyroid itself. Underactive-thyroid symptoms include fatigue, feeling cold, dry skin, hair loss, constipation, low mood and memory trouble. Those symptoms are too broad to diagnose by themselves.

Test	What it shows	Limit
TSH	The usual first thyroid screen	Moves with illness, age, medicines, pregnancy, lab method
Free T4	Usable thyroid hormone in blood	Shifts with fasting and non-thyroid illness; ranges differ
TPO antibodies	Immune attack on the thyroid	Can be absent in disease, or present without it

WHAT A STUDY FOUND

In a 20-year follow-up of 2,779 adults, doubling TSH from 2.5 to 5 mIU/L raised the chance of later underactive thyroid from 1% to 4%, and more if thyroid antibodies were present. It shows risk over years, not that a given TSH explains your symptoms today.

Vanderpump et al., Whickham survey, 1995

TSH is not a fixed ruler. It shifts with acute or chronic illness, age, sex, body weight, iodine intake and the lab's method. Steroids and blood thinners can lower it, and some mood-stabilizing and anti-thyroid medicines can raise it. Each person may also have a personal set-point, so trends over time say more than one value.

What counts as normal is debated. Labs often print about 0.4 to 4.5 mIU/L, and most guidelines treat that as normal. A lab-medicine group (the NACB) recommends 2.5 as the upper limit even without disease, and some clinicians prefer 1 to 2. In 9,020 people, deaths were lowest at TSH 1.2 to 1.95 and higher on both sides (Inoue 2019). That is an association, not a cutoff for you.

WHAT A STUDY FOUND

In 602 adults aged 68 to 97 with normal thyroid tests, lower-normal free T4 (0.76 to 0.90 ng/dL) went with better energy, mobility and fitness than upper-normal (1.08 to 1.50). T3 was not measured, and the group was older, so it may not fit younger adults.

Simonsick et al., 2016

ASK YOUR CLINICIAN

- Can you check free T4 and TPO antibodies, not only TSH?
- Could a recent illness or my medicines have moved my TSH?
- Low iron is common with thyroid autoimmunity. Should we check mine?

CHAPTER 5

Blood sugar and insulin: what the tests do and do not show

THE ONE THING TO REMEMBER

These tests show how your body handles sugar, and a normal A1C can still hide spikes.

Insulin [the hormone that moves sugar] keeps blood sugar [glucose] in check. When cells respond poorly, glucose stays high until insulin climbs to make up for it. High fasting insulin can appear years before blood sugar rises, so it can flag trouble early. Think of the three tests below as fuel gauges that each read a different tank.

Be clear on what this chapter does. The sources used for this guide do not tie these markers to everyday tiredness. They help show whether blood sugar control is part of your picture, and A1C can be thrown off by the blood count results in earlier chapters.

Test	What it shows	Limit
Fasting glucose	Blood sugar after a fast	One reading; repeat to confirm a trend
A1C	Average sugar over 100 to 120 days	Misses post-meal spikes; anemia can skew it
Fasting insulin	Early sign of insulin resistance	Lab methods vary; liver clears nearly half

WHAT A STUDY FOUND

In 87,284 Koreans without anemia or diabetes, lower hemoglobin went with a higher A1C, even when fasting glucose was not in the diabetic range. A1C can also read falsely high in iron, B12 or folate shortage and falsely low with blood loss. So the blood count matters when reading an A1C.

Bae et al., 87,284 Koreans, 2014

COMMON BELIEF

"A normal A1C means my blood sugar is fine."

WHAT THE EVIDENCE SAYS

A1C averages 100 to 120 days, so it can hide post-meal spikes (Bonora 2006). In apparently healthy people the 5.7% cutoff missed abnormal sugar handling in half of those flagged by glucose tolerance tests; researchers proposed 5.3% (Adamska 2012). That is one cohort's view.

ASK YOUR CLINICIAN

- **Can you check fasting glucose, A1C and fasting insulin together?**
- **Could anemia or recent blood loss change my A1C result?**
- **If my A1C looks unreliable, is there a back-up test?**

CHAPTER 6

Sleep: apnea signs, short sleep, and your markers

THE ONE THING TO REMEMBER

No blood test diagnoses a sleep problem, but poor sleep is linked to markers clinicians check, so describe your sleep too.

Think of sleep as a phone battery that recharges overnight. Insomnia is a clinical diagnosis, so no blood test shows it. It means a sleep problem lasting at least 3 months that distresses or impairs you; one bad week does not count. Adults are advised 7 to 9 hours of actual sleep, falling asleep within 30 minutes, and few night wakings.

SIGNS OF A SLEEP BREATHING PROBLEM

- [ ] Snoring most nights
- [ ] Loud snoring heard through a wall
- [ ] A partner sees pauses or gasping in your sleep
- [ ] Falling asleep by day while busy or driving
- [ ] High blood pressure
- [ ] Large collar size

Say so if you tick any of these. Witnessed breathing pauses carry the most weight in one six-question screening tool. It is a screen, not a diagnosis. A sleep study is the test that confirms a breathing problem, and clinicians screen for it before treating insomnia.

WHAT A STUDY FOUND

Reviews of sleep and immunity report that sleep deprivation raises inflammation messengers (cytokines) and suppresses regulatory immune cells, and that prolonged sleep deficiency may lead to chronic low-grade inflammation. Many are narrative reviews of associations, so they do not prove poor sleep alone causes disease.

Garbarino et al., Communications Biology, 2021; Besedovsky et al., Physiological Reviews, 2019

COMMON BELIEF

"Poor sleep only makes me groggy."

WHAT THE EVIDENCE SAYS

Sleep handouts link poor sleep with higher blood pressure, more insulin resistance, more inflammation and more upper respiratory infections. These are associations from observational research, not proof that sleep alone causes them.

WHAT A STUDY FOUND

In lab experiments reported second-hand, healthy people slept 4 hours a night for two weeks. Their muscles took up about 50% less glucose on a clamp test, and after a week they looked pre-diabetic. Short sleep also lowered leptin and raised ghrelin [hunger hormones]. The studies are not named in the source, so treat this as a lead.

Sleep-restriction experiments in healthy adults, reported in a 2019 interview

MY SLEEP LOG, ONE LINE EACH MORNING

Bedtime and time I fell asleep _____

Times I woke up and minutes awake _____

Wake time and any nap _____

Caffeine and alcohol, and when _____

How rested I feel, 1 to 10 _____

CHAPTER 7

Inflammation and recent illness: CRP, ESR and ferritin

THE ONE THING TO REMEMBER

CRP, ESR and ferritin all rise with infection, so a recent illness can make results look worse than your usual.

Inflammation markers work like a check-engine light: they show something is running hot, not what. CRP [a liver inflammation protein] can climb up to 50,000-fold above baseline in acute inflammation (Bardagjy 2019). It rises and falls faster than ESR [how fast red cells settle], which moves 24 to 48 hours after an insult. After an acute illness, ferritin peaks in 3 to 5 days and should be temporary.

Marker	What it shows	Catch
CRP	Fast signal of inflammation	Non-specific; standard CRP misses low levels
hs-CRP	Low-grade inflammation	Heart-risk use asks for two readings two weeks apart
ESR	Slow inflammation signal	Skewed by red cell and protein changes; pair with CRP
Ferritin	Iron stores, and inflammation	Can be high with inflammation even if iron is low

WHAT A STUDY FOUND

In 14,719 healthy women, median CRP rose with the number of metabolic syndrome features: 0.68 mg/L with none, 3.01 with three, 5.75 with all five. CRP above 3.0 plus three or more features carried higher cardiovascular risk over 8 years. Women only, and observational.

Ridker et al., 14,719 women, 2003

COMMON BELIEF

"My CRP is high, so something serious is wrong."

WHAT THE EVIDENCE SAYS

CRP is non-specific. Infection, injury, obesity, smoking, disrupted sleep, depression, gum disease, pregnancy and hormone therapy can all raise it. That is why heart-risk use asks for two readings at least two weeks apart.

Long-running inflammation can also change the iron picture. In anemia of chronic disease, ferritin goes up while transferrin and saturation are normal or low, and cells are normal or small. This is why iron results are read next to a CRP.

TELL YOUR CLINICIAN BEFORE A BLOOD DRAW

- [ ] A recent illness, infection, or injury
- [ ] New medicines, including pain relievers and statins
- [ ] Recent poor sleep or high stress
- [ ] Gum or dental problems

ASK YOUR CLINICIAN

- **Could a recent illness explain a high CRP or ferritin? Should we repeat?**
- **Do I need hs-CRP or standard CRP for my question?**
- **If my ferritin is high, can you check transferrin saturation too?**

CHAPTER 8

Take it with you: the one-page appointment sheet

THE ONE THING TO REMEMBER

One marker can miss what a pair catches, so bring your own numbers, symptoms and a short question list.

One result is a snapshot, like a single day's weather. Clinicians read several markers together, against your symptoms and history. Ferritin is not a stand-alone diagnosis, and the same goes for B12, TSH and CRP. Patterns and trends over time say the most.

WHAT A STUDY FOUND

In 9,645 US adults with B12 below 190 pg/mL, only 4.4% had a high MCV [red cell size], but 56.2% had a raised methylmalonic acid, a better B12 marker. A single common blood-count marker missed most of them. It is a survey, so it shows a pattern, not any one person's cause.

Wolffenbuttel et al., NHANES, 2020

BRING TO THE APPOINTMENT

- [ ] Your 7-day sleep and energy log
- [ ] Past results with dates, if you have them
- [ ] A list of medicines and supplements you take
- [ ] Any recent illness, blood loss, or heavy periods
- [ ] Family history of thyroid, anemia, or diabetes

MY ENERGY THIS WEEK

Day and time my energy is lowest

Day and time my energy is best

Naps and how long

Meals before the dips

Caffeine and alcohol

Mood, stress and anything new

MY NUMBERS, COPIED FROM RESULTS

Ferritin and transferrin saturation

Hemoglobin, MCV, RDW

B12 and folate

TSH and free T4

Fasting glucose, A1C, insulin

CRP or hs-CRP, and test dates

ASK YOUR CLINICIAN

- Which causes of tiredness worry you most in my case?
- Which of these tests should be repeated, and when?
- Which results are in range but near the edge of it?
- What would make you look for blood loss or poor absorption?
- What else besides blood tests could explain this?

THE WHOLE GUIDE ON ONE PAGE

If you remember nothing else

1. Tired is a symptom. Many causes overlap, so a result is a clue, not an answer.
2. Iron: ferritin falls before hemoglobin. Read it beside transferrin saturation and CRP.
3. B12: one normal result can miss a shortage. A second marker such as MMA can help.
4. Thyroid: TSH moves with illness, medicines and age. Ranges differ, so ask what yours means.
5. Blood sugar: glucose, A1C and insulin each miss something. Anemia can skew A1C.
6. Sleep: no blood test shows insomnia. Describe snoring, breathing pauses and your hours.
7. Inflammation: CRP, ESR and ferritin rise with illness. Say if you were recently sick.
8. Bring your 7-day log, past results, medicine list and your questions.

WHAT THIS GUIDE CANNOT DO

This guide cannot tell you why you are tired. It cannot diagnose anything or say whether any one number is a problem for you. Ranges differ by lab, and some ranges here are one group's view. It does not cover depression, long-term infection, or heart, lung, kidney and liver causes. It also cannot show how your own numbers move over time, which often matters most.

A FREE NEXT STEP

Read the short free page on our site about what a fuller panel looks at when your labs are 'normal' but you still feel off.

vitalsvault.com/lp/normal-labs-but-feel-off

REFERENCES

1. Balendran and Forsyth, Non-anaemic iron deficiency, Australian Prescriber, 2021
2. Al-Jafar, Low ferritin without anemia and symptoms, cited in a ferritin review, 2017
3. Asif et al., Ferritin cutoff for iron-deficiency anemia without inflammation, 2016
4. Warner and Kamran, Iron deficiency anemia, StatPearls, 2023
5. Reynolds, Folic acid and B12 neurological damage, 2016
6. Fedosov et al., Combined indicator of vitamin B12 status, 2015
7. Wolffenbuttel et al., B12, MCV and methylmalonic acid in NHANES, 2020
8. Kozman et al., Serum folate and nutritional markers, 2020
9. Tardy et al., Vitamins and minerals for energy, fatigue and cognition, Nutrients, 2020
10. Vanderpump et al., 20-year follow-up of the Whickham survey, thyroid, 1995
11. Inoue et al., TSH and all-cause mortality in NHANES, JAMA Network Open, 2019
12. Simonsick et al., Free T4 and energy, mobility and fitness in older adults, 2016
13. Jeena et al., TPO antibodies in hypothyroid patients, 2013
14. Bae et al., Hemoglobin and HbA1c in 87,284 Koreans, 2014
15. Bonora et al., HbA1c, glucose variability and post-meal spikes, 2006
16. Adamska et al., HbA1c cutoff and glucose tolerance testing, 2012
17. Garbarino et al., Sleep deprivation and immune-related disease, Communications Biology, 2021
18. Besedovsky et al., Sleep and immune system crosstalk, Physiological Reviews, 2019
19. Ridker et al., CRP and metabolic syndrome in 14,719 women, 2003
20. Bardagjy et al., CRP in acute inflammation, 2019
21. Lapic et al., ESR and CRP as paired inflammation markers, 2020
22. Alghadir and Gabr, Adrenal fatigue questionnaire and cortisol in 160 young adults, 2015
23. Munoz et al., Transferrin saturation when ferritin may be falsely high, 2009

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.