Medically Reviewed

How Does MASLD Progress to MASH?

Knowing which risk factors cause metabolic dysfunction-associated steatotic liver disease to transition toward a more aggressive form can help you take action and protect liver function.

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As many as 44% of adults in the United States may be living with metabolic dysfunction-associated steatotic liver disease (MASLD), a chronic condition characterized by excess fat buildup in the liver, often linked to metabolic issues like type 2 diabetes, high blood pressure, and obesity.

You may be one of them and not even know it: One recent study found fewer than 1% of adults with MASLD were aware they had the disease, which is often asymptomatic and can go unnoticed for years. Formerly known as nonalcoholic fatty liver disease, or simply fatty liver, MASLD in its early stages can often be successfully managed with lifestyle changes such as following a healthy diet and regular physical activity. However, about 20% of those with the condition will progress to a more aggressive form of liver disease called metabolic dysfunction-associated steatohepatitis, or MASH.

Since early intervention is essential for preventing cirrhosis and irreversible liver damage that can come with MASH, it's essential to know if you have MASLD and get prompt treatment to help slow or even stop disease progression.

MASLD vs. MASH

MASLD vs. MASH: What's the Difference?

Your liver is responsible for many key functions, from filtering out harmful substances and breaking down toxins to producing hormones and proteins. It also helps break down fats in your blood to produce energy—but if there are high levels, fats may build up in the liver.

MASLD is defined as having more than 5% of your liver's weight composed of fat, most often due to metabolic factors such as being overweight or having obesity, type 2 diabetes, or high cholesterol. By itself, MASLD does not cause serious harm. But MASLD can progress to MASH if the fat leads to inflammation and damage to liver cells. With MASH, the inflamed liver begins to swell and form scar tissue—a process called fibrosis. If untreated, this scar tissue will harden and begin to replace healthy liver tissue. Eventually this can overtake the organ and become cirrhosis, a condition in which the majority of the liver is scar tissue, and it loses its ability to function.

"When fibrosis becomes cirrhosis, this can lead to complications of liver failure, liver cancer, and the need for a liver transplant," says Lisa Ganjhu, D.O., a gastroenterologist at NYU Langone Health in New York City. There can be other issues as well, she adds, including gastrointestinal bleeding and a higher risk of developing cardiovascular disease.

Disease Consequences

The Consequences of Liver Disease Progression

Both MASLD and MASH have been growing in prevalence, with one recent study warning that if more effective treatments are not implemented, health systems should plan for large increases in liver cancer and transplants.

"MASLD is becoming very common, and it's possible that within a couple decades, its progression to MASH will be the leading indication for a liver transplant," says Peter Salam Beah, M.D., a hepatologist at Northwell's Lenox Hill Hospital in New York City. "What's important to recognize is that there are some meaningful interventions that can be done at every stage of both MASLD and MASH. Knowing the risk factors for progression is important because there is a great deal that patients and their health teams can do in terms of taking control of the rate of that progress."

If you have MASLD, it's not inevitable that you'll be on the road toward developing MASH—and even if you do have an early stage of MASH, that doesn't mean you'll eventually be in line for a liver transplant, says Dr. Beah. But there are some risk factors that can make this type of progression more likely.

Metabolic Factors

Metabolic Health Factors

Considering that both MASLD and MASH are forms of metabolic dysfunction, it's important to understand the metabolic factors that play a key part in whether this progression happens. These include:

- High blood pressure
- High levels of triglycerides, which can raise "bad" LDL cholesterol
- Low "good" HDL cholesterol
- Obesity, particularly excess abdominal fat

- Type 2 diabetes

When you have more than one of these factors, you might be dealing with metabolic syndrome, which also raises your risk for heart disease and stroke, in addition to increasing your risk of progression toward MASH.

“Managing these metabolic factors effectively can go a long way toward improving your chances of halting and perhaps even reversing MASLD,” says Dr. Beah.

For example, a study in the journal *Gastroenterology* looking at the effect of weight loss on MASLD found that participants who lost about 5% of their body weight saw significant reduction in their liver disease activity, while the majority of those who lost about 10% of their body weight resolved their MASLD completely.

Behavioral Factors

Behavioral Risk Factors

There are several habits that also play a role in MASLD progression, says Dr. Beah. In some ways, that’s good news, since it means these can be the most modifiable factors. They include:

- Alcohol consumption
- Diet high in saturated fats, refined carbohydrates, sugary treats, and highly processed foods
- Poor sleep
- Sedentary lifestyle
- Smoking
- Stress

“We know that a fatty liver can be made worse by anything that affects insulin in a negative way,” says Dr. Beah. “All of these behaviors can increase your risk of insulin resistance, which will be detrimental for liver health.”

These factors can also impair your overall health. For instance, a recent study on MASLD found that alcohol not only contributes to insulin resistance, but also promotes mitochondrial dysfunction, depletion of micronutrients, low muscle mass, inflammation, and disruption to the intestinal barrier. In that study, alcohol amount wasn't included as a variable, but in general, the Centers for Disease Control and Prevention clarify that moderate alcohol use is considered to be two drinks or less in a day for men and one drink or less in a day for women.

Non-Modifiable Factors

Non-Modifiable Risk Factors

There are several factors that remain outside of your control when it comes to disease progression, with family history being the most significant, according to Dr. Beah. These also include:

- **Age:** Your risk increases as you get older, particularly after age 45.
- **Menopause:** Postmenopausal women are at higher risk for developing advanced liver disease with MASLD, largely due to a drop in estrogen, which is protective against metabolic dysfunction, including factors like abdominal weight gain and insulin resistance.
- **PCOS:** Those with polycystic ovary syndrome, an endocrine disorder, tend to have higher risk of MASLD and progression to MASH, due to the way PCOS affects insulin resistance.
- **Sex:** Men have a higher prevalence of MASLD overall.

Although there's not much you can do about these factors, knowing about them can be helpful if you have MASLD so you can talk to your doctor about whether they may be contributing to disease progression.

Next Steps

Modifying Your Risk

Although you can't change your family's medical history or your age, there are steps you can take to slow progression if you're concerned about MASLD and its potential progression to MASH. Most of the risk factors can be modified to some degree by changes in lifestyle, says Dr. Beah.

Per the American Liver Foundation, lifestyle modifications including healthy eating habits, regular exercise, and weight loss can help address changes associated with MASLD. And in August 2025, the Food and Drug Administration approved the GLP-1 weight loss drug Wegovy (semaglutide) as a treatment for MASH.

"It would be challenging to address MASLD, and especially MASH, only through lifestyle habits, but those do make a significant difference when it comes to progression," says Dr. Beah. And ultimately, the more you can do to lower your risk of progression, the healthier your liver will be.

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