

PRIMARY CARE MASLD* TOOLKIT

*METABOLIC DYSFUNCTION-ASSOCIATED STEATOTIC LIVER DISEASE
(FORMALLY CALLED NAFLD: NONALCOHOLIC FATTY LIVER DISEASE)

SCREENING

**PATHOPHYSIOLOGY
AND
EPIDEMIOLOGY**

DIAGNOSIS

**PATIENT
EDUCATION**

**BIBLIOGRAPHY
AND
GUIDELINES**

MANAGEMENT

SCREENING

Who's at greatest risk and would benefit most from screening?

- Patients who are overweight (85-94th percentile for pediatrics; BMI 25*-29.9kg/m²) or have obesity (≥ 95th percentile for pediatrics; BMI ≥ 30kg/m²).
- Patients with Type 2 diabetes or prediabetes (fasting glucose ≥ 100mg/dL, A1C ≥ 5.7, or 2-h OGTT ≥140 mg/dL).
- Patients with one or more features of metabolic dysregulation:
 - Central adiposity (weight circumference > 94 cm in males, 80 cm in females, or 95th percentile for pediatric patients).
 - Insulin resistance (polycystic ovary syndrome, acanthosis nigricans).
 - Obstructive sleep apnea.
 - Triglycerides > 150 mg/dL in those 10 years or older (≥ 100mg/dL in people under 10 years).
 - HDL-C < 50 mg/dL (men) or < 40mg/dL (women and pediatrics).
 - Blood pressure ≥ 130/85 mm Hg (or ≥ 95th percentile for pediatric patients).
- Patients with a family history of MASLD.

When and how often should I screen?

- Start at ages 9-11 for pediatric patients.
- Screen every 2 to 3 years thereafter (more often if more risk factors develop).

How should I screen?

- For pediatrics, screen with ALT (considered a positive screen if 22 U/L for girls and 26 U/L for boys).
- For adults, ALT and Fibrosis-4 (FIB-4) score or nonalcoholic fatty liver disease score (NFS)^.

What do I do with a positive screen?

- MASLD is a diagnosis of exclusion, so rule out other causes of elevated ALT/AST with history, physical exam and appropriate laboratory tests. See the diagnostic tools page.
- Determine risk of advanced fibrosis.

*23kg/m² for those with Asian genetic heritage, ^ requires ALT/AST, and platelets level to be drawn first. NFS requires addition of albumin.

Abbreviations: A1C, glycosylated hemoglobin A1C; ALT, alanine aminotransferase; BMI, body mass index; FIB-4HDL-C, high-density lipoprotein-cholesterol; OGTT, oral glucose tolerance test.

PATHOPHYSIOLOGY, EPIDEMIOLOGY AND NOMENCLATURE

- MASLD affects 25% of adults in the United States, and more than 25% of those with MASLD have the more severe form – metabolic dysfunction-associated steatohepatitis (MASH). (Figure 1)
- MASLD was formerly known by terms such as nonalcoholic fatty liver disease (NAFLD), non-alcoholic fatty liver (NAFL) and non-alcoholic steatohepatitis (NASH). In 2023, international experts reached a consensus to rename the condition to reduce the stigma associated with old nomenclature and better capture the pathophysiology of the problem (Rinella et al., 2023). MASLD is now considered a type of steatotic liver disease (SLD). (Figure 2)
- It can be hard to predict who will go on to develop MASH. Genetics influences much of this and is an area of ongoing research.
- MASLD and MASH are increasing in prevalence and are expected to become leading reasons for liver transplantation in the near future.
- Patients with MASLD have an increased risk of liver-related mortality and morbidity, but it is actually cardiovascular disease (CVD) that is the leading cause of mortality for patients with MASLD.
- Patients with Asian or Hispanic genetic heritage may develop MASLD at a leaner body mass than other patients.
- It is possible to have SLD from both metabolic dysfunction and excess alcohol use. In the presence of both, the term MetALD is used. (Figure 2)

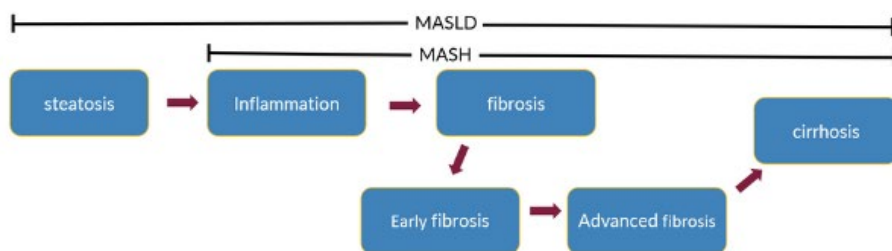


Figure 1. Pathophysiologic progression of SLD. First, steatosis develops. Over time and with the influence of genetics and multiple other factors, inflammation can develop. However, in some patients, inflammation never develops and these patients never progress into the severe forms of SLD. When inflammation is present, the term steatohepatitis is used. Eventually, steatohepatitis can cause fibrosis, which can progress to advanced stages and eventually cirrhosis. The progression to advanced fibrosis can occur as quickly as six years in some patients but usually happens over 10-15 years. With MASLD, the focus is to differentiate patients with early versus advanced fibrosis, since patients with advanced fibrosis are best managed by hepatology and gastroenterology. The challenge is that MASLD is often a silent disease with few signs or symptoms, requiring an astute clinician!

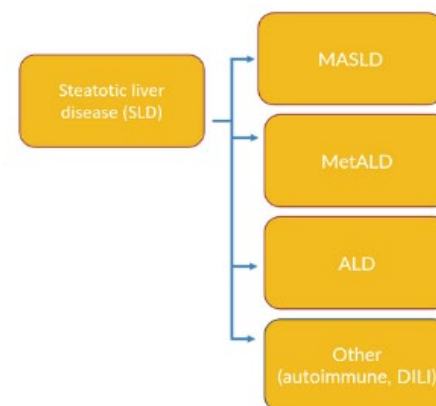


Figure 2. SLD is used to refer to liver damage from a variety of etiologies, including MASLD, alcohol overuse (ALD), both metabolic dysfunction and alcohol overuse (MetALD) or other causes, such as autoimmune conditions or medication side effects (drug-induced liver injury [DILI]) (Rinella et al., 2023).

DIAGNOSTIC TOOLS

AUDIT-C

The Audit-C is a tool used to screen for excessive use of alcohol, and it can help determine if alcohol could be contributing to liver dysfunction.

FIB-4

The FIB-4 Score is one of two non-invasive options that can be used to screen and diagnose advanced fibrosis in patients with suspected MASLD.

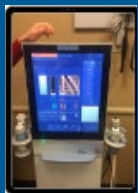
NFS

The NAFLD Fibrosis Score (NFS) is one of two non-invasive options that can be used to screen and diagnose advanced fibrosis in patients with suspected MASLD.

HEPATITIS C SCREEN

All patients being evaluated for MASLD should have hepatitis C ruled out before a diagnosis of MASLD is made. Also, consider hepatitis B screening if at risk.

LSM/VCTE

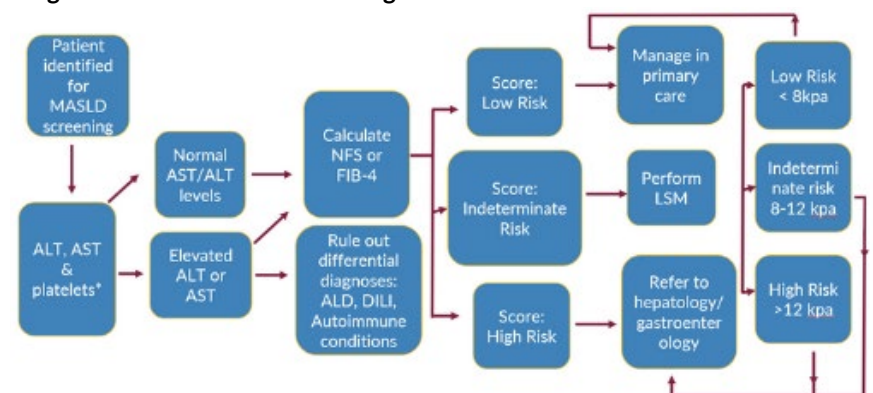


Liver stiffness measurement (LSM) is measured through vibration-controlled transient elastography (VCTE).

DIAGNOSTIC TIPS

- SLD is often silent and, without high suspicion, may only be identified incidentally from ALT/AST elevations or steatosis on liver ultrasound.
- MASLD should be a diagnosis of exclusion. Rule out other etiologies – such as alcohol, autoimmune conditions and infectious hepatitis – with history, physical and laboratory testing.
- Normal ALT/AST is not sensitive enough to exclude the possibility of MASLD, so patients could still have MASLD despite normal AST/ALT. In adults, if suspicion for MASLD is high enough, continue to screen for advanced fibrosis with FIB-4 or NFS, even if AST/ALT levels are normal.
- A liver biopsy was traditionally the only way to differentiate between mild and advanced fibrosis. However, a biopsy is costly, has risks and requires expert training. Therefore, easier, safer and more accessible approaches like the NFS, FIB-4 and LSM have been developed.
- The NFS and FIB-4 are only validated for adult use and should not be used in patients under age 18. They are most accurate in people older than age 35.

Figure 1. MASLD identification algorithm



PATIENT EDUCATION

Healthy Eating Plate

The Harvard Healthy Eating Plate is recommended by MASLD experts for nutrition counseling.

Targeting Heart Rate

Exercise recommendations for patients with MASLD are the same as those for cardiovascular health. This resource from the American Heart Association helps patients understand target heart rate and exercising for health. Patients should be encouraged to exercise at least 150 minutes per week.

Mediterranean Diet

The Mediterranean diet is recommended by MASLD experts for nutrition counseling and weight loss.

What Is a Standard Drink

This patient education resource reviews safe alcohol consumption guidelines.

Sugar Stacks

Avoiding excess sugar in the diet, including sugar-sweetened beverages, is important. Sugar Stacks is a website to help illustrate how much sugar is in food and drinks.

Patient One-pager

Download this brief one-pager, which can be used to help you educate patients.

MANAGEMENT

- Management of MASLD in primary care focuses on maximizing treatment of metabolic dysfunction through controlling diabetes, dyslipidemia and hypertension with both pharmacotherapy and nonpharmacotherapy strategies, as recommended by guidelines.
- In patients with diabetes, GLP-1RAs and pioglitazone are recommended for prioritized consideration as part of the treatment plan, since these medications have been shown to benefit patients with MASLD.
- Patients should also be counseled to refrain from using alcohol since alcohol use can accelerate fibrosis progression.
- Several novel pharmacotherapies are in Stage 2-3 trials, so be sure to stay tuned for updates in the near future!
- When MASLD occurs in a patient who also has excess alcohol use, the condition is diagnosed as MetALD and the management plan includes both management of excess alcohol use and metabolic dysfunction.

Motivational Interviewing Resources

Management of MASLD in primary care also heavily focuses on encouraging healthy nutrition, exercise and weight loss. Motivational interviewing skills are helpful when motivating patients to adopt these lifestyle practices. Click above for some resources on how to use motivational interviewing!

Obesity Management Guidelines

The link above will take you to guidelines for the management of obesity. Even 5-10 % weight loss can improve fibrosis severity or minimize chances of progression.

WHEN TO REFER TO HEPATOLOGY OR GASTROENTEROLOGY

- LSM is unavailable in your area and recommended based on FIB-4 or NFS.
- High risk score on FIB-4, NFS or LSM.
- Evidence of cirrhosis — may be identified for the first time by imaging or during evaluation for a new GI bleed.
Note: Decompensated cirrhosis occurs when ascites, hepatic encephalopathy or esophageal varices are present. Compensated cirrhosis can often be “silent.”

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GUIDELINES

**American College of
Gastroenterology:
Evaluation of Elevated
Liver Chemistries**

**North American
Society of Pediatric
Gastroenterology,
Hepatology and Nutrition
MASLD Guidelines**

**American Association
for the Study of Liver
Disease MASLD
Guidelines**

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