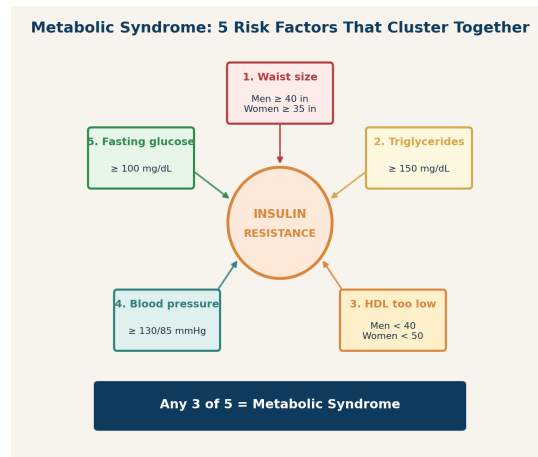


# Metabolic Syndrome

The Cluster of Risk Factors That Multiplies Your Heart Risk

When five key risk factors come together, they multiply each other. This guide explains what they are, how to measure them, and how to reverse them.



**Online:** <https://go.riasalimd.com/metabolic-syndrome-guide>

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## Names & Terms You Will Hear

| Term                     | Meaning                                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Metabolic Syndrome       | A group of 5 risk factors. Any 3 of the 5 at once means you have metabolic syndrome. Also called Syndrome X or insulin resistance syndrome.            |
| Insulin Resistance       | When cells stop using insulin well. The body makes more insulin to keep up. This raises blood sugar, blood fat, and blood pressure and lowers HDL.     |
| Belly Fat / Visceral Fat | Fat stored deep inside the belly around your organs — not the fat under the skin. Measured by waist size. This fat is more harmful than fat elsewhere. |
| Central Obesity          | Too much fat around the waist. The limit is 40 inches for men and 35 inches for women.                                                                 |
| Triglycerides            | Blood fats from food and from the liver. Above 150 mg/dL is one of the 5 criteria.                                                                     |
| HDL (Good Cholesterol)   | The good kind of cholesterol. It carries fat away from your arteries. Below 40 in men or below 50 in women is one of the 5 criteria.                   |
| Blood Pressure           | The force your blood puts on your artery walls. At or above 130/85 is one of the 5 criteria.                                                           |
| Fasting Glucose          | Blood sugar after 8 or more hours without food. At or above 100 mg/dL is one of the 5 criteria. This range is also called prediabetes.                 |
| ASCVD                    | Heart attack, stroke, or blocked leg arteries from plaque. Metabolic syndrome about doubles this risk.                                                 |
| Fatty Liver Disease      | When insulin problems cause fat to build up in the liver. Linked strongly to metabolic syndrome.                                                       |
| PCOS                     | A hormone problem in women. About half of women with PCOS also have metabolic syndrome.                                                                |



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**The 3-of-5 rule:**

Any 3 of these 5 = metabolic syndrome diagnosis:

1. Waist 40 in or more (men) / 35 in or more (women)
2. Triglycerides 150 mg/dL or higher
3. HDL < 40 (men) / < 50 (women) mg/dL
4. Blood pressure 130/85 mmHg or higher
5. Fasting glucose 100 mg/dL or higher

Being on treatment for any criterion counts as meeting it.



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## Metabolic Syndrome?

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- Metabolic syndrome is not one disease. It is a group of 5 risk factors that often appear at the same time. You are diagnosed when any 3 of the 5 are present.
- The 5 criteria are: (1) large waist — 40 inches or more in men, 35 or more in women; (2) high blood triglycerides, 150 or above; (3) low HDL (good) cholesterol — under 40 in men, under 50 in women; (4) high blood pressure, 130/85 or higher; (5) high fasting blood sugar, 100 or above. Taking medicine for any of these counts as meeting that criterion.
- Insulin resistance is the root cause. When cells stop using insulin well, the body makes more of it. Too much insulin raises blood sugar, fat in the blood, and blood pressure — and lowers HDL.
- Belly fat is especially harmful. Fat stored deep around your organs — not the fat under the skin — sends signals that damage blood vessels and make insulin work even less well.
- About 1 in 3 US adults has metabolic syndrome. It is more common with age, less exercise, weight gain, and a poor diet.
- Metabolic syndrome has no symptoms. Most people find out from a blood test or a waist measurement at a check-up.
- The good news: metabolic syndrome can often be reversed. Losing 7 to 10 percent of body weight can clear 3 or more of the 5 criteria in many people.



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Measuring waist circumference is the first of the 5 criteria — a snug tape placed level around the belly, not compressing the skin. This is checked at the same visit as your blood pressure and lab work. Photo: U.S. Air Force / Department of Defense (public domain).

### The 5 Diagnostic Criteria — Thresholds to Know

| #1<br>Waist                                                     | #2<br>Triglycerides                   | #3<br>HDL                                              | #4<br>BP                                | #5<br>Glucose                                 |
|-----------------------------------------------------------------|---------------------------------------|--------------------------------------------------------|-----------------------------------------|-----------------------------------------------|
| Men $\geq 40$ in<br>Women $\geq 35$ in<br>(or ethnic threshold) | $\geq 150$ mg/dL<br>(or on treatment) | Men $< 40$ mg/dL<br>Women $< 50$ mg/dL<br>(or treated) | $\geq 130/85$ mmHg<br>(or on treatment) | Fasting $\geq 100$ mg/dL<br>(or on treatment) |

**ANY 3 OF 5 = METABOLIC SYNDROME**

*The 5 diagnostic criteria with thresholds from the harmonized AHA/NHLBI/IDF definition. Being on treatment for any component counts as meeting that criterion. Any 3 of 5 = metabolic syndrome.*



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## The 5 criteria: what to measure, the threshold, and what helps

| Criterion               | Threshold (AHA/NHLBI)                   | First-Line Help                                                 |
|-------------------------|-----------------------------------------|-----------------------------------------------------------------|
| Central obesity (waist) | Men 40 in or more / Women 35 in or more | Weight loss; exercise; Mediterranean diet                       |
| Triglycerides           | 150 mg/dL or higher (or on treatment)   | Cut sugar/alcohol; lose weight; fibrate or omega-3 if very high |
| HDL (good cholesterol)  | Men < 40 / Women < 50 mg/dL             | Exercise; lose weight; quit smoking; niacin (adjunct)           |
| Blood pressure          | 130/85 mmHg or higher (or on treatment) | DASH diet; less sodium; exercise; ACE/ARB/CCB if needed         |
| Fasting glucose         | 100 mg/dL or higher (or on treatment)   | Weight loss; exercise; Mediterranean diet; metformin            |

### Insulin Resistance: Why the 5 Criteria Cluster Together

- Insulin helps cells take in sugar from the blood. When cells stop listening to insulin, the body makes more of it to keep up.
- Too much insulin tells the liver to make more blood fat. It lowers HDL. It raises blood pressure by keeping salt in the body. It raises blood sugar too. This is how one problem makes all 5.
- Belly fat stored around your organs is the key trigger. It sends harmful signals that make insulin work even worse.
- All 5 criteria share this one root cause. Fix the root — lose weight and move more — and all 5 can improve at once.
- Medicine treats one number at a time. Only lifestyle treats the root cause.



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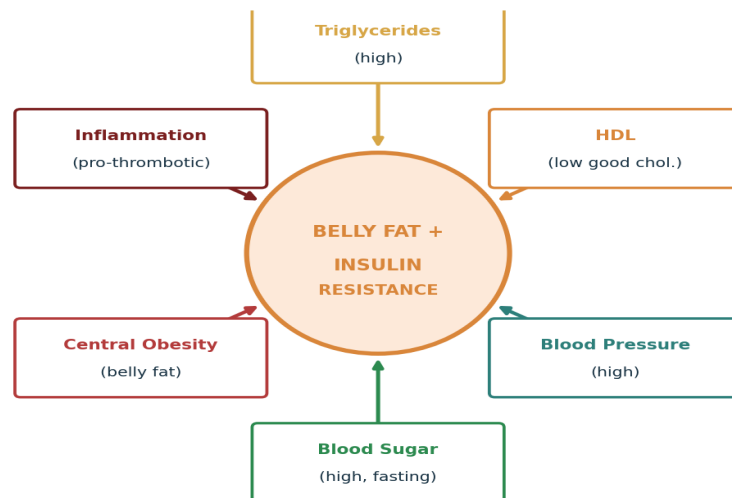


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## Why It Matters

- Metabolic syndrome about doubles your risk of heart attack and stroke. A large review of 87 studies and nearly 1 million people confirmed this (Mottillo et al., JACC 2010).
- It raises the risk of type 2 diabetes about 5 times. High fasting blood sugar — one of the 5 criteria — already means prediabetes for many people.
- The risks add up fast. Having 3, 4, or 5 factors at once is much worse than having any one alone.
- Metabolic syndrome is also linked to fatty liver, sleep apnea, PCOS, gout, and kidney disease. All are driven by the same root: poor insulin response and belly fat.
- The good news is that this can be turned around. The Diabetes Prevention Program showed: lose 5 to 7 percent of body weight and walk 150 minutes a week — that cut the risk of diabetes by 58 percent.
- Fixing all 5 at once gives the biggest results. Lifestyle often improves several at the same time.

### Insulin Resistance: The Root Cause That Drives the Cluster



*Insulin resistance and visceral fat are the shared root driving all five criteria. Each spoke feeds back to worsen the hub — a self-reinforcing cycle that lifestyle change can break.*



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**Largely reversible — but only with action.** Unlike most cardiovascular risk factors (age, genetics, prior heart attack), metabolic syndrome responds dramatically to lifestyle change. 7 to 10 percent weight loss can eliminate the diagnosis in many patients. The window of opportunity is widest before type 2 diabetes and heart disease become established.



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## Risk Factors

Some patients are more likely to develop this condition. Knowing your risk helps your care team take extra precautions.

| Risk Factor                       | Why It Increases Risk                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overweight — especially belly fat | Belly fat stored around your organs is the main driver of insulin problems. More waist size means higher blood sugar, blood fats, and blood pressure. |
| Not enough exercise               | Muscles that move use insulin well. When you sit most of the day, insulin does not work as well. A daily 30-minute walk helps a lot.                  |
| Unhealthy eating                  | Too much sugar, white bread, fried food, and soda raises blood fat, blood sugar, and weight all at once.                                              |
| Type 2 diabetes or prediabetes    | Both share the same root: insulin that does not work well. These conditions often go together with metabolic syndrome.                                |
| Family history                    | If a parent or sibling has metabolic syndrome or type 2 diabetes, your risk is higher. Genes can affect how the body uses insulin.                    |
| Sleep apnea                       | Poor sleep raises stress hormones and makes insulin work less. Treating sleep apnea with CPAP often improves blood sugar, blood pressure, and weight. |
| PCOS (in women)                   | Polycystic ovary syndrome is driven by the same insulin problems. About half of women with PCOS also have metabolic syndrome.                         |
| Certain medicines                 | Some antipsychotics, steroids, and certain blood pressure drugs can raise blood sugar, weight, or blood fats as side effects.                         |
| Age and menopause                 | Insulin response gets weaker with age. After menopause, women tend to gain belly fat — which raises metabolic syndrome risk.                          |



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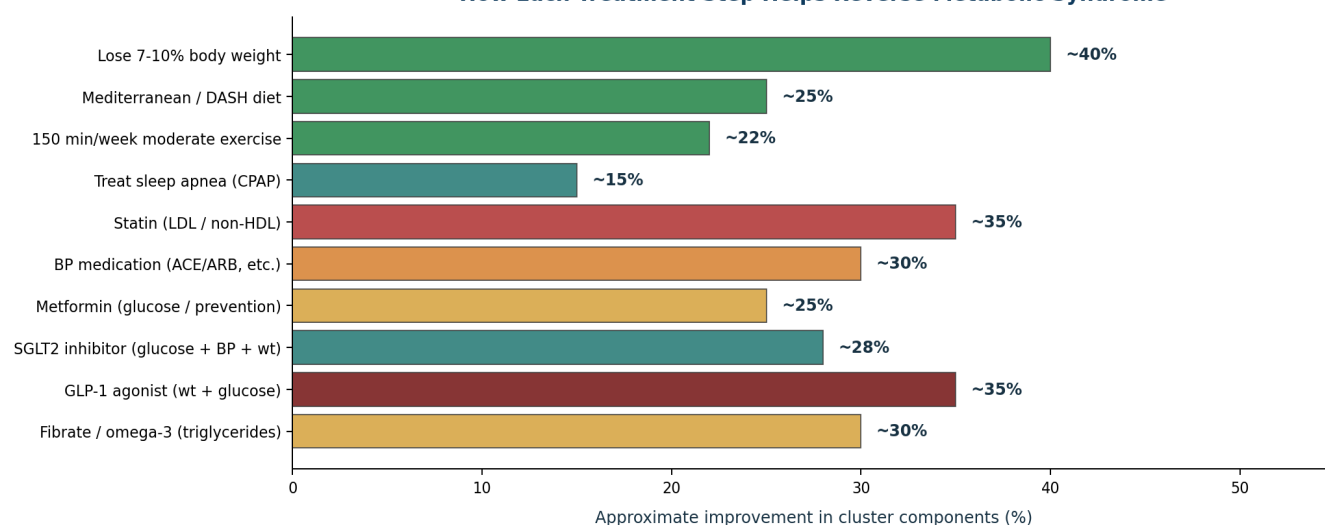


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## Treatment Options

- **Step 1 — Lose 7 to 10 percent of body weight.** For a 165-lb person that is 12 to 17 lbs. This often clears 3 or more of the 5 criteria at once. Even 5 percent is a good start.
- **Step 2 — Eat a heart-healthy diet.** The Mediterranean and DASH patterns lower blood fat, blood pressure, and blood sugar together. See our guide at [go.riasalimd.com/heart-healthy-eating-guide](https://go.riasalimd.com/heart-healthy-eating-guide).
- **Step 3 — Move 150 minutes per week.** Brisk walking, biking, or swimming all help your body use insulin better. Benefits show up within 2 weeks. See our guide at [go.riasalimd.com/exercise-heart-guide](https://go.riasalimd.com/exercise-heart-guide).
- **Step 4 — Test and treat sleep apnea.** CPAP lowers blood pressure, helps blood sugar, and makes it easier to lose weight. Ask us if you snore or wake up tired.
- **Step 5 — Medicine for each number that stays high.** Statins for high LDL. Blood pressure pills if BP stays above 130/85. Metformin or an SGLT2 drug if blood sugar stays high. Fibrates or omega-3 fish oil if triglycerides stay very high.
- **Step 6 — Ask about GLP-1 medicines (Ozempic, Wegovy).** These can cut weight by 10 to 15 percent and improve all 5 criteria. See our guide at [go.riasalimd.com/obesity-heart-guide](https://go.riasalimd.com/obesity-heart-guide).
- **See also:** our Diabetes guide at [go.riasalimd.com/diabetes-heart-guide](https://go.riasalimd.com/diabetes-heart-guide), BP guide at [go.riasalimd.com/htn-guide](https://go.riasalimd.com/htn-guide), and cholesterol guide at [go.riasalimd.com/cholesterol-guide](https://go.riasalimd.com/cholesterol-guide).

**How Each Treatment Step Helps Reverse Metabolic Syndrome**



*How much each intervention improves the cluster components. Lifestyle steps (green) address the root cause; medications (other colors) treat individual components. Most patients need a combination. Sources: DPP trial, PREDIMED, ADA Standards of Care 2024, EMPA-REG.*



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## Triglycerides and Low HDL: What Helps

- High blood fat (triglycerides) comes mainly from sugar, white bread and rice, and alcohol — not from eating fat. Cut sugar and sugary drinks first.
- Losing 5 to 10 percent of body weight cuts blood fat by 20 to 30 percent.
- HDL goes up with exercise, weight loss, and stopping smoking.
- If blood fat stays above 200 after lifestyle changes, a fish oil pill (Vascepa) can lower it 20 to 30 percent more. It also lowers heart risk (REDUCE-IT trial).
- If blood fat is above 500, a fibrate pill (fenofibrate) may be used to prevent a dangerous condition called pancreatitis.
- See our Triglycerides guide at [go.riasalimd.com/triglycerides-guide](https://go.riasalimd.com/triglycerides-guide).

## Weight Loss: The 7-to-10 Percent Rule

- Lose 5 to 7 percent of body weight. For a 200-lb person, that is 10 to 14 lbs. This cut the risk of diabetes by 58 percent in the DPP trial.
- Losing 7 to 10 percent can clear 3 or more of the 5 criteria. That means metabolic syndrome is gone.
- The PREDIMED trial showed: a Mediterranean diet cut heart events by 30 percent in people at high risk.
- One 30-minute walk improves blood sugar and insulin response for 12 to 24 hours after — even with no weight change.
- The best plan: eat 300 to 500 fewer calories a day, follow a Mediterranean style, and walk 150 minutes per week. Add strength moves twice a week.
- Once you reach your goal weight, recheck blood tests at 3 months. You may be able to cut back on medicines.



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## Comfort Measures at Home (No Medication Needed)

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These simple steps support healing and ease symptoms. Use them alongside any medication your doctor prescribes.

- Eat more plants. Use olive oil. Eat fish twice a week. Add beans and lentils often. Fill half your plate with vegetables. This style of eating helps all 5 criteria at once.
- Cut sugary drinks and white bread and rice. These raise blood fat and blood sugar faster than other food choices.
- Walk 30 minutes on most days. Three 10-minute walks work just as well as one long one.
- Lift weights or do bodyweight moves twice a week. More muscle means your body uses insulin better.
- Drink no more than 1 alcohol per day. Alcohol raises blood fat and blood pressure.
- Sleep 7 to 8 hours. Poor sleep makes blood sugar and blood pressure worse within a few days.
- Reduce stress. High stress raises a hormone called cortisol, which adds belly fat and makes insulin less effective.
- Stop smoking. Smoking raises blood fat and damages artery walls.



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## Risks, Benefits, and Alternatives

Every choice has trade-offs. Use this table to start the shared decision conversation.

| Option                                         | Risks                                                                                                                                                      | Benefits                                                                                                                                                              | Alternatives                                                                                                                     |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Lifestyle (weight loss + exercise + diet)      | Requires sustained effort; results take weeks to months. Most people regain weight within 2 years without ongoing support.                                 | Can eliminate 3 or more of the 5 criteria in many patients. DPP trial: 58% reduction in diabetes progression with 5-7% weight loss. No medication side effects. Free. | Medication for one or more components if lifestyle alone is not enough after 3 to 6 months.                                      |
| Statin (for elevated LDL / non-HDL)            | Muscle aches in 5-10% of patients; usually resolve with dose change or statin switch. Small glucose rise in pre-diabetics. Rarely, liver enzyme elevation. | Reduces LDL 30-50%, cuts heart attack and stroke risk by 25-35%. Well-studied, generic and cheap.                                                                     | Ezetimibe, bempedoic acid, or PCSK9 inhibitor if truly statin-intolerant.                                                        |
| BP medication (ACE/ARB/CCB)                    | ACE inhibitors can cause a dry cough (switch to ARB). Rare: low blood pressure, kidney function change. Diuretics may slightly raise glucose.              | Lowers BP to target (<130/80); reduces stroke, heart attack, and kidney damage risk significantly. ACE/ARBs also protect against kidney disease in diabetes.          | Lifestyle first; add medication if BP stays above 130/80 after 3 months of lifestyle change.                                     |
| Metformin (for prediabetes / elevated glucose) | GI upset (nausea, diarrhea) in 10-20% — better with extended-release form. Rare vitamin B12 deficiency.                                                    | DPP trial: 31% reduction in T2DM progression. Weight-neutral or slight weight loss. Safe long-term. Very cheap.                                                       | Lifestyle alone if weight-loss target is met. SGLT2 inhibitors or GLP-1 agonists if more weight loss or CV protection is needed. |



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| Option                                                     | Risks                                                                                                                | Benefits                                                                                                                                        | Alternatives                                                                                                               |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| GLP-1 agonist (Ozempic, Wegovy) for obesity-driven cluster | Nausea, vomiting in first 2-4 weeks. Slow stomach emptying. Expensive; insurance coverage varies. Weekly injections. | Semaglutide: 10-15% weight loss, significant improvement in all 5 criteria. STEP and SURMOUNT trials show CV event reduction in obese patients. | Lifestyle program + metformin first. Bariatric surgery for BMI of 40 or higher, or 35 or higher with severe comorbidities. |



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## Common Misconceptions

| Myth                                                  | Reality                                                                                                                                                                                                                                   |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "Metabolic syndrome is just being overweight."        | Weight is ONE of 5 criteria. You need 3 or more. Some thin people have it. Some overweight people do not. A waist measurement and blood tests are the only way to know for sure.                                                          |
| "I feel fine, so I must be OK."                       | Metabolic syndrome has no symptoms at all. High blood fat, mild high blood pressure, and high blood sugar cause no pain. You will not feel them until a heart attack or stroke happens. Only a blood test and a tape measure can find it. |
| "I need a separate pill for each of the 5 numbers."   | Losing 7 to 10 percent of body weight can fix blood fat, blood sugar, blood pressure, and waist size all at once. You often do not need a pill for each number when you lose weight.                                                      |
| "My doctor would have told me."                       | Metabolic syndrome is often not named at a visit even when the labs meet the criteria. Ask your doctor: 'Do I have metabolic syndrome?' You have a right to that answer.                                                                  |
| "No one thing is badly wrong, so it is not serious."  | Having 3, 4, or 5 mild problems at once is much worse than having just one. The cluster doubles heart attack and stroke risk even when each single number seems only a little high.                                                       |
| "I have diabetes, so this does not add anything new." | Diabetes and metabolic syndrome together are much worse than either one alone. If you have both, treating all 5 criteria — not just blood sugar — lowers your heart risk the most.                                                        |



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## Possible Complications

Knowing what can go wrong helps you spot problems early. Most complications are uncommon, especially with treatment.

| Where / What                | What Can Happen                                                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Heart attack                | Plaque builds up in heart arteries. Metabolic syndrome roughly doubles this risk.                                                                                     |
| Stroke                      | High blood pressure and high blood fat from the cluster are direct causes of stroke.                                                                                  |
| Type 2 diabetes             | Metabolic syndrome raises diabetes risk about 5 times. High fasting blood sugar — one of the 5 criteria — is often already prediabetes. This is the best time to act. |
| Fatty liver disease         | Too much insulin drives fat into liver cells. Over years it can scar the liver. Losing weight is the best treatment.                                                  |
| Sleep apnea                 | Belly fat can block the airway at night. Sleep apnea makes insulin work worse — a harmful cycle. Get tested if you snore or wake up tired.                            |
| Kidney disease              | High blood pressure and high blood sugar together damage the kidneys over many years.                                                                                 |
| PCOS and fertility problems | Women with PCOS often have the same insulin problem at its root. Losing weight and taking metformin can help restore ovulation.                                       |
| Gout                        | Insulin resistance reduces how well the kidneys clear uric acid. This can lead to painful crystal deposits in joints.                                                 |

### Cross-links to companion guides.

[Diabetes and the Heart](#) · [Understanding Cholesterol](#) · [Hypertension](#) · [Triglycerides](#) · [Obesity and Heart Health](#) · [Heart-Healthy Eating](#) · [Exercise and Your Heart](#).



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## Points to Know

If you remember nothing else, remember these key points.

- Metabolic syndrome = any 3 of 5: large waist, high blood fat, low HDL, high blood pressure, high fasting blood sugar. Taking medicine for one of these counts as meeting it.
- The root cause is belly fat and insulin that does not work well.
- It doubles your risk of heart attack and stroke. It raises your diabetes risk about 5 times.
- There are no symptoms. Only blood tests and a waist tape can find it.
- Lose 7 to 10 percent of body weight. This often clears 3 or more of the 5 criteria at once.
- Walk 150 minutes a week. It helps your body use insulin better.
- One lifestyle change can fix more than one number at the same time. You may not need a separate pill for each.
- Metabolic syndrome can be reversed with the right changes.



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## When to Call Us - and When to Call 911

If you are not sure, call. We would rather hear from you twice than miss a real problem.

- **Call 911** for chest pressure or pain, shortness of breath at rest, weakness on one side, sudden trouble speaking, or sudden severe headache. These are heart attack and stroke signs.
- **Call our office (727-943-5200)** if your waist measurement is at or above 40 inches (men) or 35 inches (women) and you have never had a metabolic syndrome screening conversation with your doctor.
- **Call us** if your fasting glucose comes back at 100 mg/dL or higher — this is prediabetes range and the time to act is now, before it becomes diabetes.
- **Call us** if your triglycerides are above 200 mg/dL or your HDL is below 40 (men) or 50 (women). These need treatment.
- **Call us** if you have been told you have sleep apnea but are not on treatment — untreated apnea worsens every component of metabolic syndrome.
- **Call us** if you have lost 7 to 10 percent of your body weight and want to recheck your labs — you may be able to reduce medications.
- **Ask us** about a referral to a structured lifestyle program (CDC-recognized Diabetes Prevention Program). These 12-month group programs have the best track record for long-term reversal.

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## Trusted Resources

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The links below are the trusted resources Dr. Ali used to write this guide and that he recommends you visit for more information. Each is a clickable link in the digital version and a Short.io tracked URL on the printed version.

- [AHA — About Metabolic Syndrome](#) - AHA patient page with criteria, risk explanation, and lifestyle advice.
- [NHLBI — Metabolic Syndrome](#) - Federal reference with full diagnostic criteria and management guidance.
- [Cleveland Clinic — Metabolic Syndrome](#) - Plain-language overview including NAFLD, PCOS, and sleep apnea links.
- [Mayo Clinic — Metabolic Syndrome](#) - Patient-friendly summary of diagnosis, risk factors, and treatment.
- [NIH NIDDK — Insulin Resistance and Prediabetes](#) - Explains the insulin-resistance mechanism and the path to prevention.
- [Dr. Ali — Diabetes and the Heart Guide](#) - Companion guide on T2DM as a cardiovascular disease.
- [Dr. Ali — Understanding Cholesterol Guide](#) - Companion guide on LDL, HDL, triglycerides, and statin therapy.
- [Dr. Ali — Hypertension Guide](#) - Companion guide on blood pressure management.
- [Dr. Ali — Triglycerides Guide](#) - Companion guide on high triglycerides — diet, medicines, and risk.
- [CDC — National Diabetes Prevention Program](#) - Find a CDC-recognized lifestyle program near you for metabolic syndrome reversal.



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## Sources Used to Build This Guide

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Every recommendation in this guide is grounded in one or more of the studies, guidelines, or trusted resources below. Short links are tracked so Dr. Ali can see which references patients are reading; nothing personally identifying is captured.

- [AHA / ACC — Metabolic Syndrome Definition and Management](#) [Clinical Guideline]  
Harmonized AHA/NHLBI/IDF definition of the 5 diagnostic criteria and thresholds; management framework.
- [NHLBI — Metabolic Syndrome Patient Information](#) [Government Health Resource]  
NHLBI criteria for central obesity, triglycerides, HDL, blood pressure, and fasting glucose; lifestyle reversal evidence.
- [Alberti et al. — Harmonizing the Metabolic Syndrome \(Circulation 2009\)](#) [Peer Reviewed Journal]  
Landmark IDF/NHLBI/AHA/WHF/IAS/IASO harmonized definition paper establishing the 3-of-5 criteria framework.
- [Grundy SM et al. — Metabolic Syndrome — A Multiplex Cardiovascular Risk Factor \(JACC 2008\)](#) [Peer Reviewed Journal]  
JACC review on CVD risk doubling and ~5x T2DM risk from metabolic syndrome; insulin resistance as pathophysiological hub.
- [Mottillo S et al. — The Metabolic Syndrome and Cardiovascular Risk \(JACC 2010\)](#) [Peer Reviewed Journal]  
Meta-analysis of 87 studies (951,083 patients) confirming 2x cardiovascular event risk and all-cause mortality with metabolic syndrome.
- [Cleveland Clinic — Metabolic Syndrome](#) [Authoritative Patient Resource]  
Plain-language framing of criteria, lifestyle reversal, and cross-linked conditions (NAFLD, PCOS, sleep apnea).
- [Mayo Clinic — Metabolic Syndrome](#) [Authoritative Patient Resource]  
Patient-friendly diagnostic criteria, risk factor overview, and management principles.
- [Huang PL — A comprehensive definition for metabolic syndrome \(Dis Model Mech 2009\)](#) [Peer Reviewed Journal]  
Mechanistic review of insulin resistance, visceral adiposity, pro-inflammatory/pro-thrombotic state driving the cluster.
- [ADA Standards of Medical Care in Diabetes 2024 — Prevention of Type 2 Diabetes](#) [Clinical Guideline]  
Evidence for 7-10% weight loss preventing T2DM progression from metabolic syndrome / prediabetes; lifestyle program evidence (DPP trial).
- [Estruch R et al. — PREDIMED Trial — Primary Prevention with Mediterranean Diet \(NEJM 2013\)](#) [Peer Reviewed Journal]  
30% cardiovascular event reduction with Mediterranean diet in high-risk patients; lifestyle management pillar.



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## About This Guide

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**Version:** 2026-08-15

**Reviewer note:** Reviewed Cleveland Clinic, Mayo Clinic, AHA, and NHLBI Metabolic Syndrome pages. This guide adds: a 5-criteria visual with exact thresholds (cover and body diagram); an insulin-resistance hub-and-spoke diagram naming the six downstream consequences; a 10-row lifestyle-vs-medication effect chart; per-component BodySubsections for deep dives; and explicit cross-links to companion cholesterol, diabetes, hypertension, and triglycerides guides.

## Disclaimer

This guide is for educational purposes only and does not replace medical advice from your physician. Recommendations may not apply to every patient. Always follow the specific instructions of Dr. Ali and your care team. In an emergency call 911 or go to the nearest emergency department.



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