Dr. Kacey Lyons is an Instructor of Medicine and Gastroenterology Nurse Practitioner at Baylor College of Medicine in Houston, Texas. She earned her Doctor of Nursing Practice from The University of Texas Health Science Center at Houston and her Bachelor of Science in Nursing from The University of Texas at Arlington.

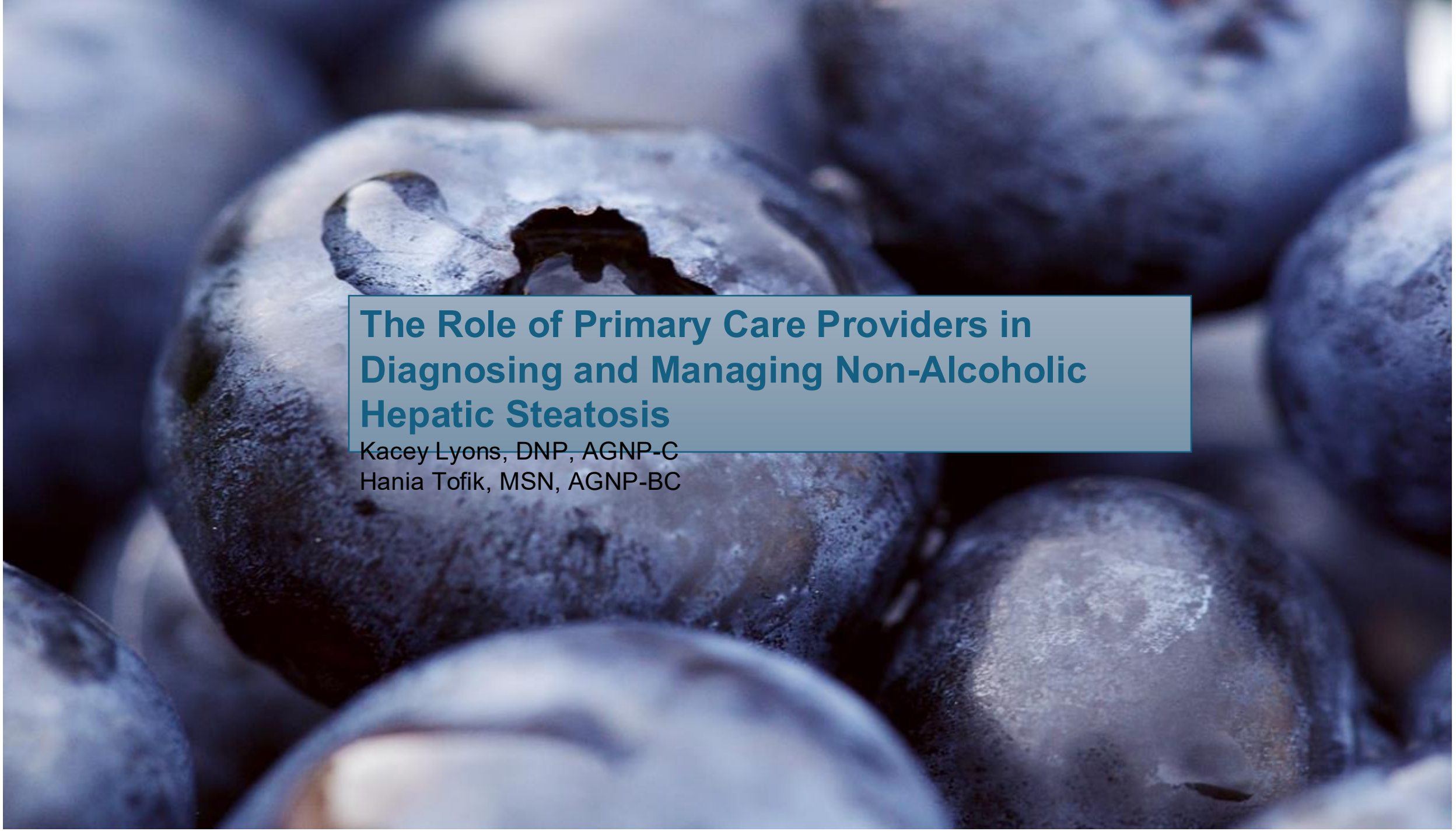
Dr. Lyons specializes in the diagnosis, treatment, and management of gastrointestinal disorders, with clinical expertise in inflammatory bowel disease, GERD, H. pylori infection, and liver disease. In addition to her clinical and academic roles, she serves as both a speaker and advisor for pharmaceutical companies, sharing her expertise to advance therapeutic strategies in gastroenterology. Outside of her professional work, Dr. Lyons finds joy in family life with her husband, energetic 3-year-old daughter, and two beloved kitty cats.”

Hania Tofik is an Adult-Gerontology Nurse Practitioner specializing in gastroenterology at Baylor College of Medicine in Houston, Texas. She brings over a decade of nursing experience, with expertise in both acute and primary care. In her current role as an Instructor and advanced practice provider in the Department of Gastroenterology, she delivers patient-centered care while collaborating closely with multidisciplinary teams to manage complex liver and digestive disorders.

Hania earned her Bachelor of Science in Nursing and Master of Science in Nursing from the University of Texas. She is board-certified by the American Nurses Credentialing Center (ANCC) and licensed in the state of Texas.

Her clinical interests include the diagnosis and management of liver diseases, nonalcoholic fatty liver disease (NAFLD), and other gastrointestinal conditions. She is passionate about patient education, advancing the role of nurse practitioners in specialty care, and contributing to quality improvement initiatives.

Outside of work, Hania enjoys spending time with her family, swi traveling.



The Role of Primary Care Providers in Diagnosing and Managing Non-Alcoholic Hepatic Steatosis

Kacey Lyons, DNP, AGNP-C
Hania Tofik, MSN, AGNP-BC

Financial Disclosure

- Kacey Lyons: speaker bureau - Phathom Pharmaceuticals, Advisory board - Aderlyx
- Hania Tofik AGNP: no financial disclosure

Objectives

By the end of this presentation, primary care providers will be able to:

1. Define non-alcoholic hepatic steatosis and describe its prevalence in primary care settings
2. Identify high-risk patients who warrant screening for hepatic steatosis
3. Compare the accuracy and utility of invasive versus non-invasive diagnostic approaches
4. Implement evidence-based lifestyle interventions for patient management
5. List pharmacological interventions for hepatic steatosis.

NAFLD Ranges From Simple Steatosis to NASH

NAFLD: Nonalcoholic fatty liver disease[1-4]

- Entire spectrum of fatty liver disease in individuals without significant alcoholic consumption.

NAFL: Nonalcoholic fatty liver

- Isolated steatosis (fat ≥ 5% of hepatocytes)

NASH: Nonalcoholic steatohepatitis

- Steatosis with ongoing hepatocyte injury
- Can only be detected by liver biopsy
- Active form of the disease characterized by:
  - Steatosis
  - Ballooning
  - Inflammation

NASH with fibrosis

Stage of fibrosis:

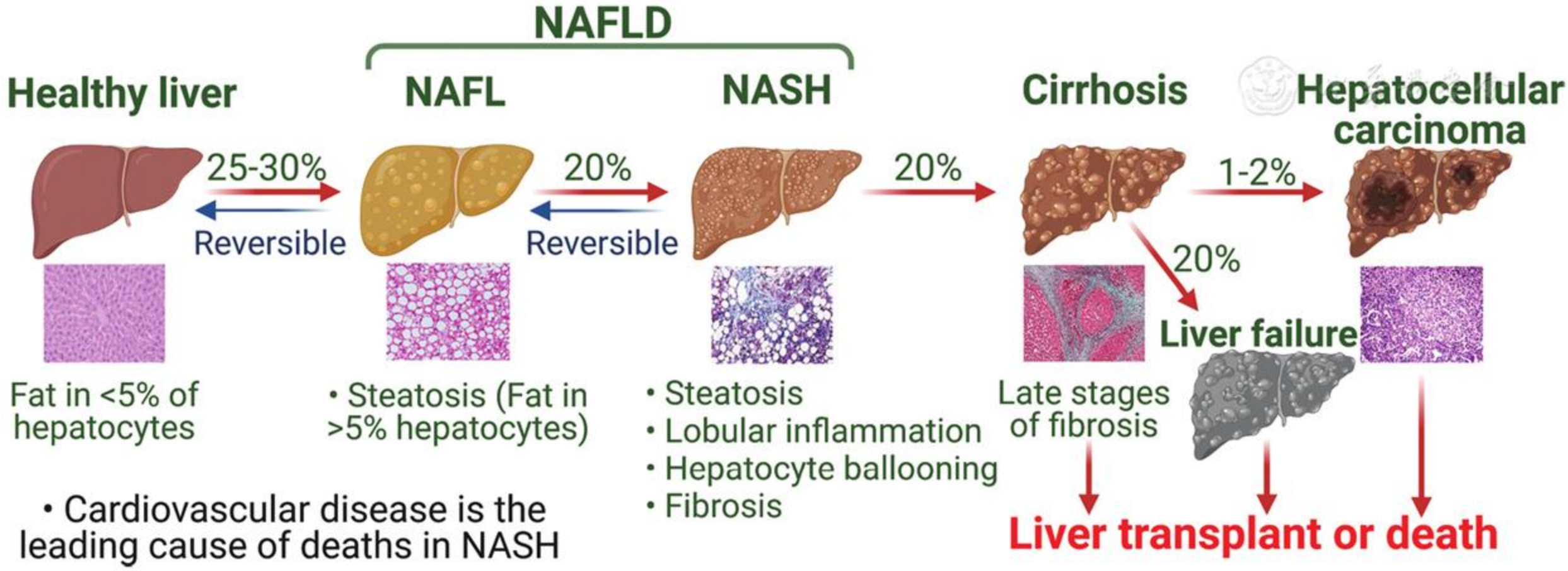
- Mild: fibrosis stage 1 (F1)
- Significant: F2/F3
- Cirrhosis: F4

F, fibrosis stage; NAFL, nonalcoholic fatty liver; NAFLD, nonalcoholic fatty liver disease; NASH, nonalcoholic steatohepatitis.

1. Sheka AC, et al. *JAMA*. 2020;323(12):1175-1183. 2. Alkhouri N, McCullough AJ. *Gastroenterol Hepatol (N Y).* 2012;8(10):661-668. 3. EASL–EASD–EASO. *J Hepatol*. 2016;64:1388-1402.
4. Diehl AM, Day C. *N Engl J Med*. 2017;377:3063-3072.

Disease Progression and Fibrosis in NASH

NASH can progress to cirrhosis, liver cancer or result in death



Pan & Zhang, Hepatocyte nuclear factor 4a in the pathogenesis of non-alcoholic fatty liver disease. China Medicine Journal. 2022.

Hepatic steatosis is a clinical finding with many possible causes

Macrovesicular Steatosis

- **Metabolic syndrome/obesity: Metabolic Associated Steatotic Liver Disease (MASLD)**
- Alcohol (>140g in women/>210g in men weekly)
- HCV genotype 3
- Wilson's disease
- Lysosomal acid lipase deficiency
- Hypobetalipoproteinemia
- Lipodystrophy
- Rapid weight loss
- Total parenteral nutrition
- Medications:
corticosteroids, methotrexate, tamoxifen, amiodorone, diltiazem, protease inhibitors, 5FU.

Microvesicular Steatosis

– Inborn errors of metabolism
– Reye's syndrome
– HELLP
– Acute Fatty Liver of Pregnancy
– Medications:
Tetracycline, Valproate

Chalasani et al, AASLD Practice Guidelines. Hepatology. 2018

Other causes of steatosis/liver disease: diagnostic workup

Cause	Screening tests and thresholds that should trigger further evaluation
Alcohol	History: >14 drinks weekly in women; >21 drinks weekly in men
Hepatitis C	Hepatitis C antibody positive → should trigger HCV viral load
Hepatitis B	Hepatitis B surface antigen positive
Hemochromatosis	Ferritin >200 ng/L in women and >300 ng/L in men; iron saturation >45% → Triggers testing HFE genotype
Autoimmune Hepatitis	Antinuclear antibody positive with titer >1:320, smooth muscle antibody detected
Wilson's Disease	Cerruloplasmin <20 mg/dL
Alpha-1 antitrypsin deficiency	Alpha 1 Antitrypsin level < 100 mg/dL
Drug-Induced Liver Injury	corticosteroids, methotrexate, protease inhibitors, tamoxifen, amiodarone, Irinotecan, 5FU

Rinella M et al, AASLD Practice Guidelines on NAFLD, Hepatology 2023.

Estimated Prevalence of in the US

	NAFLD	NASH	Compensated Cirrhosis	HCC
2016 prevalence[1]	25% of adults	5-6% of adults	1-2% of adults	N/A
2030 projections [2]	101 million adults	27 million adults	3 million adults	25,000 adults

F, fibrosis stage; HCC, hepatocellular carcinoma; NAFLD, nonalcoholic fatty liver disease; NASH, nonalcoholic steatohepatitis.

1. Younossi ZM, et al. *Hepatology*. 2016;64(1):73-84. 2. Estes C, et al. *Hepatology*. 2018;67:123-133. 3. Diehl AM, Day C. *N Engl J Med*. 2017;377:3063-3072.
4. Kanwal F, et al. *Gastroenterology*. 2018;155(6):1828-1837.

Metabolic Associated Steatotic Liver Disease (MASLSD)

2023-2025 updates – summary of key changes

• New Name: NAFLD → Metabolic Dysfunction Associated Steatotic Liver Disease (MASLD).

- Paradigm shift toward systematically classifying steatotic liver diseases based on their underlying causes.

- Redefines MASLD criteria so that the diagnosis can be made affirmatively, as opposed to being a diagnosis of exclusion.

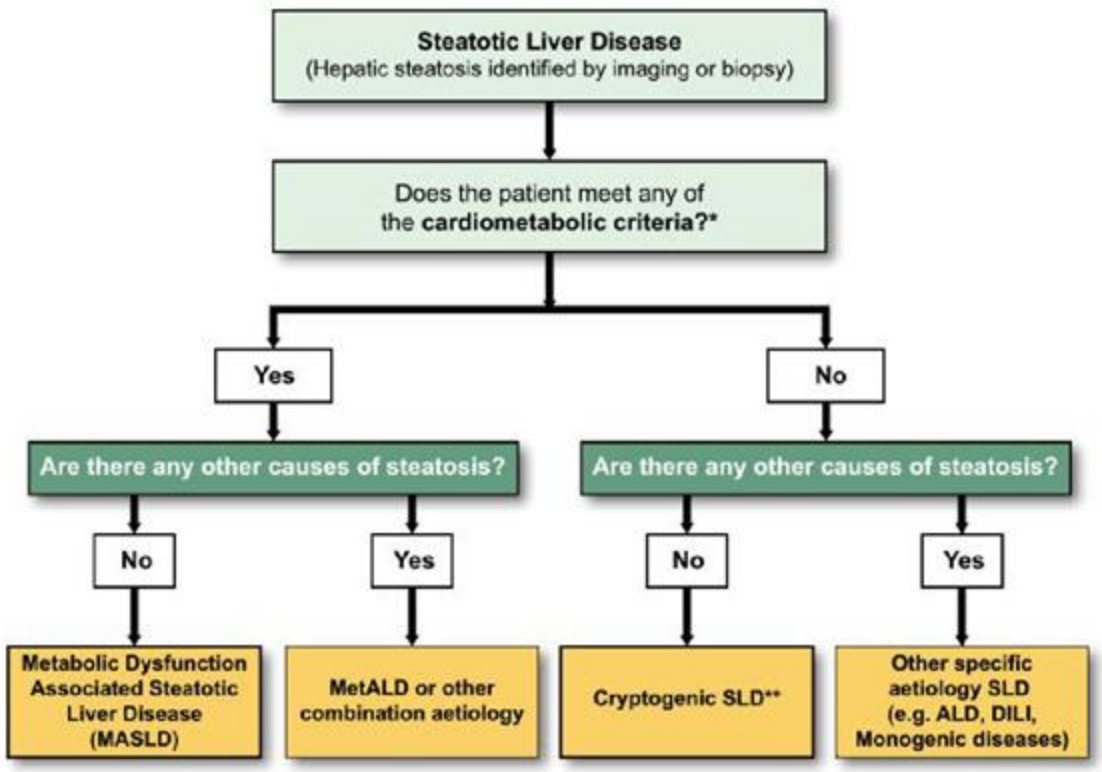
- Reduces potential social stigma associated with terms “fatty liver” & “nonalcoholic.”

• Fibrosis risk stratification using non-invasive testing.

• New medication (conditionally FDA approved): **Resmetirom, Semaglutide**

Rinella M et al, A multi-society Delphi consensus statement on new fatty liver nomenclature. Hepatology, 2023

MASLD – Diagnostic Criteria



Cardio-metabolic Criteria (need at least 1 out of 5)	
Criteria	Evaluation & Abnormal threshold
Overweight/Obesity?	BMI≥25kg/m2 (23kg/m2 in Asian popl)
Prediabetes or diabetes?	Prior diagnosis or ongoing treatment Hemoglobin A1c ≥ 5.7% 2 hour glucose tolerance test ≥ 140mg/dL Fasting glucose ≥ 100
Hypertension?	Existing diagnosis or ongoing treatment BP>130/85mmHg
High triglycerides?	Ongoing treatment (statin, fibrate) Fasting triglycerides ≥ 150mg/dL
Low HDL?	Ongoing treatment (statin) HDL <40mg/dL in in women

Rinella M et al, A multi-society Delphi consensus statement on new fatty liver nomenclature. Hepatology, 2023.

MASLD – risk stratification

- Once you've diagnosed MASLD, the next step is to stratify patients' risk for future liver related complications and mortality.
- Determine whether the patient has stage 2 fibrosis or more.
- MASH (Metabolic Dysfunction-associated Steatohepatitis):
  - more severe form of MASLD
  - characterized by inflammation and liver cell damage in addition to the fat accumulation.

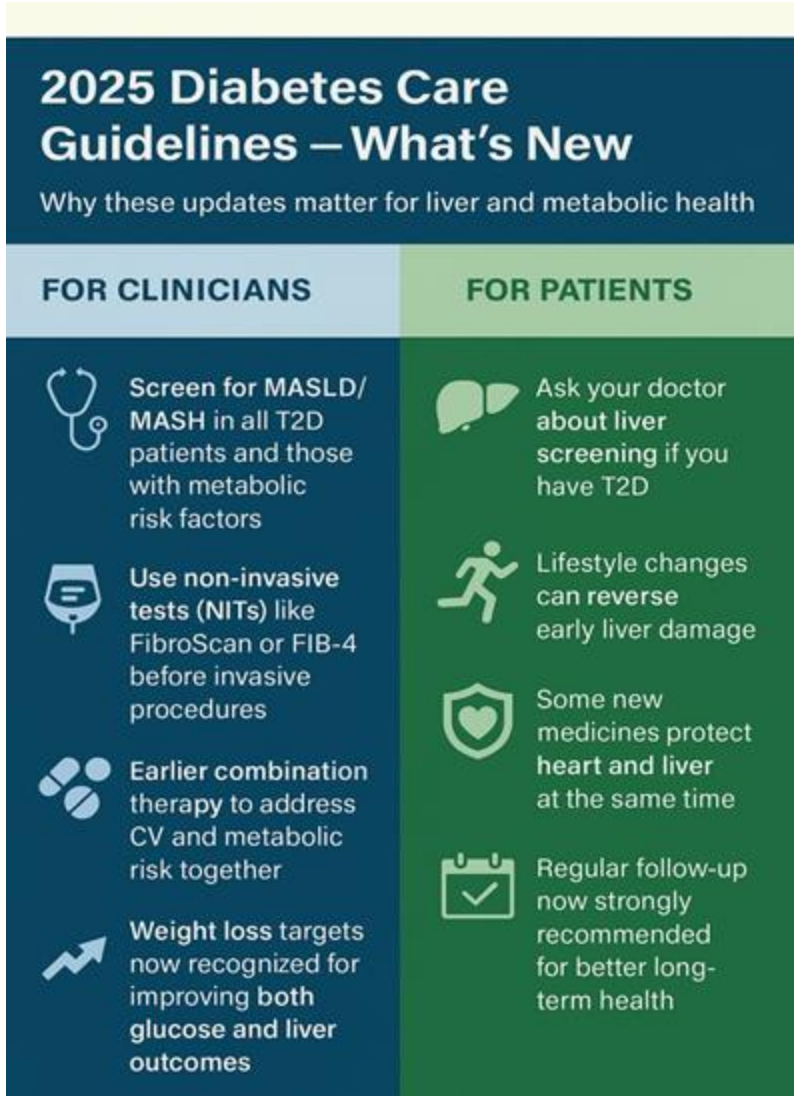
- Guides management (primary care v co-manage with specialist)
- Guides pharmacologic treatment decisions – ie treatment with liver
- directed pharmacotherapy

Rinella M et al, A multi-society Delphi consensus statement on new fatty liver nomenclature. Hepatology, 2023

The 2025 Diabetes Care Guidelines

✅ Routine MASLD/MASH screening in high-risk patients
✅ Non-invasive liver tests recommended before invasive procedures
✅ New therapies that protect heart and liver together
Focus on weight loss to improve both glucose and liver health
✅ Focus on weight loss to improve both glucose and liver health

Why it matters:
• For clinicians → these updates mean earlier detection and better integrated care.
• For patients → it's your chance to catch liver problems early and protect your long-term health.



Kim J, Bajaj HS, Ramji A, Bemeur C, Sebastiani G. Diabetes and Metabolic Dysfunction-associated Steatotic Liver Disease in Adults: A Clinical Practice Guideline. Can J Diabetes. 2025;49(3):222-236.

Liver biopsy is the referent standard for assessing stage of fibrosis

X

64 million people with NALFD

=

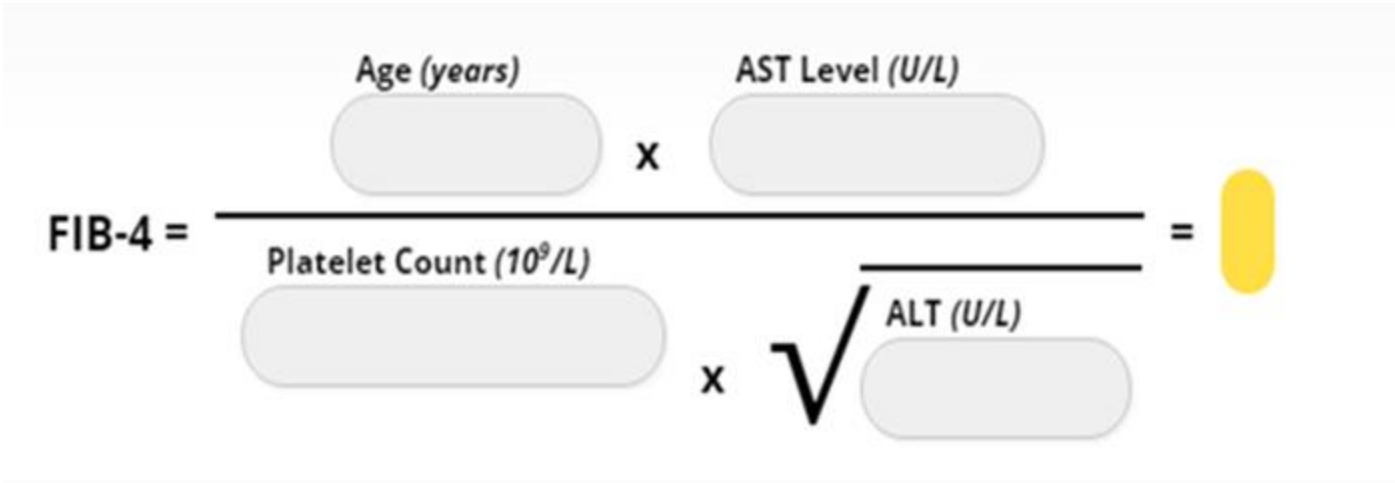
Impossible

Non-invasive tests (NITs) for fibrosis

Method	Description	Diagnostic performance
FIB4	Calculated clinical score (AST, ALT, platelets, age)	High negative predictive value Poor positive predictive value Poor sensitivity in age<35years Inconclusive among ~30% patients
Vibration Controlled Transient Elastography (VCTE)/Fibroscan	Point of care, ultrasound based elastography	High negative predictive value Poor positive predictive value Inconclusive among ~30% patients
Enhanced Liver Fibrosis Test (ELF)	Proprietary blood test	High negative predictive value Poor positive predictive value Inconclusive among a subset of patients
MR Elastography	MRI based elastography	Highest accuracy across NITs

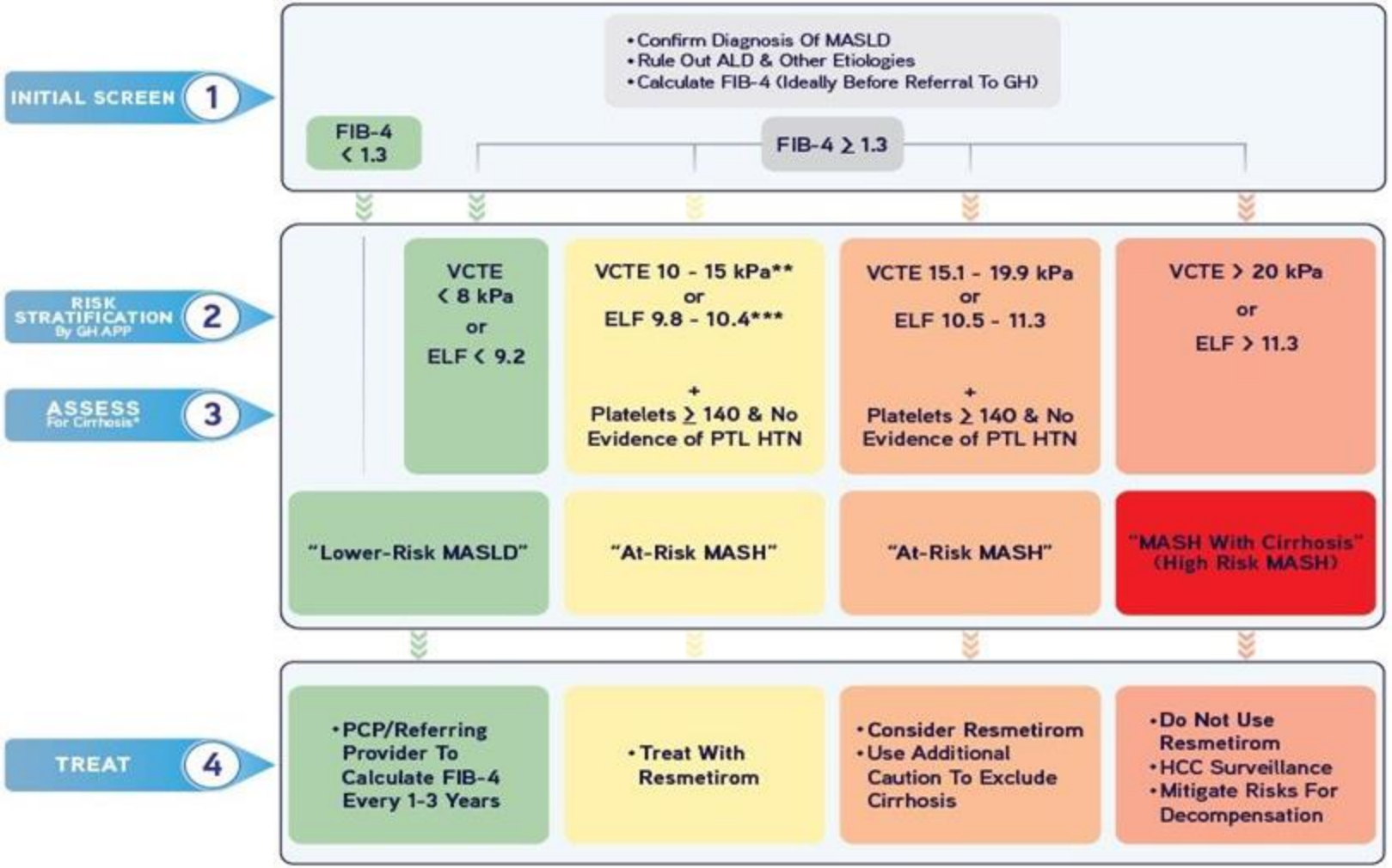
Balakrishnan M, J Clin Gastroenterol 2020; Kanwal F et al, Gastroenterology 2021; Sumida Y et al, World J Gastrol 2014; Rinella M, AASLD NAFLD Guidelines 2023.

How to calculate FIB4



- Website: https://www.mdcalc.com/calc/2200/fibrosis-4-fib-4-index-liver-fibrosis

Screening, diagnostic, and treatment guidelines for MASLD in Primary Care



Lam et al., Focused Recommendations for the Management of Metabolic Dysfunction-Associated Steatohepatitis by Advanced Practice Providers in the United States. Clinical Journal of Gastroenterology. 2025.

Management - Non-Pharmacological

1) Screen for and treat cardiovascular risk factors

- Use standard of care guidelines.
- Treat other comorbidities: HTN, HLD, Obesity, Type 2 DM, Polycystic ovary syndrome

- Statins are ok to use, caution with dose in decompensated cirrhosis.

2) Weight Loss

- Therapeutic, associated with histologic improvements in a dose dependent manner

- 10% body weight = steatohepatitis resolution; improvement in fibrosis

- 7% body weight = steatohepatitis improvement

- 5% body weight = reduction in steatosis

- Bariatric surgery is not recommended specifically for treatment of MASLD, but consider if patient meets standard indications (BMI≥40kg/m2 OR BMI≥35kg/m2 + obesity related comorbidity).

Pharmacological Management

Patient with MASH and/or clinically significant fibrosis without cirrhosis (F2/F3)

	FDA Approved for MASLD	Histologic Improvement	Metabolic Benefits?	CV Benefits?	Risks
Vitamin E 800IU daily	No. *Off label use: MASH w/o cirrhosis or DM2*	MASH – yes Fibrosis – no	No	No	May increase risk of adverse CV outcomes
Resmetirom	Yes	MASH – yes Fibrosis – yes	Yes	Yes	Gallstone, acute cholecystitis, obstructive pancreatitis, hepatotoxicity
Semaglutide	Yes	MASH – yes Fibrosis – yes	Yes	Yes	Pancreatitis, gallstones
Pioglitazone 15-45mg daily	No. *Off label use MASH*	MASH – yes Fibrosis – possibly	Yes: (↓ progression of prediabetes to T2DM)	Yes	Weight gain Bone demineralization Contraindicated in heart failure

Resmetirom

- **Contraindication: liver cirrhosis**

1) Mechanism of action

- targeting the thyroid hormone receptor beta (THR-β) in the liver, which is a key regulator of lipid metabolism. By selectively activating THR-β, resmetirom enhances hepatic fat metabolism and reduces lipotoxicity, ultimately leading to a decrease in liver fat accumulation and inflammation. It also impacts other aspects of liver function, such as cholesterol and bile acid metabolism. - 7% body weight = steatohepatitis improvement

2) Dosing

- Weight base
- 80 mg and 100 mg once daily

3) Side effects

- Diarrhea, nausea
- Hepatotoxicity
- Gallstone, acute cholecystitis, obstructive pancreatitis

4) Affect on statin

- When taken concurrently with resmetirom, the recommended maximum dosage for rosuvastatin and simvastatin is 20 mg/d; the recommended maximum dosage for atorvastatin and pravastatin is 40 mg/d. 80 mg and 100 mg once daily

Resmetirom

- Phase 3 RCT, 1143 patients with biopsy proven MASH, most with F2-3.
- Interim findings over 1 year of treatment
- MASH resolution: 25% of resmetirom 80mg treated v 10% placebo ($p<0.001$)
- Fibrosis regression: 24% resmetirom 80mg treated v 14% placebo ($p<0.001$)
- Current FDA approved indications: Presence of MASLD F2 or F3

Lab monitoring after starting on Resmetirom

- CMP every month x 3 months then q 3 months while on treatment.
- CBC, INR, thyroid panel (free T4, free T3, TSH), and lipid panel every 6 months while on treatment and prior to initiating treatment .
- Fibroscan to assess for response every 6 months while on treatment.
- RUQ US with new onset RUQ pain given the potential association between Resmetirom and cholelithiasis/ cholecystitis.

GLP 1 - Semaglutide

- GLP-1 agonists like semaglutide can help with weight loss and improve glycemic control, which are crucial for managing NAFLD. They may also directly impact liver health by reducing steatosis and inflammation

GLP 1 side effects

- Nausea
- vomiting,
- diarrhea,
- abdominal pain,
- Headache
- Pancreatitis and gallstone
- Injection site reactions

Key Points for MASLD

- Diagnosis made based on the presence of metabolic-syndrome features &
- steatosis.
- New framework allows for co-existing causes of steatosis.
- Presence of significant fibrosis (≥F2) is associated with increased risk of liver complications & mortality.
- Risk stratify: FIB4<1.3, VCTE liver stiffness<8kPa → low risk patient
- Therapy: weight loss is cornerstone
- Pharmacologic therapy is reserved for MASH

References

Alkhouri N, McCullough AJ. Pathogenesis of nonalcoholic steatohepatitis: role of insulin resistance and mechanisms of hepatotoxicity. Gastroenterol Hepatol (NY). 2012;8(10):661-668.

Chalasani N, Younossi Z, Lavine JE, et al. The diagnosis and management of nonalcoholic fatty liver disease: practice guidance from the American Association for the Study of Liver Diseases. Hepatology. 2018;67(1):328-357.

EASL-EASD-EASO Clinical Practice Guidelines on the management of metabolic dysfunction-associated steatotic liver disease (MASLD). Journal of Hepatology. 2024;81(3):492-542. doi:10.1016/j.jhep.2024.04.031

Kanwal F, Shubrook JH, Younossi Z, et al. Preparing for the NASH epidemic: A call to action. Gastroenterology. 2021;161(3):1030-1042.

Loomba R, Hartman ML, Lawitz EJ, et al. Phase 3 Trial of Semaglutide in Metabolic Dysfunction-Associated Steatohepatitis. N Engl J Med. 2025;392(18):1697-1708. doi:10.1056/NEJMoa2413258

Petta S, Kani HT, Yilmaz Y. The first MASH drug therapy on the horizon: Current perspectives of resmetirom. Liver Int. 2024;44(7):1647-1656.

Rinella ME, Lazarus JV, Ratziu V, et al. A multisociety Delphi consensus statement on new fatty liver disease nomenclature. Hepatology. 2023;78(6):1966-1986. doi:10.1097/HEP.0000000000000520

Sheka AC, Adeyi O, Thompson J, Hameed B, Crawford PA, Ikramuddin S. Nonalcoholic steatohepatitis: a review 2020;323(12):1175-1183. doi:10.1001/jama.2020.2298