Lab Results

Report

John Doe

Report date: 08 November 2024

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Personal information

NAME

John Doe

SEX AT BIRTH

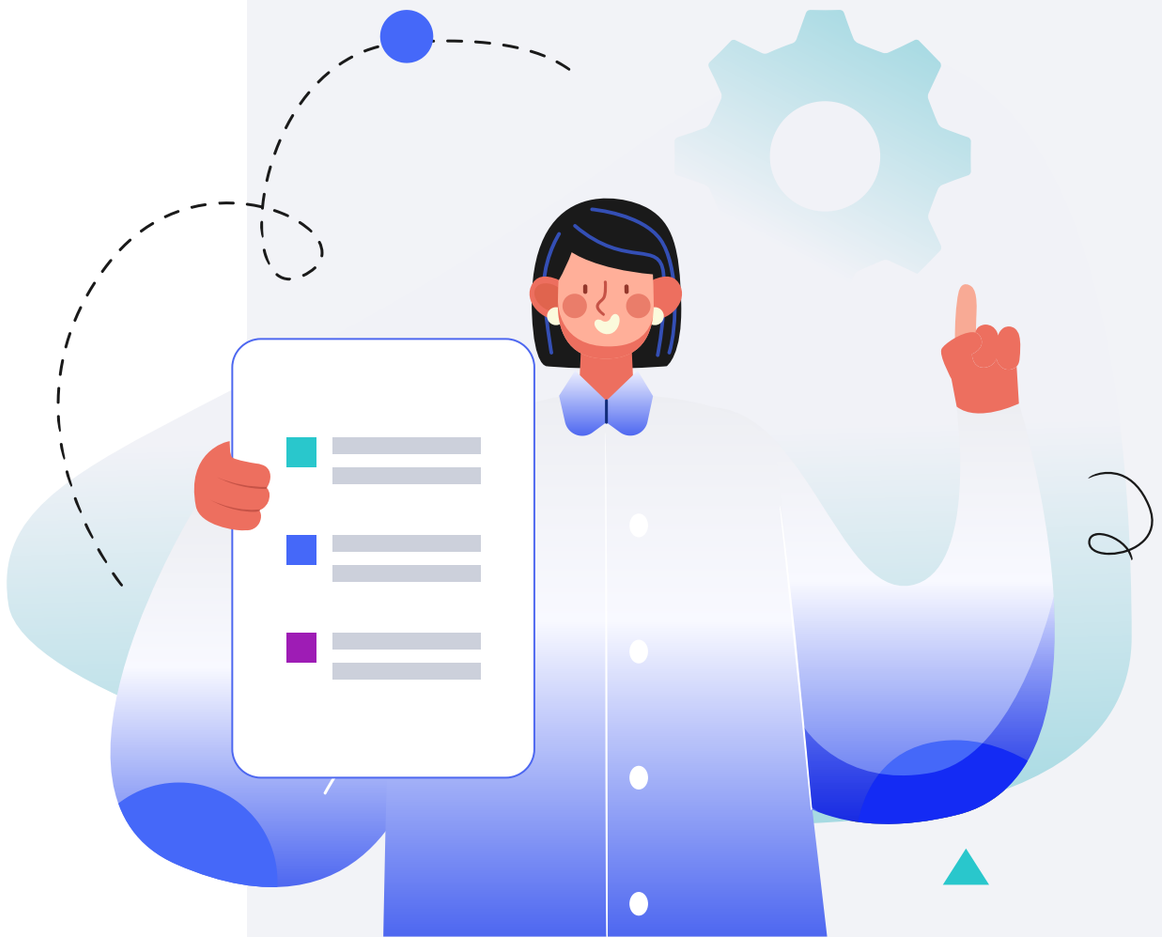
Male

HEIGHT

5ft 10" 180.3cm

WEIGHT

170lb 77.0kg



Lab Results

Uric Acid	6.7 mg/dL	2 · 3.7 · 4 · 6 · 9	10 Sep 2021
Ferritin	72.27 ng/mL	30 · 80 · 193 · 380	10 Sep 2021
Sodium	144 mmol/L	125 · 135 · 136 · 142 · 145 · 155	2 Oct 2023
LDL Cholesterol	109 mg/dL	50 · 100 · 130 · 189	30 Oct 2021
Triglycerides	96 mg/dL	0 · 90 · 150 · 500	10 Sep 2021
RDW	13.2 %	11.5 · 13 · 15	2 Oct 2023
Hemoglobin A1c (%)	5.4 %	4.3 · 4.5 · 5.4 · 5.6 · 6.5	2 Oct 2023

Uric Acid

Your levels are **High**

Based on your latest result

Your latest result: 6.7 mg/dL

Optimal range: 4 mg/dL - 6 mg/dL

About Uric Acid

This test measures uric acid in your blood.

Uric acid is made in the liver. It is the end product of the breakdown of purines, which are produced in the digestion of certain proteins and DNA. Purines are released into the bloodstream when cells age and die. Some purines are also derived from foods [R, R].

In normal conditions, most of the uric acid is removed by the kidneys through urine, while the rest is removed with feces [R].

However, if too much uric acid is produced or not enough is removed, it can build up in the blood. Then, uric acid crystals can deposit in the body, causing kidney stones or gout [R, R].

On the other hand, scientists have discovered that uric acid is not solely a waste product. In fact, studies suggest that uric acid acts as a natural antioxidant and may account for up to 60% of the antioxidant capacity of the blood. In addition, uric acid can protect the brain by preventing neurodegenerative diseases [R, R, R, R].

Therefore, balanced uric acid levels are important for general well-being.

Blood uric acid increases with age. Men tend to have higher levels than women, and are therefore at greater risk of developing gout. This may be because estrogen helps eliminate uric acid through the kidneys [R, R].

Remember there is certain variability in the ranges from lab to lab due to differences in the equipment, techniques, and chemical reagents used. Don't panic if your result is slightly out of range on the app; As long as it's within the normal range according to the lab that performed the test, its value is normal.

Also called

- Uric Acid, Serum

High Uric Acid Health Effects

Your uric acid levels are higher than normal.

This can occur either when your body is producing too much uric acid, or when your kidneys are not capable of eliminating it efficiently. However, a result that's higher than normal, doesn't necessarily mean that you have a health condition needing treatment. Your doctor will interpret your results, taking into account your medical history, symptoms, and other test results.

Causes of elevated uric acid levels include:

- Diets high in purines (e.g meat, seafood, soybeans) and fructose [R, R, R, R, R, R, R]
- Obesity [R]
- Dehydration [R, R]
- Fasting, including ketosis [R, R, R, R]
- Rapid weight loss (short-term) [R, R]

- Alcohol and alcoholism [R]
- Vitamin D insufficiency [R, R]
- Thyroid and parathyroid disorders [R, R, R, R]
- Kidney disease [R]
- Lead exposure [R, R]
- Cancer [R]
- Rare genetic disorders [R, R]

Many drugs can increase blood uric acid levels, including:

- Water pills (diuretics) [R, R]
- Chronic use of low-dose aspirin R]
- Nicotinic acid (niacin) [R, R]
- Medications that suppress the immune system (immunosuppressants) [R, R, R]
- Chemotherapy [R, R, R, R]
- Sildenafil (Viagra) [R, R]
- Testosterone [R, R]

Causes shown here are commonly associated with high uric acid levels. Work with your doctor or another health care professional to get an accurate diagnosis.

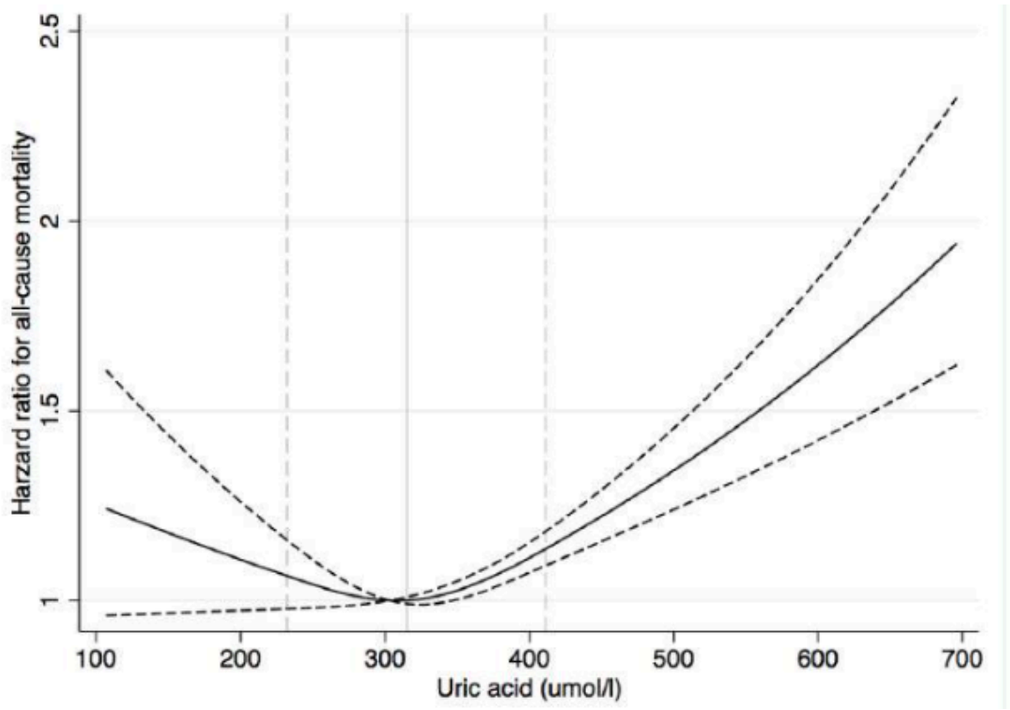
People with high uric acid levels are often without any outwardly-obvious symptoms, and generally don’t require medical treatment. However, a build-up of uric acid can cause problems in the long run, such as increased oxidative stress, inflammation, and interference with normal cell function [R, R].

High uric acid levels can cause:

- Kidney stones [R]
- Gout (deposits of uric acid crystals in joints) [R, R]

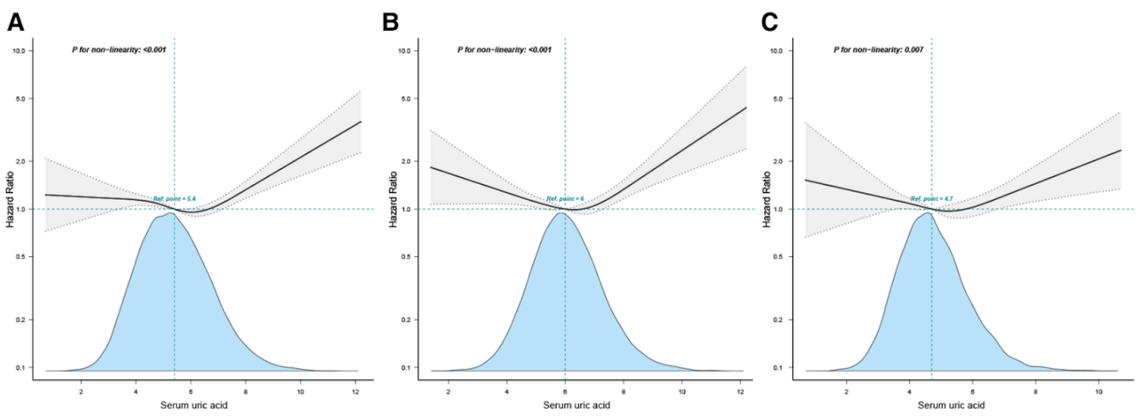
Reference Range Explained

- A study using data from two big groups of people: one from Sweden and another from the UK Biobank revealed that both very low and very high levels of uric acid are associated with a higher risk of dying compared to levels in the middle range. According to this study, the uric acid levels associated with the lowest mortality are between 4.2-4.5 mg/dL and 6.1 mg/dL [R].



Note: Uric acid levels in umol/L times 0.0168 are equivalent to uric acid levels in mg/dL

- In a study examining 20,038 people with high cholesterol levels, both very low (below 4.2 mg/dL) and high (above 6.6 mg/dL) uric acid levels were associated with increased mortality risk, compared to those with mid-range levels (5.8–6.5 mg/dL). Specifically, the safest uric acid level was found to be around 6.30 mg/dL, with risks of death decreasing slightly below this point and then increasing above it. This was true for both men and women, though the exact turning point of the curve varied slightly by sex [R].



Note: Multivariable-adjusted hazard ratios for all-cause mortality by serum uric acid level: (A) all population, (B) male, and (C) female.

- A study of 375,163 Korean men and women found that both low and high levels of uric acid were linked to a higher chance of dying from any cause, heart disease, or cancer. For men, having uric acid levels below 3.5 mg/dL and for women, below 2.5 mg/dL, increased the risk of dying from any cause. On the flip side, very high levels of uric acid increased the risk significantly. Men with high levels (above 9.5 mg/dL) had more than double the risk, while women (above 8.5 mg/dL) had almost 4 times the risk of dying [R].

Table 3. All-cause, CVD, and cancer mortality by uric acid level among men*

Uric acid level, mg/dl	Person-years	No. of events	Mortality rate (per 100,000 person-years)	Adjusted HR (95% CI)† Model 1	Model 2	Model 3
All-cause mortality						
<3.5	16,683.2	60	359.6	1.95 (1.47–2.58)	1.80 (1.35–2.39)	1.58 (1.18–2.10)
3.5–4.4	71,322.4	132	185.1	1.13 (0.91–1.40)	1.04 (0.84–1.29)	0.94 (0.75–1.16)
4.5–5.4	244,426.5	363	148.5	1.11 (0.95–1.30)	1.06 (0.90–1.24)	1.00 (0.85–1.17)
5.5–6.4	419,502.4	432	103.0	0.99 (0.85–1.15)	0.97 (0.83–1.13)	0.95 (0.81–1.10)
6.5–7.4	290,985.9	274	94.2	1.00 (reference)	1.00 (reference)	1.00 (reference)
7.5–8.4	108,976.8	122	112.0	1.20 (0.97–1.49)	1.21 (0.98–1.50)	1.23 (0.99–1.52)
8.5–9.4	29,359.2	32	109.0	0.98 (0.68–1.41)	1.01 (0.70–1.46)	1.04 (0.72–1.50)
≥9.5	8,907.3	24	269.4	2.13 (1.40–3.24)	2.25 (1.48–3.41)	2.39 (1.57–3.66)
P for quadratic trend				<0.001	<0.001	0.005

Table 4. All-cause, CVD, and cancer mortality by uric acid level among women*

Uric acid level, mg/dl	Person-years	No. of events	Mortality rate (per 100,000 person-years)	Adjusted HR (95% CI)† Model 1	Model 2	Model 3
All-cause mortality						
<2.5	14,729.8	18	122.2	1.83 (1.12–2.98)	1.81 (1.11–2.95)	1.80 (1.10–2.93)
2.5–3.4	145,331.7	84	57.8	1.01 (0.79–1.30)	1.01 (0.78–1.30)	1.00 (0.78–1.29)
3.5–4.4	397,828.0	227	57.1	1.00 (reference)	1.00 (reference)	1.00 (reference)
4.5–5.4	246,319.4	162	65.8	1.00 (0.82–1.22)	0.99 (0.81–1.21)	0.99 (0.80–1.21)
5.5–6.4	55,964.8	60	107.2	1.22 (0.91–1.62)	1.21 (0.90–1.62)	1.19 (0.89–1.61)
6.5–7.4	8,566.2	19	221.8	1.53 (0.95–2.47)	1.47 (0.91–2.39)	1.43 (0.88–2.34)
7.5–8.4	1,450.3	8	551.6	2.55 (1.24–5.23)	2.61 (1.27–5.39)	2.36 (1.12–4.99)
≥8.5	368.0	3	81.5	3.60 (1.14–11.33)	3.99 (1.26–12.60)	3.77 (1.17–12.17)
P for quadratic trend				<0.001	<0.001	<0.001

- In a study of 27,490 Korean people aged 40 and above with normal kidney function, men with uric acid levels below 4.0 mg/dL had a higher mortality rate compared with those with uric acid levels of 4.1-6.0 mg/dL. An even higher uric acid (above 8.0 mg/dL) caused a greater increase of mortality in men. There was no association between uric acid and mortality in women [R].

- A large study involving over half a million Japanese adults aged 40 to 74 found that high levels of uric acid in the blood are linked to an increased risk of death from any cause and from heart-related issues. Specifically, the risk of dying from any cause or cardiovascular problems rises significantly when uric acid levels reach or exceed 7 mg/dL in men and 5 mg/dL in women [R].

The determination of an optimal uric acid level for the lowest all-cause mortality may still require additional targeted research. As it is published, we keep our ranges updated.

Range	Values
Critical Low	0 mg/dL - 2 mg/dL
Low	2 mg/dL - 3.7 mg/dL
Suboptimal	3.7 mg/dL - 4 mg/dL
Optimal	4 mg/dL - 6 mg/dL
High	6 mg/dL - 9 mg/dL
Critical High	9 mg/dL - 20 mg/dL

Read more about optimal ranges here.

Ferritin

Your levels are **Suboptimal**

Based on your latest result

Your latest result: 72.27 ng/mL

Optimal range: 80 ng/mL - 193 ng/mL

About Ferritin

This test measures ferritin, a protein that stores and transports iron in the blood.

Iron has many important roles in our bodies. For example, it's critical for making red blood cells and it's needed for muscle and heart cells to produce energy. However, iron by itself can be toxic, primarily because it produces free radicals that cause damage to cells and tissues. For this reason, the body uses special proteins like ferritin to safely store and transport iron to where it is needed [R].

Low ferritin levels signal that the body's iron stores are low. Higher levels, on the other hand, may indicate that you have a condition that causes the body to store too much iron [R].

However, ferritin also plays a role in the immune response, and increases in conditions such as chronic inflammation, infections, and cancer, irrespective of iron levels [R].

This test, therefore, serves as a measure of the total amount of iron stored in your body, but can also point to inflammatory conditions [R].

Also called

- Ferritin, Serum

Suboptimal Ferritin Health Effects

Your ferritin levels are within the normal range, but they may be lower than optimal [R, R].

Levels in this range don't necessarily mean that you have any health issues -- many people who have ferritin levels in this range are healthy. However, you should pay attention to your iron levels if you are also experiencing symptoms of iron deficiency, such as unexplained fatigue, headaches, hair loss, and shortness of breath [R, R, R, R, R]. Your doctor will interpret your result, taking into account your medical history, symptoms, and other test results.

These can decrease your ferritin levels:

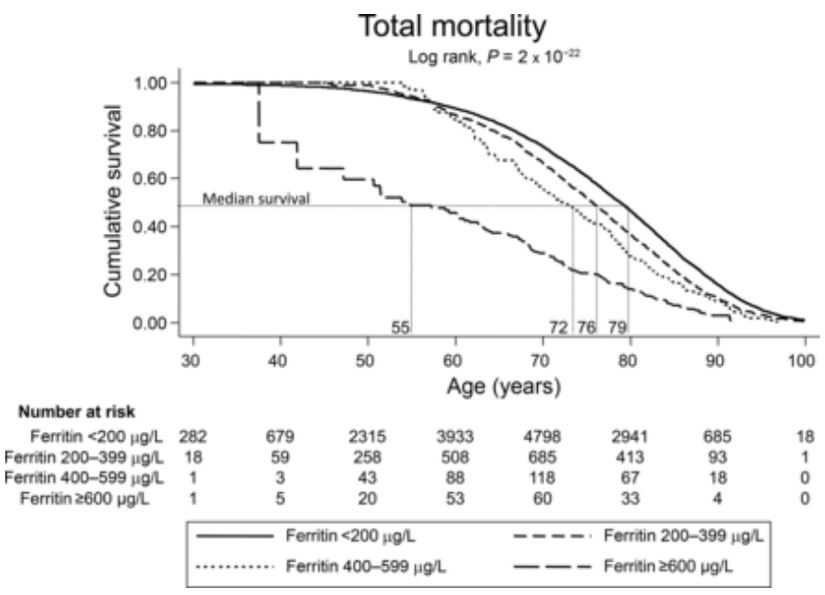
- Dietary iron deficiency. People who follow a vegetarian diet are at a greater risk for having low blood ferritin [R, R, R]
- Iron deficiency due to conditions that impair nutrient absorption in the gut, such as celiac disease R, R]
- Iron deficiency due to blood loss, e.g. abundant menstruation, blood donations, accidents/surgery [R]
- Underactive or impaired thyroid (hypothyroidism) [R]
- Vitamin C deficiency (rare) [R]
- Long-term use of drugs that cause gut bleeding or impair nutrient absorption, such as aspirin or proton pump inhibitors [R, R]

Reference Range Explained

Note: Ferritin levels in ng//mL are equivalent to ferritin levels in ug/L.

The optimal level of ferritin for the lowest all-cause mortality, as suggested by the studies, varies depending on the population and health status:

- A study analyzing data from the Copenhagen City Heart Study, involving 8,988 people, suggested that increased ferritin concentrations are associated with early death in a dose-dependent manner. Specifically, individuals with ferritin levels below 200 µg/L had lower mortality risk compared to those with higher levels. The study found that survival decreased with increasing ferritin concentrations [R].



- Another study with 161,921 people found that both low and high ferritin levels were associated with increased all-cause mortality. The ferritin level associated with the lowest mortality was 60 µg/L for women and 125 µg/L for men without systemic inflammation. It was 52 µg/L for women and 118 µg/L for men with systemic inflammation [R].
- The English longitudinal study of aging with 5,471 people found that ferritin had sex-specific prognostic patterns. High ferritin levels in men with no major chronic disease and low ferritin levels in all women were associated with increased all-cause mortality. High ferritin levels in men with no major chronic diseases were also associated with an increased risk of heart disease-related mortality [R].

Model	MEN				WOMEN			
	Ferritin quartile				Ferritin quartile			
	Lowest	Second lowest	Second highest	Highest	Lowest	Second lowest	Second highest	Highest
	2-69ng/ml	70-118ng/ml	119-193ng/ml	194-598ng/ml	2-44ng/ml	45-73ng/ml	74-115ng/ml	116-341ng/ml
All-cause mortality								
No. of participants	640	604	638	627	737	735	740	742
No. of deaths	140	106	100	111	122	82	75	100
Person years of follow-up	4718	4582	4869	4732	5619	5756	5824	5758
Model 1 HR (95% CI)[a]	1.19 (0.92–1.53)	1.16 (0.88–1.53)	1.00 (reference)	1.16 (0.89–1.52)	**1.55 (1.16–2.07)**	1.05 (0.77–1.43)	1.00 (reference)	1.22 (0.90–1.65)
Model 2 HR (95% CI)[b]	1.07 (0.83–1.39)	1.11 (0.84–1.45)	1.00 (reference)	1.12 (0.86–1.48)	**1.46 (1.10–1.96)**	1.05 (0.77–1.44)	1.00 (reference)	1.26 (0.93–1.70)
Model 3 HR (95% CI)[c]	1.01 (0.78–1.32)	1.13 (0.86–1.49)	1.00 (reference)	1.12 (0.85–1.47)	**1.44 (1.08–1.93)**	1.06 (0.77–1.45)	1.00 (reference)	1.26 (0.93–1.70)
Model 4 HR (95% CI)[d]	1.04 (0.80–1.36)	1.17 (0.89–1.53)	1.00 (reference)	1.10 (0.84–1.45)	**1.56 (1.17–2.09)**	1.10 (0.80–1.50)	1.00 (reference)	1.25 (0.92–1.69)
Model 5 HR (95% CI)[e]	0.98 (0.75–1.27)	1.16 (0.88–1.53)	1.00 (reference)	1.07 (0.81–1.41)	**1.59 (1.18–2.13)**	1.11 (0.80–1.52)	1.00 (reference)	1.23 (0.91–1.66)

These findings indicate that while lower ferritin levels are generally associated with a lower risk of all-cause mortality, the specific optimal level may vary based on individual health conditions and risk factors. The determination of an optimal ferritin level for the lowest all-cause mortality may still require additional targeted research. As it is published, we keep our ranges updated.

Range	Values
Low	10 ng/mL - 30 ng/mL
Suboptimal	30 ng/mL - 80 ng/mL
Optimal	80 ng/mL - 193 ng/mL
Suboptimal	193 ng/mL - 380 ng/mL
High	380 ng/mL - 500 ng/mL

Read more about optimal ranges here.

Sodium

Your levels are **Suboptimal**

Based on your latest result

Your latest result: 144 mmol/L

Optimal range: 136 mmol/L - 142 mmol/L

2 Oct 2023

About Sodium

This test measures the amount of sodium in your blood.

Sodium is a positive ion and one of the body's main electrolytes, which are minerals we need in relatively large amounts. It plays a vital role in controlling blood pressure, fluid balance, and the acid-base balance in the blood. In addition, sodium is needed for proper nerve and muscle function [R].

Table salt (sodium chloride) and the natural salt content in foods are the main sources of sodium in the diet. Adults need less than 500 mg sodium/day to maintain normal sodium levels in the body. However, 95% of the world's population consumes between 3 and 6 g/day, which is much more than necessary [R, R].

Healthy sodium levels in the body are maintained in a narrow range by [R, R, R]:

- Hormones that increase (natriuretic peptides) or decrease (aldosterone) kidney excretion of sodium through urine
- Hormones that prevent the loss of fluids together with sodium (antidiuretic hormone)
- Thirst. Normally, even a very small (2–3%) increase in blood sodium induces thirst, and sodium levels go back down to normal once the person drinks water

Dietary sodium deficiency is extremely rare, even among people on very low-sodium diets. Sodium levels may fall below normal under extreme conditions of heavy and continued sweating, or in cases of heavy injury, chronic diarrhea, or kidney disease where the body is unable to hold onto sodium [R, R].

Blood sodium can increase above normal when people don't drink enough water or have an excessive salt intake. It can also increase due to health issues such as kidney disease. Elevated sodium is more common in the elderly, because of a decline in kidney function and a lower intake of liquids [R, R, R].

Remember that there is some lab-to-lab variability in ranges due to differences in equipment, techniques, and chemicals used. Don't panic if your result is slightly out of range in the app - as long as it's in the normal range based on the laboratory that did the testing, your value is normal.

Also called

- Sodium, Serum
- Na

Suboptimal Sodium Health Effects

Your levels are within the normal range, but are slightly higher than ideal.

Sodium levels can be increased by:

- Not drinking enough water, especially during strenuous exercise [R, R]
- Losing too much water due to sweating, fever, diarrhea, or vomiting [R]
- Excessive salt or sodium bicarbonate (baking soda) intake [R, R]
- Chronic alcohol consumption [R]
- Altered mental state, dementia, delirium, or brain damage that decrease thirst and water consumption [R]
- Too much licorice [R, R]
- Aging, associated with a decline in kidney function and lower intake of liquids [R]

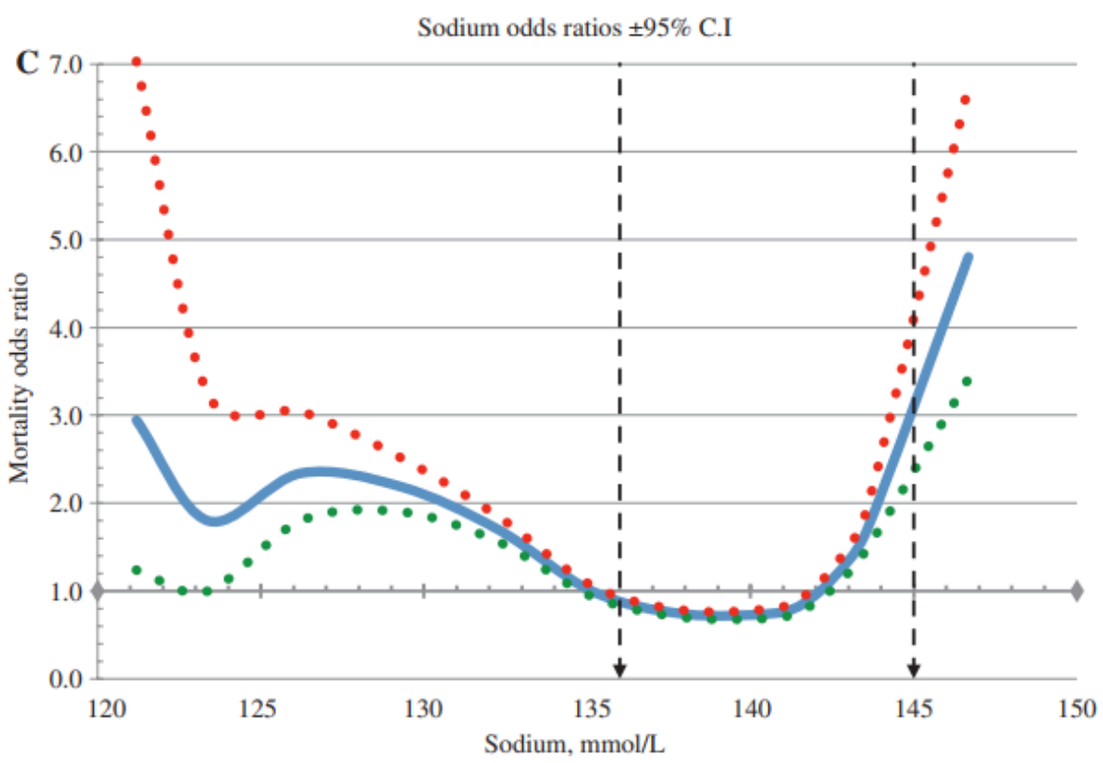
Drugs that can increase sodium levels include:

- Antibiotics [R]
- Corticosteroids (hydrocortisone, prednisone), used to treat a variety of inflammatory conditions and diseases [R]
- Laxatives [R]
- NSAIDs [R]

Reference Range Explained

The optimal sodium level for the lowest all-cause mortality is not explicitly defined in the literature. However, the following studies provide insights into the optimal level of sodium and we based our optimal range on them:

- A study of 39,964 people found the lowest mortality risks for sodium levels between 136 and 142 mmol/L [R].



- Research indicates that both lower and higher serum sodium levels are associated with increased mortality in patients with chronic kidney disease. The lowest mortality was seen in patients with a sodium level of 140 mEq/L [R].

The determination of an optimal sodium level for the lowest all-cause mortality may still require additional targeted research. As it is produced, we keep our ranges updated.

Range	Values
Critical Low	98 mmol/L - 125 mmol/L
Low	125 mmol/L - 135 mmol/L
Suboptimal	135 mmol/L - 136 mmol/L
Optimal	136 mmol/L - 142 mmol/L
Suboptimal	142 mmol/L - 145 mmol/L
High	145 mmol/L - 155 mmol/L
Critical High	155 mmol/L - 212 mmol/L

Read more about optimal ranges here.

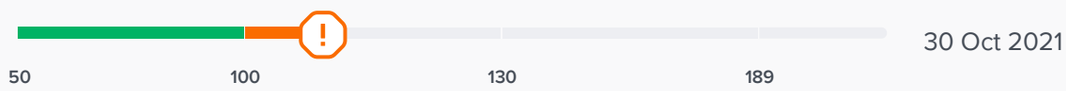
LDL Cholesterol

Your levels are **Suboptimal**

Based on your latest result

Your latest result: 109 mg/dL

Optimal range: 50 mg/dL - 100 mg/dL



About LDL Cholesterol

This test measures the amount of LDL-cholesterol, also known as "bad" cholesterol, in your blood.

LDL-cholesterol is cholesterol bound to low-density lipoprotein (LDL) particles. Lipoprotein particles transport cholesterol in the bloodstream much like cars transport passengers [R].

LDL- cholesterol is considered the “bad” cholesterol because it deposits in blood vessels. Cholesterol can penetrate arterial walls where it combines with oxygen (oxidizes). This is a key step in the development of the hardening of the arteries and heart disease [R, R].

High LDL cholesterol is considered a strong risk factor for developing heart disease [R, R].

Also called

- LDL cholesterol - Direct
- LDL-C
- LDL Chol Calc (NIH)
- LDL Chol Calc Reportable
- LDL
- LDL-Cholesterol

Suboptimal LDL Cholesterol Health Effects

Your LDL-cholesterol levels are slightly higher than optimal.

If you are at risk of developing heart disease, you may want to decrease your levels. Your doctor will interpret your results, taking into account your medical history, symptoms, and other test results.

These can increase LDL-cholesterol:

- Diets high in calories and saturated fats [R]
- Lack of physical exercise [R]
- Drinking coffee [R]
- Underactive thyroid (hypothyroidism) [R]

There are also many drugs that can increase cholesterol, including [R, R]:

- Anabolic steroids
- Corticosteroids, drugs used to treat inflammation
- Water pills (diuretics)
- Beta-blockers
- Immunosuppressive drugs

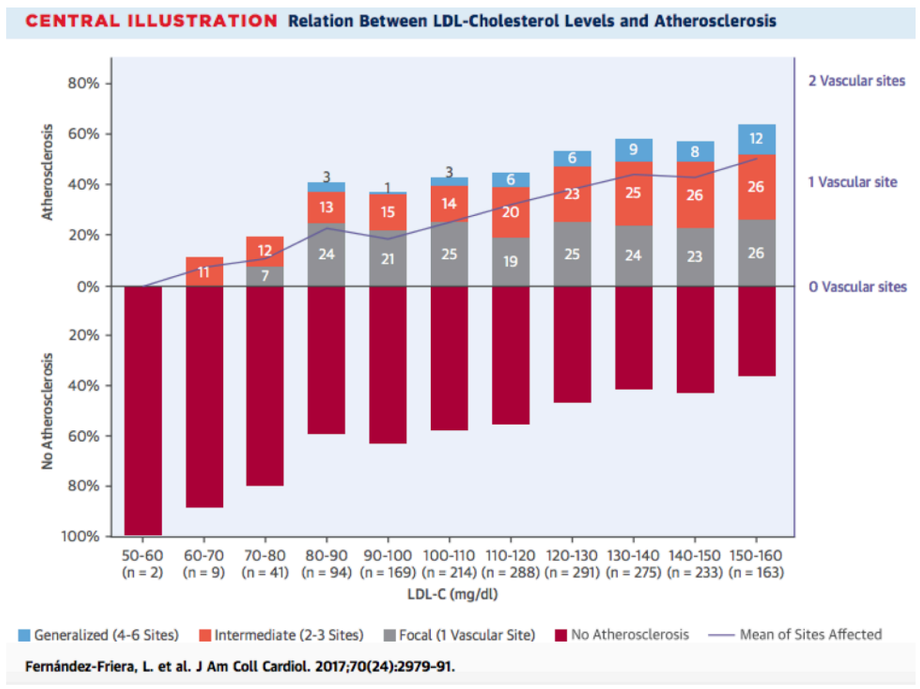
Causes shown here are commonly associated with high LDL cholesterol. Work with your doctor or another health care professional to get an accurate diagnosis.

LDL-cholesterol levels in this range have been associated with a slightly higher risk of heart disease [R, R, R].

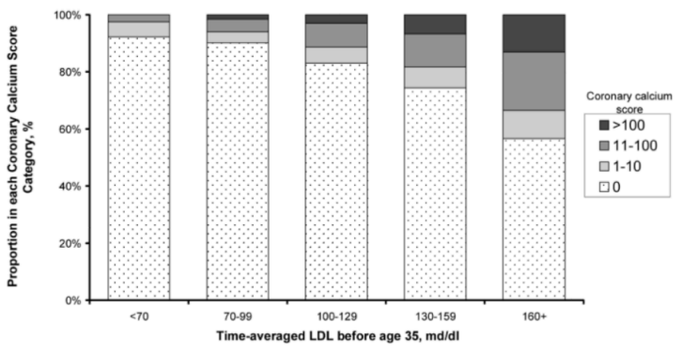
Reference Range Explained

The optimal level of LDL cholesterol (LDL-C) for the lowest all-cause mortality is not clearly defined and may vary depending on age and other health factors. Here are key insights from relevant studies:

- In a study of 4,184 people who were in their mid-40s, those with LDL cholesterol levels between 50-60 mg/dL did not show signs of artery hardening. However, as LDL levels rose above this range, the likelihood of finding it increased [R].



- In a study of 3,258 young adults (under 35 years old), those who initially had LDL cholesterol levels lower than 70 mg/dL ended up having the lowest levels of coronary calcium 20 years later compared to those with LDL levels higher than 100 mg/dL [R].



- In a study of 4,860 people, those with LDL below 100 mg/dL had the lowest risk for heart disease-related events, whereas those with LDL between 101 -130 had 1.5 higher risk and those with LDL above 131 mg/dL had a 2.2-2.4 times higher risk [R].

Further research is needed to establish specific optimal LDL-C levels across different age groups and health conditions. The determination of an LDL cholesterol level for the lowest all-cause mortality may still require additional targeted research. As it is published, we keep our ranges updated.

Range	Values
Optimal	50 mg/dL - 100 mg/dL
Suboptimal	100 mg/dL - 130 mg/dL
High	130 mg/dL - 189 mg/dL
Critical High	189 mg/dL - 500 mg/dL

Read more about optimal ranges here.

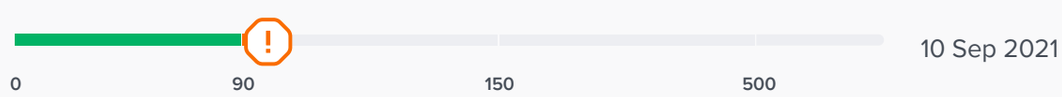
Triglycerides

Your levels are **Suboptimal**

Based on your latest result

Your latest result: 96 mg/dL

Optimal range: 0 mg/dL - 90 mg/dL



About Triglycerides

This test measures the amount of triglycerides circulating in your blood.

Triglycerides (TG) are the most common type of fat in your body.

You get triglycerides from food, such as meat, dairy, vegetable oils, and fats. Triglycerides are digested and absorbed in the small intestine and then packaged together with cholesterol and proteins. These packages can then be used by cells as a form of energy [R, R].

The liver is also able to make and store triglycerides. It does so when you eat a lot of carbs, or more calories than your body needs [R, R, R].

It's important to watch your triglyceride levels and maintain them in a healthy range. High triglyceride levels are associated with an increased risk of developing heart disease [R, R].

Also called

- Cardio IQ® Triglycerides

Suboptimal Triglycerides Health Effects

Your triglyceride levels are within the normal range, but they are higher than optimal.

Your doctor will interpret your results, taking into account your medical history, symptoms, and other test results.

These can increase triglyceride levels:

- Diets high in calories (overeating), carbs, and fats [R, R]
- Being physically inactive/sedentary lifestyle [R, R, R]
- Obesity [R]
- Smoking [R, R, R]
- High alcohol intake [R, R]
- Diabetes [R]
- Inflammation and infection [R, R]
- Vitamin D deficiency [R, R, R]
- Underactive thyroid (hypothyroidism) [R, R]
- Autoimmune disease [R]

Triglyceride levels normally rise significantly during the third trimester of pregnancy, before eventually returning to normal [R].

Certain drugs can increase triglyceride levels including:

- Corticosteroids [R]
- Estrogens [R, R]
- Water pills (diuretics) [R, R]
- Beta-blockers [R, R]
- Antiretrovirals [R]

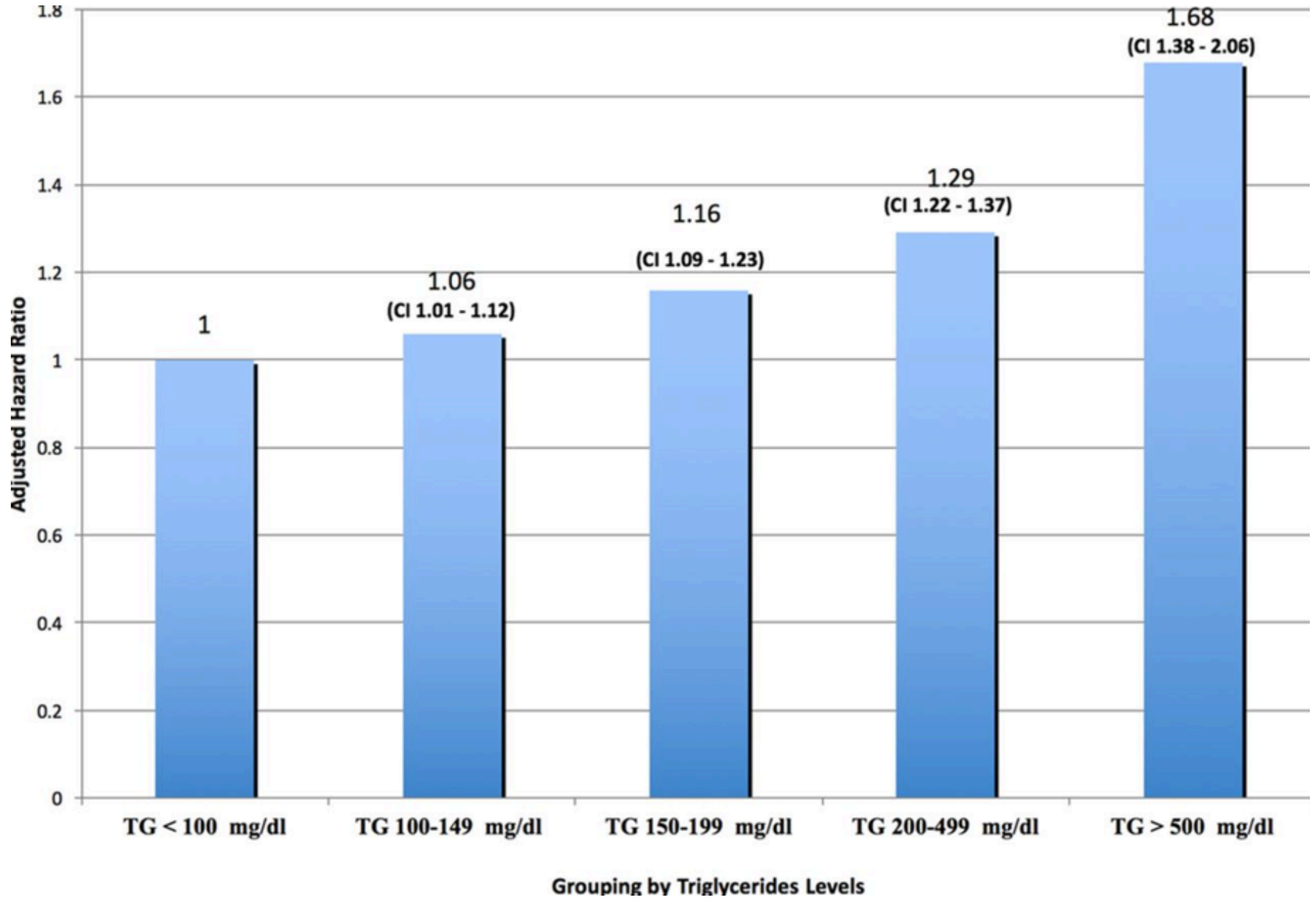
- Retinoids [R]
- Some antipsychotics [R]

Studies have found an association between triglyceride levels in this range and a higher risk of heart disease and less than optimal overall health [R, R, R, R].

Reference Range Explained

The optimal blood triglyceride level for the lowest all-cause mortality has been investigated in various studies. Our current optimal range is based on them.

- A large study that looked at data from 61 other studies, including over 726,000 people, found that having triglyceride levels below 90 mg/dL (1.02 mmol/L) is associated with the lowest risk of dying from heart disease compared to having a moderate level of triglycerides (90-149 mg/dL). Those with levels just a bit higher (150-199 mg/dL) or much higher (200 mg/dL or more) had up to 25% higher risk of dying from heart disease and a 20% higher for any other reason [R].
- A study comprising 15,355 people with established coronary heart disease found that higher triglyceride levels were associated with increased all-cause mortality. Even patients with triglyceride levels of 100 to 149 mg/dL 81-1.68 mmol/L) showed an elevated risk of death. Severe hypertriglyceridemia (≥500 mg/dL) denoted a population with particularly increased mortality risk [R].



- The risk of death for all causes was maximally reduced for the 13,957 subjects that had nonfasting triglycerides < 89 mg/dL (1.0 mmol/L) in a Mendelian randomization study [R].
- In a study of 24,545 women, the risk of death for coronary heart disease was maximally reduced for triglyceride values less than 135 mg/dL (1.5 mmol/L), whereas the risk was significantly increased for triglyceride values above. Risk of death for all causes was maximally reduced for triglyceride values less than 135 mg/dL (1.5 mmol/L), whereas mortality risk increased for values greater than 225 mg/dL (2.5 mmol/L) [R]

The determination of an optimal triglyceride level for the lowest all-cause mortality may still require additional targeted research. As it is produced, we keep our ranges updated.

Range	Values
Optimal	0 mg/dL - 90 mg/dL
Suboptimal	90 mg/dL - 150 mg/dL
High	150 mg/dL - 500 mg/dL
Critical High	500 mg/dL - 3000 mg/dL

Read more about optimal ranges here.

RDW

Your levels are **Suboptimal**

Based on your latest result

Your latest result: 13.2 %

Optimal range: 11.5 % - 13 %

About RDW

This test measures the variation of the size/volume of your red blood cells.

The Red Blood Cell Distribution Width (RDW) test measures how much your blood cells vary in size.

Low values mean that your blood cells are roughly similar in size, whereas higher values indicate that there is more variety in how big each red blood cell is. Very high levels mean that your blood cells are very unequal in size -- a condition called anisocytosis [R, R].

A high RDW can serve as a sign of several underlying diseases, including [R, R, R, R]:

- Anemias
- Iron and vitamin B12/folate deficiency
- Inflammation
- Injuries and bleeding/hemorrhage
- Liver disease
- Kidney disease
- Hereditary red blood cell disorders, such as thalassemia

However, RDW can still be at a normal level in patients with certain types of anemia (such as aplastic anemia). Therefore, your doctor will keep an eye on your other blood-cell-related test results to fully rule out these possibilities [R].

Remember that some lab-to-lab variability occurs due to differences in equipment, techniques, and chemicals used. Don't panic if your result is slightly out of range in the app - as long as it's in the normal range based on the laboratory that did the testing, your value is normal.

Also called

- Red blood cell distribution width
- Red cell distribution width (RDW-CV)

Suboptimal RDW Health Effects

Your RDW is within the normal range, but it is higher than optimal. This means that your red blood cells are somewhat unequal in size [R, R].

These can increase RDW:

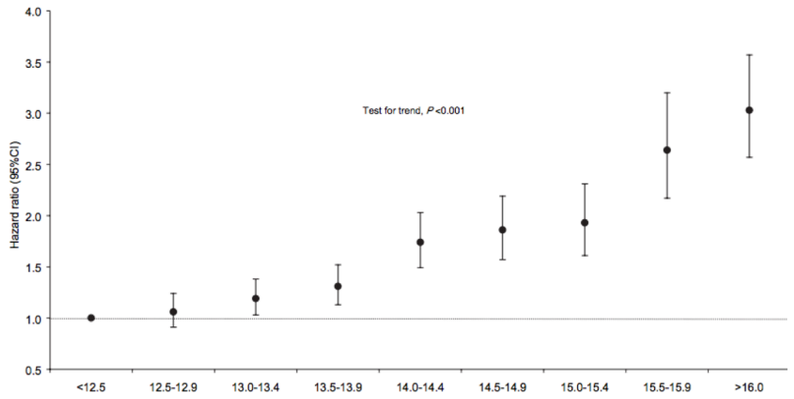
- Nutrient deficiencies, due to a lack of iron, folate, or vitamin B12 [R, R, R, R]
- Alcoholism/alcohol abuse [R]
- Smoking [R]
- Sleep disturbances and disorders [R, R, R]
- Impaired kidney function [R]
- Liver disease [R]
- Blood transfusions (due to the differences in blood between the donor and the recipient) [R]
- Hereditary red blood cell disorders, such as sickle cell anemia, thalassemia, and spherocytosis [R, R, R]

RDW in this range is associated with less than optimal health [R, R, R, R, R, R].

Reference Range Explained

The following studies have described the relevance of RDW in predicting mortality in various clinical settings. We have defined our current optimal range based on them.

- A study comprising 11,827 older adults found an increased risk of death associated with higher RDW values. For every 1% increment in RDW, total mortality risk increased by 14%. In addition, RDW was associated with deaths from heart disease, cancer, and other death causes [R]:



Dead, no. (%)	235 (26.9)	499 (28.9)	711 (29.7)	642 (31.0)	579 (36.5)	375 (37.5)	253 (38.3)	199 (43.9)	492 (46.4)
Death rate*	37.5	42.8	47.2	52.6	68.4	72.2	75.7	94.2	109.0

- In a study of 8175 community-dwelling adults, a higher RDW was associated with an increased risk of death. For every 1% increment in RDW, all-cause mortality risk increased by 22%, even in those with normal RDW (11%-15%) [R]:
- A study in 6,568 women and 10,629 men also found increased mortality in people with RDW >14.4% for men and above 14.7% for women [R].
- A study of 389 men found that increased RDW (>14.4%) was a strong and independent predictor of all-cause mortality in people with heart disease [R].

RDW may also be associated with complications and death related to specific diseases. For example:

- The lowest risk of dementia was found for RDW values < 13%, whereas it increased for RDW values > 14.8% in the 2,556 older adults [R].

According to two studies, the body's biological clues may help assess our biological age, which is a measure of how well our body is functioning compared to how long we have lived. By analyzing 60 different blood markers of over 300,000 people, less than 20 markers turned out useful, including the RDW. According to the results, a higher RDW is associated with higher biological age and mortality, with no specific upper limit [R, R].

The determination of an optimal RDW for the lowest all-cause mortality may still require additional targeted research. As it is published, we keep our ranges updated.

Range	Values
Low	5 % - 11.5 %
Optimal	11.5 % - 13 %
Suboptimal	13 % - 15 %
High	15 % - 25 %

Read more about optimal ranges here.

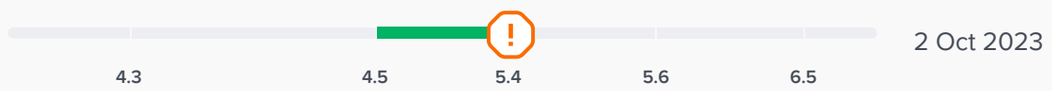
Hemoglobin A1c (%)

Your levels are **Suboptimal**

Based on your latest result

Your latest result: 5.4 %

Optimal range: 4.5 % - 5.4 %



2 Oct 2023

About Hemoglobin A1c (%)

HbA1c is a measure of your 3-month average blood sugar levels.

When circulating in the blood, glucose (blood sugar) sticks to hemoglobin found inside red blood cells and forms glycated hemoglobin (HbA1c). The higher your blood sugar, the more HbA1c you'll have in the blood. Usually, HbA1c comprises approximately 5% of a normal adult's hemoglobin [R].

Because red blood cells that carry hemoglobin live for approximately 3 months, HbA1c can be used as a measure of average blood sugar levels over the past 3 months [R, R].

HbA1c is an important test that can be used to both diagnose and monitor diabetes.

According to the American Diabetes Association, screening for diabetes is recommended in people over 45 (every 3 years), or at any age if you have certain risk factors, including [R]:

- Being overweight, obese, or physically inactive
- Having a close (first or second-degree) relative with diabetes
- Belonging to a certain race/ethnic group (Native Americans, African-Americans, Hispanic Americans, Asians/South Pacific Islanders)
- Having signs of insulin resistance or conditions associated with insulin resistance, such as high blood pressure (hypertension), low good cholesterol and/or high triglycerides (dyslipidemia), and polycystic ovary syndrome
- Having had diabetes in pregnancy (gestational diabetes)

HbA1c is more convenient than glucose because, unlike glucose, it doesn't require fasting before testing and there is no large day-to-day variation in HbA1c levels. However, some health conditions that affect red blood cells and hemoglobin (e.g., anemia) can falsely increase or decrease HbA1c levels [R].

Also called

- Cardio IQ® Hemoglobin A1c (%)
- HbA1c (%)
- Haemoglobin A1c (%)

Suboptimal Hemoglobin A1c (%) Health Effects

Your HbA1c% is within the normal range, but it's slightly higher than optimal.

Your doctor will interpret this test, taking into account your medical history and other test results.

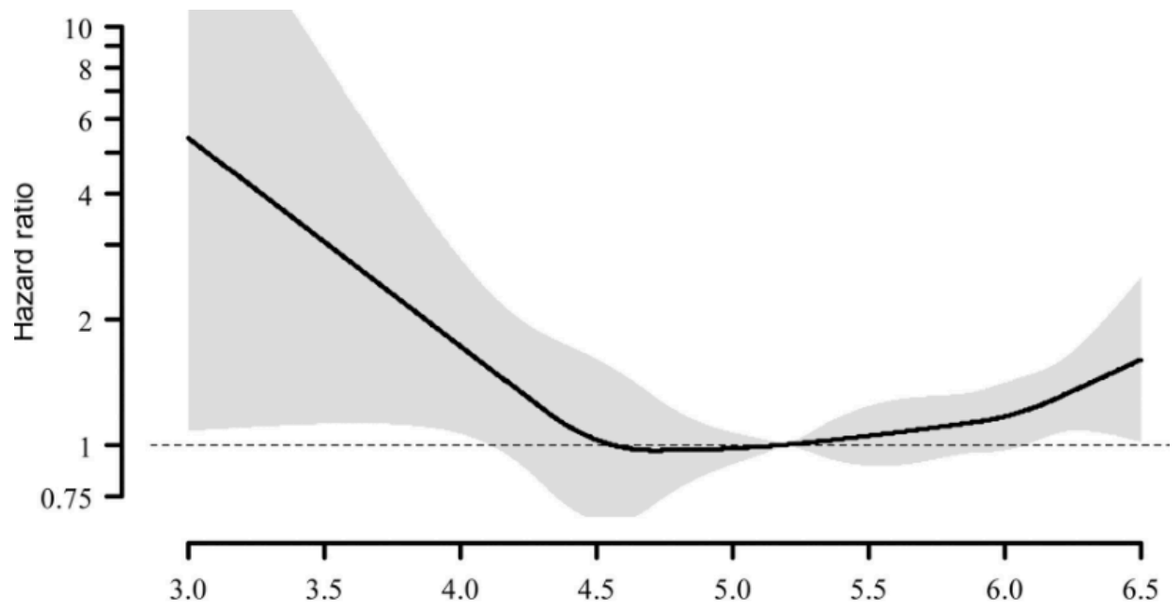
Factors that are associated with increased HbA1c include:

- Obesity [R, R, R, R, R]
- Smoking [R, R]
- Iron, vitamin B12, or folate deficiency anemia [R, R, R, R, R]
- Some chronic conditions, such as periodontal (gum) disease, *H. pylori* infection, and chronic kidney disease [R, R, R, R, R]
- Hyperbilirubinemia (high bilirubin) [R]
- Lead poisoning [R]
- Some genetic hemoglobin disorders [R]
- Drugs such as statins and opiates [R, R]

The causes shown here have been associated with increased HbA1c levels. Work with your doctor or another healthcare professional to get an accurate diagnosis.

Reference Range Explained

- A study including data from 14,099 people without diabetes found that an HbA1c <4.0% versus 5.0% to 5.4% was associated with an increased risk of all-cause mortality [R].

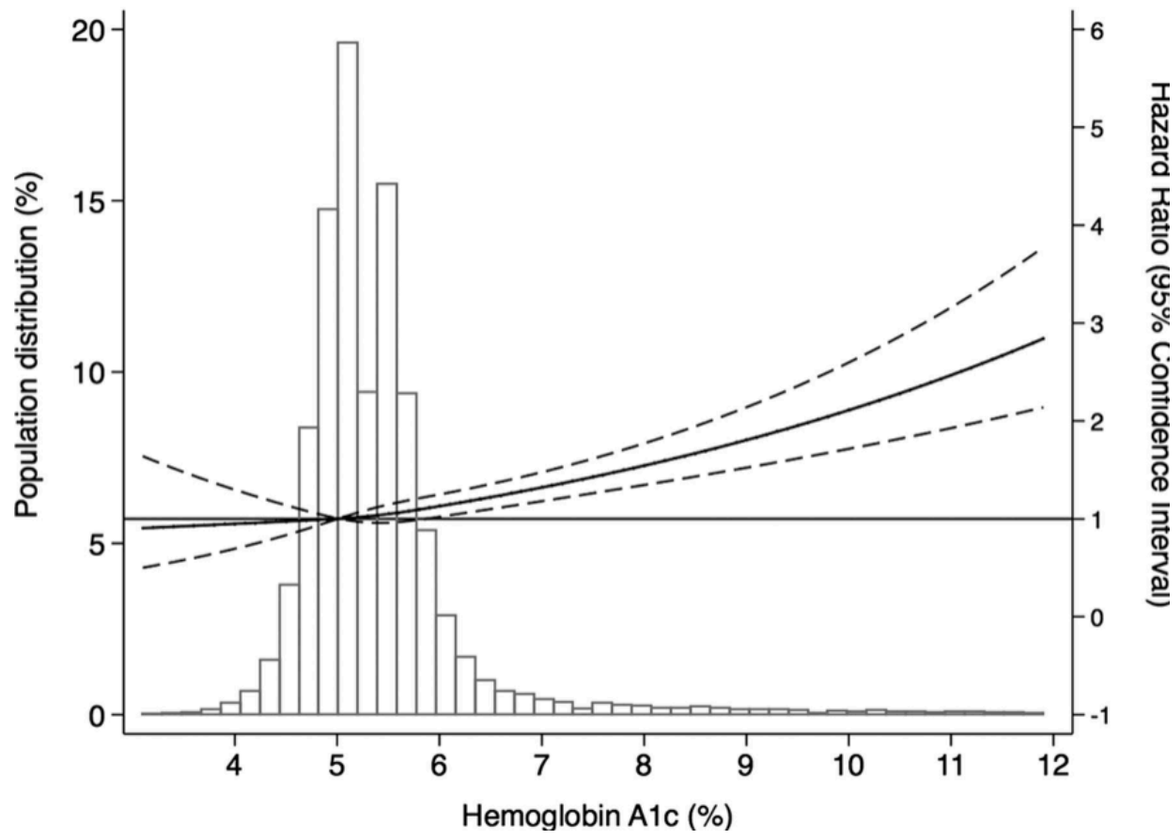


The optimal HbA1c level for people with diabetes may be higher than for people without diabetes.

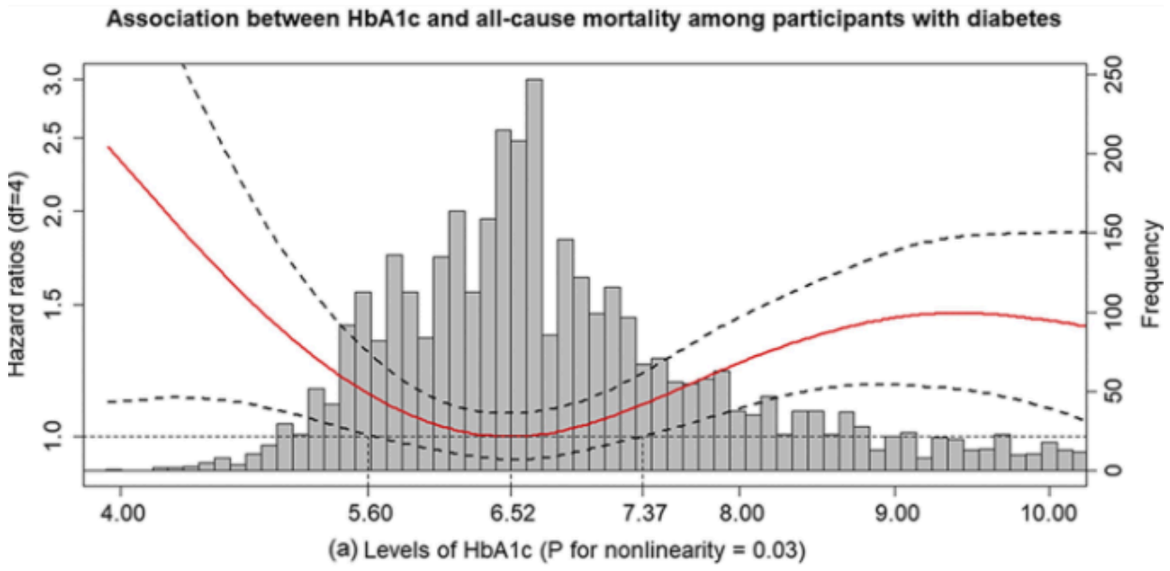
- HbA1c levels over 8.0% increase the risk of all-cause mortality in people with diabetes. The risk was highest at levels above 9.0%. However, HbA1c levels below 6.0% also showed increased mortality risk. The optimal HbA1c levels for minimizing mortality risk in people with diabetes appeared to range from 6.0% to 8.0%.

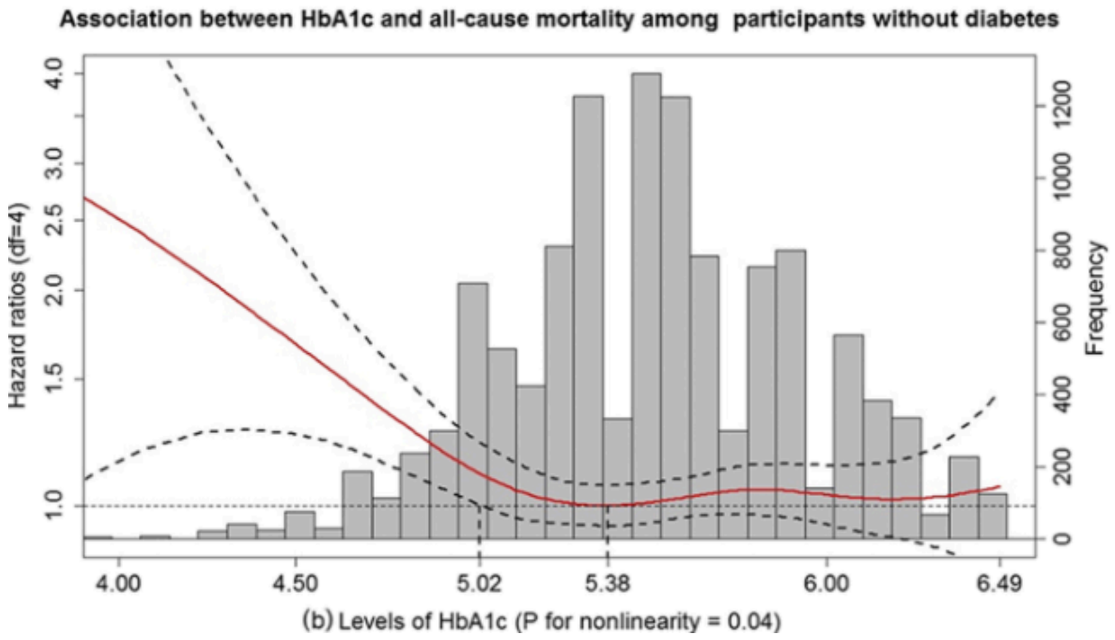
  The optimal HbA1c range for the lowest all-cause mortality in people without diabetes was found to be between 5.0% and 6.0%. Similar to the diabetic population, both lower (<5.0%) and higher (>6.0%) HbA1c levels were associated with an increased risk of mortality [R].

- Another study assessed the risk of mortality by HbA1c levels among older adults with and without diabetes, reinforcing the idea that HbA1c levels over 8.0% are associated with an increased risk of all-cause and cause-specific mortality in older adults with diabetes [R].



- Among 15,869 people with diabetes, those with an HbA1c level of 6.5% experienced the lowest risk of all-cause mortality. Mortality risk became significant at HbA1c levels below 5.6% or above 7.4% compared to an HbA1c level of 6.5%. In people without diabetes, the lowest mortality risk was observed at an HbA1c level of 5.4%. The risk of mortality increased significantly at HbA1c levels below 5.0% compared to an HbA1c level of 5.4% [R].





According to a large study, some body's biological clues may help assess our biological age, which is a measure of how well our body is functioning compared to how long we have lived. By analyzing 60 different blood markers of around 300,000 people, less than 10 markers turned out useful, including the HbA1c level. According to the results, a higher HbA1c level is associated with higher biological age and mortality, with no specific upper limit [R].

These findings highlight the importance of maintaining HbA1c within specific ranges to reduce mortality risk, with the optimal levels being slightly higher for individuals with diabetes compared to those without.

Range	Values
Low	0 % - 4.3 %
Suboptimal	4.3 % - 4.5 %
Optimal	4.5 % - 5.4 %
Suboptimal	5.4 % - 5.6 %
High	5.6 % - 6.5 %
Critical High	6.5 % - 20 %

Read more about optimal ranges here.

Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your lab results, along with the amount of scientific evidence supporting the recommendation.

You'll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

1. Whole-Food Plant-Based Diet
2. Avoid Sugary Foods & Drinks
3. Vitamin C
4. Magnesium
5. Alpha-Lipoic Acid
6. Chlorella
7. Psyllium
8. Whole Grains
9. Maintain Optimal Vitamin D Levels
10. Avoid Phthalate Exposure
11. Almonds
12. Glycine
13. Eat Fiber-Rich Foods
14. Berberine
15. Black Seed (Black Cumin)

1 Whole-Food Plant-Based Diet

IMPACT 4 / 5

EVIDENCE 4 / 5

To implement a plant-based diet, fill your meals with fruits, vegetables, legumes, seeds, and whole grains. Aim for at least 5 servings of fruits and vegetables per day, include legumes in your meals several times a week, and choose whole grains over refined grains. Adjust your diet gradually over a few weeks to avoid digestive discomfort.

Helps with these labs

Uric Acid · Hemoglobin A1c (%) · LDL Cholesterol · Triglycerides

2 Avoid Sugary Foods & Drinks

IMPACT 4 / 5

EVIDENCE 5 / 5

To avoid sugary foods, eliminate or significantly reduce consumption of foods and beverages high in added sugars such as sodas, candies, baked goods, and sugary cereals from your diet. Instead, opt for natural sugar sources like fruits. Aim to do this daily for ongoing health benefits.

Helps with these labs

Triglycerides · Hemoglobin A1c (%) · Uric Acid

3 Vitamin C

IMPACT 3 / 5

EVIDENCE 3 / 5

Take 500-2000 mg of vitamin C supplement daily. It can be taken at any time of the day, with or without food, according to personal preference or tolerance.

TYPICAL STARTING DOSE

1000 mg

Helps with these labs

Hemoglobin A1c (%) · Uric Acid · LDL Cholesterol · Triglycerides

4 Magnesium

IMPACT 2 / 5

EVIDENCE 2 / 5

Take 250 mg of magnesium daily as a supplement, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

250 mg

Helps with these labs

Hemoglobin A1c (%) LDL Cholesterol Triglycerides Uric Acid

5 Alpha-Lipoic Acid

IMPACT 2 / 5

EVIDENCE 3 / 5

Take 600-1800 mg of alpha-lipoic acid daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

600 mg

Helps with these labs

Triglycerides LDL Cholesterol Hemoglobin A1c (%) Uric Acid

6 Chlorella

IMPACT 1 / 5

EVIDENCE 1 / 5

Take 3 to 5 grams of chlorella in tablet or powder form daily, ideally before meals to improve digestion. Continue this supplementation for at least 2 to 3 months to observe benefits.

TYPICAL STARTING DOSE

3 g

Helps with these labs

Uric Acid Triglycerides LDL Cholesterol Hemoglobin A1c (%)

7 Psyllium

IMPACT 1 / 5

EVIDENCE 1 / 5

Take 5 grams of psyllium husk powder with at least 8 ounces of water. Do this once daily, preferably in the morning before breakfast. Continue this regimen daily for ongoing digestive health benefits.

TYPICAL STARTING DOSE

5 g

Helps with these labs

Triglycerides | LDL Cholesterol | Hemoglobin A1c (%) | Uric Acid

8 Whole Grains

IMPACT 2 / 5

EVIDENCE 3 / 5

Incorporate at least three servings of whole grains into your daily diet. This can include consuming foods such as whole grain bread, brown rice, whole grain pasta, and oats. Aim to replace refined grains with whole grains at each meal for optimal benefits.

Helps with these labs

LDL Cholesterol | Hemoglobin A1c (%) | Triglycerides | Uric Acid

9 Maintain Optimal Vitamin D Levels

IMPACT 2 / 5

EVIDENCE 3 / 5

Check your vitamin D levels, they should ideally be in the 30-66 ng/mL range. If your levels are lower than that, take a vitamin D supplement, 1000-4000 IU daily, to reach an optimal range.

TYPICAL STARTING DOSE

1000 iu

Helps with these labs

Triglycerides | Uric Acid | LDL Cholesterol | Hemoglobin A1c (%)

10 Avoid Phthalate Exposure

IMPACT 3 / 5

EVIDENCE 3 / 5

To avoid phthalate exposure, check product labels and choose phthalate-free options for personal care items, plastics (look for recycling codes 3 and 7 or the letters 'V' or 'PVC'), and household products. Additionally, reduce the use of plastic containers for food storage, especially those not marked as 'phthalate-free', and avoid microwaving food in plastic containers. Aim to make these changes consistently in your daily life for long-term health benefits.

Helps with these labs

Hemoglobin A1c (%) | Uric Acid

11 Almonds

IMPACT 1 / 5

EVIDENCE 1 / 5

Incorporate a handful of almonds (about 23 kernels) into your daily diet. You can eat them as a snack, add them to your breakfast cereals or yogurt, or include them in salads and other dishes. Do this consistently for ongoing health benefits.

Helps with these labs

- LDL Cholesterol
- Triglycerides
- Uric Acid
- Hemoglobin A1c (%)

12 Glycine

IMPACT 1 / 5

EVIDENCE 1 / 5

Take 3 to 5 grams of glycine supplement per day with water, preferably before bedtime for sleep improvement or spread throughout the day for general health benefits. Continue indefinitely as needed, but consult a healthcare provider for long-term use beyond three months.

TYPICAL STARTING DOSE

3 g

Helps with these labs

- Triglycerides
- Uric Acid
- Hemoglobin A1c (%)

13 Eat Fiber-Rich Foods

IMPACT 4 / 5

EVIDENCE 4 / 5

Incorporate foods high in fiber, such as fruits, vegetables, whole grains, and legumes, into your daily meals. Aim for a total dietary fiber intake of 25 to 30 grams per day, spread out over all meals.

Helps with these labs

- LDL Cholesterol
- Hemoglobin A1c (%)
- Triglycerides

14 Berberine

IMPACT 3 / 5

EVIDENCE 3 / 5

Take 500 mg of berberine two times a day before meals. Continue this regimen for up to three months, then evaluate its effects with your healthcare provider.

TYPICAL STARTING DOSE

500 mg

Helps with these labs

Hemoglobin A1c (%) | LDL Cholesterol | Triglycerides

15 Black Seed (Black Cumin)

IMPACT 3 / 5

EVIDENCE 3 / 5

Take 1000 mg of black seed (black cumin) supplement daily, preferably split into two doses of 500 mg each, one in the morning and one in the evening.

TYPICAL STARTING DOSE

1000 mg

Helps with these labs

LDL Cholesterol | Hemoglobin A1c (%) | Triglycerides