

What Is Metabolic Dysfunction–Associated Steatohepatitis (MASH)?

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What Is MASH?

Ira Breite, MD, a gastroenterologist at Mount Sinai Health System, discusses metabolic dysfunction–associated steatohepatitis (MASH).

Metabolic dysfunction–associated steatohepatitis (MASH) is a progressive form of [liver disease](#) that occurs when there's an accumulation of fat in the liver.

MASH, which was formerly known as nonalcoholic steatohepatitis (NASH), is more common in people who have certain conditions associated with high blood lipid (fat) levels, such as [type 2 diabetes](#) and obesity. It is a more advanced stage of [metabolic dysfunction–associated steatotic liver disease \(MASLD\)](#), formerly known as nonalcoholic fatty liver disease (NAFLD).

slowed, and even reversed, by medication and healthy lifestyle changes.^[1]

Stages of MASH

MASH is the second stage in a disease spectrum caused by excessive liver fat:^[2]

MASLD: The liver has accumulated an excess of fat. MASLD, which typically has no symptoms, is extremely common, affecting up to a quarter of American adults.

MASH: Excess fat has begun to cause inflammation and cell damage.

Fibrosis: Inflammation has caused scarring, and the liver begins to lose function.

Cirrhosis: Permanent scarring has seriously reduced the liver's ability to function, leading to symptoms and complications.



How to Make Healthy MASH Lifestyle Changes That Actually Last

Starting small is key to sustainability. Learn the secret to building habits like taking a 10-minute walk or cutting out one soda and building on those changes over time.

Start Small, Start Now

Only about 5 to 12 percent of people with MASH will ever experience cirrhosis. The odds of stopping or reversing this disease progression are greatly enhanced by early diagnosis and treatment.^[1]

right side of the abdomen.

As MASH progresses to cirrhosis, more distinct symptoms may accumulate, including:^[3]

[Jaundice](#), or yellowing of the skin and eyes

Itching

Spider veins

Bruising and bleeding easily

Swelling of the abdomen (ascites)

Confusion, drowsiness, and slurred speech (hepatic encephalopathy)

Causes and Risk Factors of MASH

MASH is more likely to occur in people with [metabolic syndrome](#), a group of warning signs associated with [obesity](#).^[4] Metabolic syndrome is defined as the presence of three or more of the following conditions:

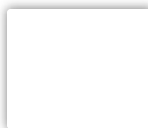
[Hypertension](#) (high blood pressure)

[Abdominal obesity](#) (belly fat)

[Prediabetes](#), [type 2 diabetes](#), or elevated fasting glucose

[Low HDL](#) (“healthy”) [cholesterol](#)

[High triglycerides](#)



How Is MASH Diagnosed?

If your doctor suspects you have liver disease, they'll run a series of tests that can identify liver damage. Because MASLD and MASH usually have no early symptoms, many people find out they have liver disease after routine blood tests detect an issue.

To [diagnose MASH](#), tests may include the following:^[5]

Blood Tests A blood sample can help a doctor detect evidence of liver inflammation, including elevated liver enzymes. A lipid panel will indicate whether you have elevated levels of fat in your blood, while a fibrosis assessment test can identify fibrosis, or scarring. Additional blood tests may rule out other conditions.

Imaging Tests An abdominal ultrasound, CT scan, or MRI will allow your doctor to look at your liver and check for signs of inflammation, swelling, and scarring.

Liver Stiffness Tests These modified imaging tests measure stiffness and fibrosis levels in your liver.

Liver Biopsy The gold standard test to confirm a MASH diagnosis is a liver biopsy, although it's usually not needed if your doctor is able to find evidence of MASH through other testing measures. To perform a biopsy, your doctor will insert a small needle through your abdomen to collect a tissue sample from your liver.

Treatment and Medication Options for MASH



symptoms and complications.

Medication Options

In the United States, there are two drugs approved for the treatment of MASH:

Resmetirom (Rezdiffra), a daily pill, can be prescribed to people with MASH who have moderate to advanced fibrosis. The drug activates a hormone in the liver that reduces inflammation and fat accumulation, reversing liver scarring.^[6]

Semaglutide (Wegovy), a weekly injection, can also be prescribed to people with MASH who have moderate to advanced fibrosis. The drug, which is also a blockbuster in the treatment of obesity and type 2 diabetes, promotes weight loss and other metabolic changes that reduce fat levels in the liver, leading to improvements in inflammation and reversal of scarring.^[7]

Both resmetirom and semaglutide are intended to be used in combination with lifestyle changes.

Though only two drugs are indicated for MASH, many people with the condition will be prescribed other drugs to control MASH risk factors such as [diabetes](#), high blood pressure, and cholesterol.

If your condition progresses to cirrhosis, it is likely that you will need to take additional medications to help control the symptoms and side effects. Options could include:^[8]



Hypertension drugs to reduce blood pressure in the portal vein, the large vein attached to the liver

Cholesterol-lowering drugs to relieve itching

Liver Transplant

A liver transplant is the only treatment for the most advanced cases of liver disease. Unfortunately, there are more people who need a liver transplant than there are donors available. Doctors use a risk of death estimate to decide what priority potential transplant recipients have on the donation waiting list.^[9]

This is an intense procedure, and recipients will need to take anti-rejection drugs for the rest of their lives, but it can extend lifespan by years. About 75 percent of people who receive a liver transplant live another five years.

Lifestyle Changes for MASH

[Lifestyle modifications](#) are central to the treatment of liver disease, and are the only direct treatment for the many people who have not yet developed moderate fibrosis.

Expert recommendations for a healthy MASH lifestyle don't necessarily differ much from general health recommendations. That makes sense, because the development and progression of MASH is intimately linked to that of other lifestyle conditions such as diabetes, obesity, high blood pressure, high cholesterol, and heart disease.^[10]

Choose a [heart-healthy diet](#), with plenty of vegetables, whole grains, minimally processed ingredients, and wholesome sources of fat and protein.

Prioritize sleep quality and good mental health.

Your doctor may also advise you to limit or avoid certain over-the-counter medications and herbal supplements that are known to harm the liver, including acetaminophen (Tylenol).^[11]

Prevention of MASH

MASH is preventable using the same general lifestyle modifications that are recommended to help treat MASH and to prevent related conditions such as obesity, diabetes, and metabolic syndrome. Probably the most effective prevention is a healthy diet and physical activity to maintain a healthy weight.

Although MASLD is widespread, only about 13 percent of people with the condition also develop MASH.^[12]

MASH Prognosis

MASH does not necessarily have any effect on your quality of life or life expectancy. Most people with the condition will not develop advanced fibrosis or cirrhosis.

When scarring progresses to an advanced and irreversible stage, however, the loss of liver function can have a profound effect on long-term health. If cirrhosis is diagnosed and treated early, studies suggest that life expectancy may be an additional 10 to 15 years. If cirrhosis progresses to the point that it causes severe complications, such as internal bleeding, life expectancy may be as short as three to

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Complications of MASH

If you've been diagnosed with MASH, the primary worry is that liver fat and inflammation will lead to cirrhosis, irreversible liver damage. Only a minority of people with MASH will develop cirrhosis, a condition that has several potentially dangerous consequences:^[14]

Liver failure, which may require a liver transplant to be treated

[Liver cancer](#), or hepatocellular carcinoma (HCC), a deadly form of cancer

Hepatic encephalopathy, a potentially life-threatening form of brain dysfunction that occurs when toxins build up in the blood

Research and Statistics: How Many People Have MASH?

Metabolic liver disease is extremely common, and rates are only growing hand in hand with the obesity and type 2 diabetes epidemics. The latest estimates suggest that the following numbers of American adults have developed some form of the condition:^[15]

MASLD: 86.3 million (33.7 percent of U.S. adults)

MASH: 14.9 million (5.8 percent)

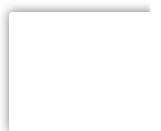
Medically significant fibrosis: 6.7 million (2.6 percent)

Disparities and Inequities in MASH

In the United States, MASH appears to be most common among people of Hispanic descent, especially in men and those of Mexican origin. Some 45 percent of Hispanic adults have MASLD, compared with 33 percent of white adults and 24 percent of Black adults. Hispanic adults with MASLD are also more likely to progress to MASH and to more serious disease outcomes.

Experts believe that there is no one factor driving these disparities, but that they may instead be a result of genetics, environment, culture, and socioeconomic circumstances.^[16]

Related Conditions of MASH



contribute to MASH because they may increase the amount of fat in the liver:^[17]

Obesity

Type 2 diabetes

Insulin resistance

Metabolic syndrome

High cholesterol

High triglycerides

Support for People With MASH

There are a number of organizations in America that can help [educate and empower people with MASH](#).

American Liver Foundation

The American Liver Foundation (ALF) offers online resources and education, and hosts a Facebook support group for MASH to help you connect with others.

Community Liver Alliance

The Community Liver Alliance (CLA), which is based in Pittsburgh, develops videos and educational materials, hosts workshops, and coordinates support groups. They also help facilitate medical care and are a source of information on clinical trials testing experimental liver health therapies.

Global Liver Institute

The Takeaway

MASH is a progressive liver disease caused by the accumulation of fat in the liver and is often found in people with conditions like obesity and type 2 diabetes.

Early diagnosis and treatment of MASH can significantly slow or reverse the disease's progression.

If untreated, MASH can cause cirrhosis, which may lead to dangerous complications such as liver failure and liver cancer.

Lifestyle modifications, including a healthy diet and regular exercise, are crucial for managing MASH and preventing further liver damage.

FAQ

Is MASH related to alcohol?

No. MASH is not caused by drinking alcohol, though your doctor may advise you to [limit alcohol](#), or abstain completely, to keep from further stressing your liver.

Is MASH reversible?

How fast does MASH progress?

Fatty Liver Alliance: [The Crucial Role of Moderate Exercise for MASLD and MASH](#)

American Liver Foundation: [How Liver Disease Progresses](#)

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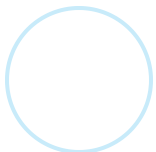
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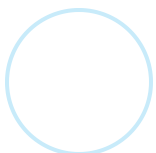
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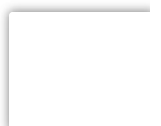


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