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Metabolic Dysfunction-Associated Steatotic Liver Disease: From NAFLD to MASLD: Implications of the New Nomenclature for Clinical Practice

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Abstract

The transition from Non-Alcoholic Fatty Liver Disease (NAFLD) to Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) marks a pivotal shift in hepatology. This new nomenclature, endorsed by major international societies in 2023, emphasizes the metabolic roots of the condition while reducing stigma. It moves away from exclusionary language toward a positive, etiology-focused diagnosis. This paper explores the rationale behind the change, its diagnostic and therapeutic implications, and how clinicians can integrate it into everyday practice. With MASLD affecting over a third of adults globally and rising rapidly alongside obesity and diabetes, embracing this framework could improve early detection, patient engagement, and multidisciplinary care — ultimately curbing the tide of liver-related complications.

Introduction

For decades, "Non-Alcoholic Fatty Liver Disease" (NAFLD) served as the catch-all term for hepatic steatosis, not linked to significant alcohol use or other clear causes. It captured a spectrum from simple fat accumulation to inflammation and fibrosis (non-alcoholic steatohepatitis, or NASH).[2,11] While useful in its time, the name had limitations. The "non-alcoholic" label felt like a diagnosis by exclusion, potentially downplaying the central role of metabolic dysfunction. Terms like "fatty" carried unintended stigma, which could discourage patients from seeking care or discussing their condition openly. [1,2,3]

In 2023, a Multi-society Delphi consensus — involving experts, patients, and stakeholders — introduced "Steatotic Liver Disease" (SLD) as the overarching category. Within this, NAFLD became MASLD, and NASH became Metabolic Dysfunction-Associated Steatohepatitis (MASH). A new entity, MetALD, acknowledges overlap with moderate alcohol consumption.[1,2] This wasn't just cosmetic; it reflects a deeper understanding of pathophysiology centered on insulin resistance, visceral adiposity, and cardiometabolic risk factors.[2,13,16]

The change feels refreshing in clinical conversations. Patients often respond better to a name that links their liver issue directly to familiar problems like weight, blood sugar, and lipids. It also aligns better with how we manage the growing epidemic driven by modern lifestyles. [1,3,7]

MetALD bridges a critical gap by covering the diagnostic gray zone for patients who present with metabolic risk factor and consume alcohol above the strict MASLD threshold (140-350g/week for females and 210-420g/week for males). [1,3,22]

Rationale for the Nomenclature Change

The old terminology had several shortcomings. It relied heavily on ruling out alcohol, which could overlook mixed etiologies or create diagnostic gray zones. Stigma around "alcoholic" vs. "non-alcoholic" sometimes leads to judgment or underdiagnosis in primary care. Moreover, it didn't highlight the shared metabolic pathways with type 2 diabetes, obesity, and cardiovascular disease — the real drivers of morbidity.[3,4,5,6]

MASLD requires hepatic steatosis (confirmed by imaging, biopsy, or biomarkers) plus at least one cardiometabolic risk factor, with alcohol intake below harmful thresholds. This positive diagnostic approach simplifies identification, especially in busy clinics where metabolic syndrome is already screened routinely.[3,7] Studies show remarkable continuity: 99% of prior NAFLD cases qualify as MASLD, preserving the validity of existing data while opening doors for better risk stratification.[21] Hepatitis steatosis + at least 1 cardio metabolic risk factor among five specifics (e.g. elevated BMI, hyperglycemia, HTN, dyslipidemia).[3]

Table 1: Key Differences in Nomenclature

Aspect	***NAFLD/NASH***	***MASLD/MASH* (*and SLD Framework*)**
Overarching Term	Non-Alcoholic Fatty Liver Disease	Steatotic Liver Disease (SLD)
Main Subtype	NAFLD (exclusion-based)	MASLD (positive metabolic criteria)
Inflammatory Form	NASH	MASH
Mixed Etiology	Not distinctly categorized	MetALD (MASLD + moderate alcohol) Threshold value of alcohol for clinical effects • Around 20–30 mg/dL: Mild impairment may begin in some people. • 50–100 mg/dL: Noticeable impairment of judgment, coordination, and reaction time. • >300 mg/dL: Risk of coma. • >400 mg/dL: Can be life-threatening, especially in people without alcohol tolerance.
Stigma & Language	"Non-alcoholic", "Fatty"	Focus on metabolic dysfunction; less stigmatizing

This table highlights how the shift promotes clarity and patient-centered communication.

Diagnostic Implications in Clinical Practice

Diagnosing MASLD starts with recognizing steatosis in the context of metabolic health. Clinicians no longer need to laboriously exclude every alternative; instead, they affirm the metabolic link.[1,3,12] Standard tools like ultrasound, FibroScan, or MRI-PDFF remain key to steatosis and fibrosis assessment. Non-invasive scores (FIB-4, NFS) help triage patients needing specialist referrals.[8,9]

Table 2: Cardiometabolic Risk Factors for MASLD Diagnosis.

(Adapted from consensus criteria; at least one required alongside steatosis)[3,8]

Metabolic risk factor	***Adult criteria***
Overweight/obesity	BMI ≥25 kg/m² (≥23 kg/m^2 in Asians) or waist circumference >94 cm (men)/>80 cm (women), ethnicity-adjusted
Hyperglycemia	Fasting glucose ≥100 mg/dL or HbA1c ≥5.7% or 2-hour post-load glucose ≥140 mg/dL or type 2 diabetes or treatment for type 2 diabetes
Hypertension	BP ≥130/85 mmHg or antihypertensive treatment
Plasma triglycerides	≥150 mg/dL or lipid-lowering therapy
HDL cholesterol	≤39 mg/dL in men and ≤50 mg/dL

(Note: These overlap heavily with metabolic syndrome criteria, aiding integration into routine checks)

In practice, this means endocrinologists, primary care physicians, and cardiologists are now frontline detectors. A patient with type 2 diabetes and elevated liver enzymes or fatty liver on imaging can receive a positive MASLD label immediately, prompting holistic management rather than "watchful waiting".[2,3]

Prevalence

Prevalence data underscore urgency. Globally, MASLD affects ~38% of adults, with projections exceeding 55% by 2040.[4,5] In people with type 2 diabetes, rates approach 65-70%.[5] In the US, models predict MASLD cases rising to over 120 million adults by 2050, with sharp increases in advanced fibrosis, cirrhosis, HCC, and transplants.[15,18]

Therapeutic and Management Implications

The nomenclature doesn't overhaul treatment but reframes it around metabolic optimization. Lifestyle remains foundational: 7-10% weight loss can resolve MASH in many cases.[20] ≥ 5% weight loss - reduces hepatic steatosis, ≥7% - resolves necroinflammation (steatohepatitis/MASH), ≥10% - stabilizes or completely reverses hepatic fibrosis. Mediterranean-style diets combined with aerobic/resistance exercise (≥150 min/week), and behavioral support yields the best results. [8,10]

Pharmacotherapy targets comorbidities aggressively. GLP-1 receptor agonists and SGLT2 inhibitors benefit both diabetes/obesity and liver histology.[8] Resmetirom(a selective thyroid hormone receptor-beta agonist) stands as a first approved targeted

pharmacotherapy for noncirrhotic MASH with moderate to advance F2- F3, represents a liver-specific advance.[19] Pioglitazone also shows promise in select patients.[8] Multidisciplinary teams — integrating dietitians, endocrinologists, and hepatologists to improve outcomes. [8,10]

Table 3: Tiered Management Approach for MASLD/MASH[8,9,19]

Fibrosis Stage/Risk	***Lifestyle Focus***	***Pharmacologic Considerations***	***Monitoring/Surveillance***
Mild (F0-F1)	Weight loss 5-10%, Med Diet, Exercise	Optimize T2DM/CVD risks (GLP-1RA, etc.)	Annual non-invasive assessment
At-Risk MASH (F2-F3)	Intensive lifestyle + behavioral	• Add MASH-specific (e.g., resmetirom); consider pioglitazone, • Recent studies indicates GLP-1 (Semaglutide)	• Fibro scan/FIB-4 every • 6-12 mo; HCC surveillance if F3
Cirrhosis	Tailored nutrition, avoid sarcopenia.	Cardiovascular protection, portal hypertension managements	Upper Endoscopy for varices screening, Abdominal imaging for every 6 months

Cardiovascular disease remains the leading cause of death, so liver care must align with heart and metabolic health. The new name encourages this integrated view, reducing silos.[8,14]

A Contested Consensus

MASLD was not the first proposed successor to NAFLD, nor an uncontested one. In 2020, three years before the Delphi process concluded, an international consensus panel with strong Asia-Pacific representation proposed MAFLD — metabolic dysfunction-associated fatty liver disease — a purely inclusion-based diagnosis requiring steatosis plus evidence of overweight/obesity, type 2 diabetes, or metabolic dysregulation. [6,7] Critically, MAFLD did not require exclusion of other liver diseases: a patient with viral hepatitis or another coexisting cause of steatosis could still carry a MAFLD diagnosis if metabolic dysfunction was also present.[6] When the AASLD/EASL-led Delphi process convened, it considered this framework but ultimately adopted the more exclusion-based MASLD model instead — a decision that still leaves some journals and regions using MAFLD and MASLD in parallel today.[1,16,17]

The MASLD definition itself has drawn direct critique. Cusi, Younossi, and Roden argued shortly after publication that requiring only one of five cardiometabolic criteria risks overdiagnosis, handles lean and metabolically atypical patients poorly, does not resolve the difficulty of coexistent viral hepatitis given the continued exclusion-based structure, amplifies biological heterogeneity within the label, and translates awkwardly to pediatric populations.[16] The nomenclature steering committee's published reply defended the single-criterion threshold as a deliberate, debated choice, made specifically to preserve maximal continuity with the pre-existing NAFLD evidence base.[17] That trade-off is worth stating plainly: the feature that makes MASLD easy to adopt — broad, permissive criteria — is the same feature its critics argue dilutes its precision.

Challenges and Future Directions

Adoption isn't seamless. Electronic records, billing codes, and trial protocols need to be updated. Some worry about reclassifying patients, but evidence reassures continuity.[21] Public awareness campaigns could reduce stigma further and drive screening in high-risk groups. Research must now validate outcomes under the new criteria, explore MetALD specifically, and accelerate therapies. Longer-term, MASLD highlights broader societal issues—food environments, physical inactivity, and equity in access to care. Pediatric cases are rising alarmingly, demanding early intervention.

Conclusion

The shift to MASLD isn't semantic nitpicking; it's a pragmatic evolution that better equips us to tackle a defining 21st-century disease. By naming the metabolic elephant in the room, we foster earlier diagnosis, reduce shame, and promote comprehensive care that addresses root causes. Clinicians who lean into this change — screening proactively in metabolic clinics, using positive language, and building team-based pathways — will see better patient buy-in and outcomes. As prevalence surges, this nomenclature provides a stronger foundation for research, policy, and prevention. The liver, after all, never acts in isolation; neither should we.

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