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ORIGINAL ARTICLE

Hepatology

Fibrosis and steatotic liver disease in US adolescents according to the new nomenclature

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Abstract

Objective: To apply the new nomenclature for steatotic liver diseases (SLD), replacing nonalcoholic fatty liver disease (NAFLD) with metabolic dysfunction-associated steatotic liver disease (MASLD), in adolescents using National Health and Nutrition Examination Survey (NHANES) data.

Methods: Among 1410 adolescents (12–19 years) in NHANES (2017-March, 2020), the controlled attenuation parameter (CAP) of transient elastography (TE) was used to define steatosis and fibrosis (TE ≥ 7.4 kPa). Obesity and alanine aminotransferase (ALT) ≥ 80 U/L were used to identify adolescents qualifying for hepatology referral according to practice guidelines. NAFLD was defined as liver steatosis without a specific exposure; it has no cardiometabolic risk factor requirement, unlike MASLD.

Results: Steatosis (yes/no) is the first decision point in the new diagnostic protocol; however, criteria for steatosis are undefined. At the supplier (EchoSens)-recommended CAP threshold of 240 dB/m, 30.5% (95% confidence interval [CI]: 27.1%–34.0%) of adolescents had SLD and about 85% of adolescents with NAFLD met criteria for MASLD. The other 15% would receive an ambiguous diagnosis of either cryptogenic SLD or possible MASLD. At higher CAP thresholds, MASLD/NAFLD concordance increased and approached 100%. Among adolescents with MASLD-fibrosis, only 8.8% (95% CI: 0%–19.3%) had overweight/obese and ALT ≥ 80 U/L.

Conclusions: The new nomenclature highlights the high prevalence of liver steatosis. At the CAP threshold of 240 dB/m, however, approximately 15% of adolescents would receive an ambiguous diagnosis, which could lead to confusion and worry. Fewer than 10% of adolescents with MASLD-fibrosis had overweight/obese and ALT ≥ 80 U/L. Revised guidelines are needed to ensure that the other 90% receive appropriate referral and liver disease care.

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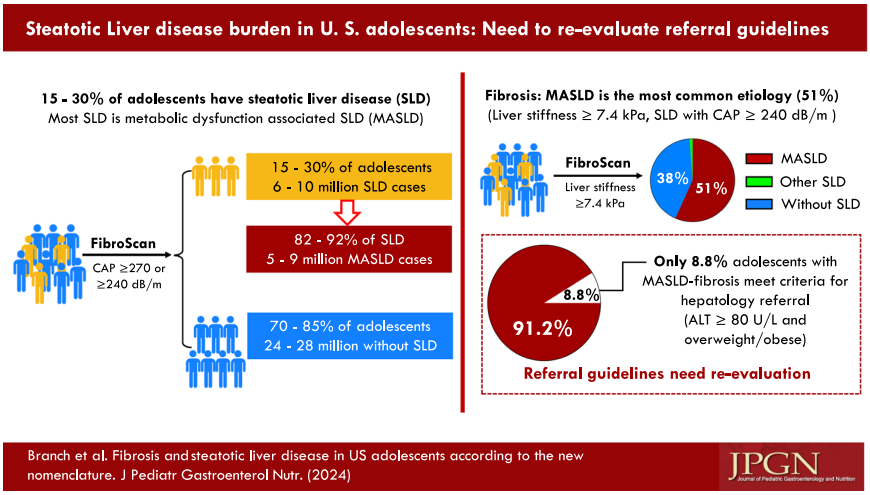

KEYWORDS
cardiometabolic risk factors, cryptogenic SLD, MASLD, NHANES, VCTE

1 | INTRODUCTION

Recently, members of multinational liver societies and patient advocacy groups used a modified Delphi approach to evaluate steatotic liver disease (SLD) nomenclature.[1,2] The expert panel aimed to reduce the stigma associated with the words "nonalcoholic" and "fatty" in the term nonalcoholic fatty liver disease (NAFLD), while also increasing awareness of metabolic dysfunction as a driver of liver disease. Metabolic dysfunction-associated steatotic liver disease (MASLD) was chosen as the replacement term for NAFLD.

The panel issued a statement reporting its findings and presenting a new diagnostic algorithm in which liver steatosis and cardiometabolic risk factors (CMRF) are key determinants.[1,2] In the new algorithm, patients are first divided into those with and without SLD. Patients with SLD are then divided into those with and without at least one of the five designated CMRFs. The new diagnostic algorithm separates most liver diseases, including viral hepatitis, into multiple diagnostic categories, for example, viral hepatitis ± steatosis and ± CMRF. This is expected to increase awareness of steatosis and insulin resistance as disease drivers across all liver disease etiologies. Alcohol-related liver diseases are classified more precisely than in the past. Patients who meet all criteria for MASLD except that they consume a moderately higher amount of alcohol (140–350 g/week [women/girls], 210–420 g/week [men/boys]) are diagnosed with metabolic dysfunction-associated alcohol-associated liver disease (MetALD). As reported by the nomenclature panel,[1] in the liver investigation: Testing marker utility in steatohepatitis (LITMUS) study, nearly all the patients with NAFLD in this international cohort have at least one CMRF and thus meet the diagnostic criteria of MASLD. To our knowledge, MASLD/NAFLD concordance has not yet been examined in adolescents in the United States.

This study was undertaken to investigate the concordance of NAFLD and MASLD in adolescents (ages 12–19 years) in the United States, to determine the prevalence of SLD subtypes, and to estimate the percentage of adolescents with MASLD-fibrosis who have overweight/obese and ALT ≥ 80 U/L and thus

What is Known

- New nomenclature of steatotic liver disease was issued to reduce stigma of fatty liver disease by replacing nonalcoholic fatty liver disease (NAFLD) with metabolic dysfunction-associated steatotic liver disease (MASLD).
- According to the current North American Society of Pediatric Gastroenterology, Hepatology and Nutrition guidelines, the referral/diagnosis criterion for NAFLD includes alanine aminotransferase (ALT) level ≥80 U/L in children who are overweight/obese.

What is New

- Our study analyzes concordance between new MASLD criteria and NAFLD, and demonstrates high disease burden in adolescents in the US population.
- Less than 10% of adolescents with MASLD-fibrosis had overweight/obese and ALT ≥ 80 U/L. Revised guidelines are needed to ensure that the other 90% receive appropriate referral and liver disease care.

meet criteria for referral to hepatology according to practice guidelines set by the North American Society of Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN).[3] The new nomenclature's diagnostic algorithm was projected onto National Health and Nutrition Examination Survey (NHANES) data. Major advantages of this data include the high-quality and completeness of the data, the over-sampling of non-Hispanic Black (NHB), Mexican American (MA), and other (O) racial and ethnic groups, and the availability of statistical methods that allow findings to be extrapolated to the housed civilian population of adolescents in the entire United States.[4] The nomenclature panel did not define what "constitutes hepatic steatosis," but noted that "in reality most, if not all, patients will usually have imaging at some point."[1] In this study, steatosis was defined by the controlled attenuation parameter (CAP) of vibration controlled transient elastography (VCTE), with NHANES data from 2017-March, 2020.

The findings show that MASLD/NAFLD concordance and other end points vary with the criteria used to define steatosis. However, regardless of the threshold, MASLD/NAFLD concordance exceeded 80%. The results highlight the importance of SLD as a personal and public health problem and reveal the high prevalence of MASLD and of MASLD-defining CMRFs. The analysis also shows, however, that a significant number of adolescents who meet diagnostic criteria for NAFLD, do not meet criteria for MASLD at the supplier (EchoSens)-recommended threshold for defining liver steatosis using the CAP of VCTE. Additionally, fewer than 10% of adolescents with MASLD and VCTE-defined fibrosis (liver stiffness ≥ 7.4 kPa) had elevated adiposity and alanine aminotransferase (ALT) ≥ 80 U/L. New screening guidelines may be needed to ensure that other 90% of adolescents with SLD and increased liver stiffness are identified and referred to pediatric hepatology in a timely manner.

2 | METHODS

2.1 | Study population and data sources

Data collection in NHANES follows standardized procedures approved by the National Center for Health Statistics Research Ethnic Review Board. Institutional review board review was waived for analysis of deidentified NHANES data.[4] NHANES 2017-March, 2020 datasets with VCTE data were used.

2.2 | VCTE

Transient elastography was performed using the FibroScan 502 V2 Touch by Echosens by well-trained health technicians. Eligible participants were those aged 12 years and above, except for those unable to lie on the examination table, pregnant individuals, those with implanted electronic medical devices, or those with lesions on the right abdomen.[5] Participants were required to fast for at least 3 h before undergoing the test. The test was conducted in a supine position; it measured liver stiffness and steatosis through shear wave velocity. Liver stiffness was expressed in kilopascals (kPa). Each participant underwent multiple measurements, up to 30 or more, using either a medium or large probe. The procedure required at least 10 valid liver stiffness measurements with an interquartile range (IQR)/median stiffness (M) ratio of less than 30%. Simultaneously, hepatic steatosis was assessed using the CAP in decibels per meter (dB/m), with both the median and IQR calculated for each participant.[5]

2.3 | Indicators of SLD and significant fibrosis

SLD was defined by VCTE-CAP ≥ 240 dB/m and by additional VCTE-CAP thresholds. Fibrosis was defined by liver stiffness ≥7.4 kPa in adolescents.[6]

2.4 | CMRFs defined by the nomenclature review panel

Adolescents (12–19 years of age) were evaluated for the CMRFs[1] identified by the review panel: (1) Elevated adiposity, indicated by body mass index (BMI) ≥ 85th percentile for age/sex (BMI *z*-score ≥ +1) or WC > 95th percentile; (2) prediabetes/diabetes, indicated by fasting plasma glucose (FPG) ≥ 100 mg/dL or hemoglobin A1c (HbA1c) ≥ 5.7% or self-reported diagnosis of diabetes and treatment; (3) elevated blood pressure (BP), indicated by BP ≥ 95th percentile (12≤ age <13 years) and BP ≥ 130/85 mmHg (age ≥ 13 years) or use of antihypertensive medication; (4) elevated triglycerides, indicated by plasma triglycerides ≥150 mg/dL or self-reported lipid lowering treatment; (5) reduced high-density lipoprotein cholesterol (HDL), indicated by plasma HDL ≤ 40 mg/dL or self-reported lipid-lowering treatment.

2.5 | Liver disease definitions

NAFLD was defined as SLD with no more than 140 g/week alcohol consumption for women/girls and 210 g/week for men/boys and no other discernable cause of liver disease. MASLD was defined as SLD with at least one CMRF and no more than 140 g/week of alcohol consumption for women/girls and 210 g/week for men/boys and no other discernible cause. "Increased alcohol intake" was 140–350 g/week of alcohol for

women/girls and 210–420 g/week of alcohol for men/boys over the past 12 months. MetALD was MASLD with increased alcohol intake. Alcohol associated liver disease (ALD) was >350 g/week of alcohol for women/girls or >420 g/week for men/boys over the past 12 months. Viral hepatitis (VH) was past/current infection with hepatitis B virus (HBV), positive core antibody or surface antigen; or hepatitis C virus (HCV), ribonucleic acid (RNA) or antibody. Cryptogenic SLD was SLD without a CMRF or any other identifiable cause. No etiology identified was no discernable cause of liver disease and no SLD.

2.6 | Demographic variables

Self-reported sex (male/female) and race/ethincity (non-Hispanic White [NHW], NHB, Mexican American [MA], and other [O] race [non-MA Hispanics and others]) were included. In NHANES 2017-March, 2020 with VCTE data, the adolscent age range was 12–19 years.

2.7 | Statistical analysis

All the analyses were performed following the guidelines established by NHANES.[4] The data were appropriately adjusted to account for the complex NHANES design by using survey commands in SAS OnDemand for Academics (SAS Institute Inc.). The age standardization estimates were derived using the direct method and standardized to the 2000 US census population. Differences between groups were tested by univariate *t* statistics.[7] To determine the population counts in each etiology group, the weighted prevalence was calculated and subsequently multiplied by the estimated population in the United States; importantly, this weighted prevalence analysis differs slightly from the age-standardized-weighted prevalence described immediately above.[4] The population estimates were obtained from the American Community Survey.[8]

3 | RESULTS

3.1 | Projecting the new nomenclature's diagnostic algorithm onto the adolescent population of the United States

Analyses were carried out on NHANES data collected 2017-March, 2020,[5] which included 14,300 participants who completed an interview visit and were examined at a mobile examination center. Participants aged 20 years and older were excluded. Additionally, participants with incomplete elastography data were excluded for the following reasons[5]: (1) partial or invalid examination due to fasting for less than 3 h, inability to obtain 10 valid measurements, or IQR/M ratio greater than 30%; (2) ineligible due to pregnancy or without a pregnancy test, or other reasons such as having implantable electric device; and (3) examination was not conducted due to participants refusal or limited time. Finally, participants with missing values of any cardiometabolic factor and missing status of viral hepatitis were excluded. The study group included a total of 1410 adolescents (12–19 years of age) who had complete data for VCTE, CMRF, and viral hepatitis. Alcohol consumption data were only available for adolescents aged 18–19 years.

The flow diagram in Figure 1A shows the diagnostic algorithm of the new nomenclature projected onto the study subjects. The first branch point divides the population into adolescents with and without SLD. By introducing the overarching term, SLD, and making it the first decision point in the diagnostic tree, the new nomenclature calls attention to the importance of liver steatosis at the personal and population levels and establishes a framework for investigating the natural history of liver diseases of all etiologies in adolescents with and without SLD.

The age-standardized weighted prevalence of SLD with stratification by race/ethnicity is presented (Figure 2). Applying a VCTE-CAP threshold of 240 dB/m for the definition of steatosis grade 1 or higher, as recommended by the major supplier (EchoSens),[9] the prevalence of SLD was 30.5% (95% confidence interval [CI]: 27.1%–34.0%). Because the nomenclature panel did not specify the threshold that should be used to define SLD, a range of cut points was examined (Figure 2). At a threshold of 270 dB/m, 16.5% (95% CI: 13.5%–19.4%) of adolescents had SLD. The prevalence of SLD was similar in NHB and NHW, but higher in MA. Among MA adolescents, 45.6% (95% CI: 36.8%–54.4%) had VCTE-CAP ≥ 240 dB/m and 30.6% (95% CI: 21.5%–39.7%) had VCTE-CAP ≥ 270 dB/m.

The second step in the diagnostic algorithm divides adolescents with SLD into those with and without at least one CMRF. Nearly all adolescents with SLD, 82.5% (95% CI: 77.3%–87.7%), had least one CMRF; 77.5% (95% CI: 72.4%–82.6%) had elevated adiposity (Table S1). Almost half of adolescents without liver steatosis, 45.6% (95% CI: 40.5%–50.7%), also had at least one CMRF (Table S1).

A major goal of the nomenclature review panel was to introduce a diagnostic scheme that would define a population with MASLD that recapitulated the population with NAFLD, keeping in mind that MASLD requires at least one CMRF and NAFLD does not. MASLD/NAFLD concordance varied with the CAP cut point used to define steatosis. At a threshold of 240 dB/m, concordance was only about 85% in adolescents because about 15% did not have a CMRF and thus did not meet criteria for MASLD (Figure 1A,B).

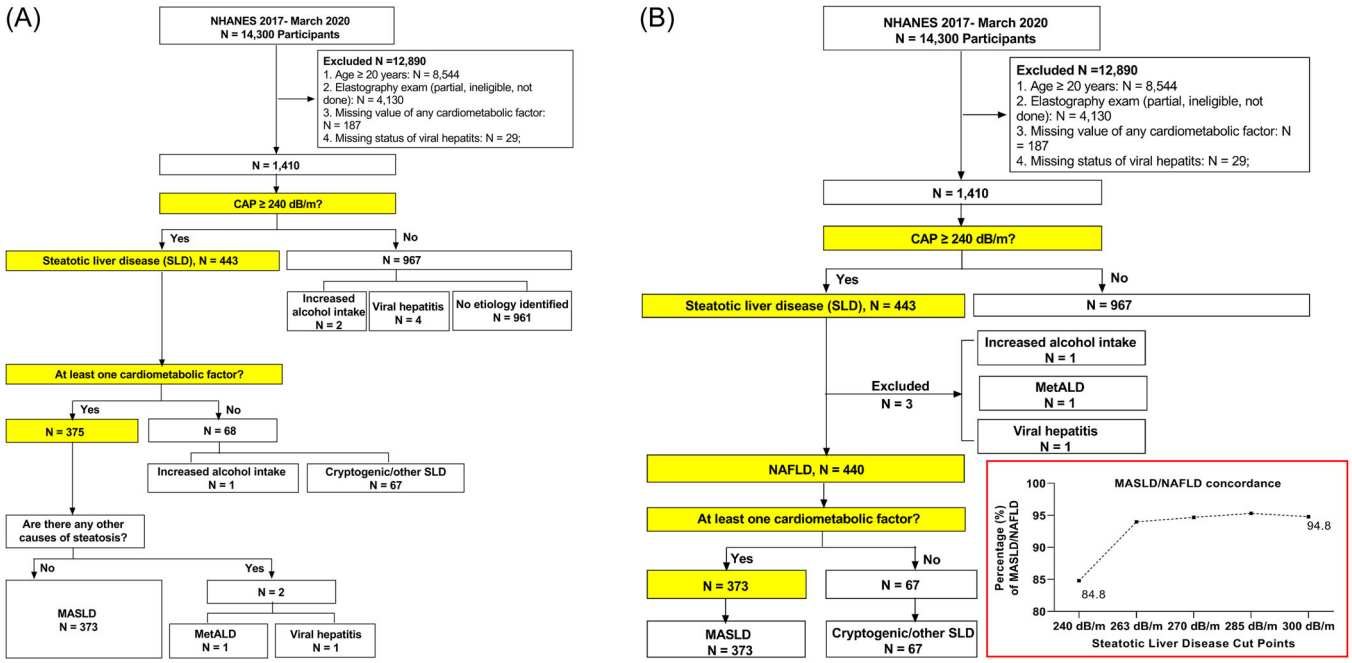

FIGURE 1 The new nomenclature's diagnostic scheme applied to adolescents in the United States. The flowcharts show 1410 adolescents (age 12–19 years old) categorized (A) according to new nomenclature; and (B) according to NAFLD criteria. The graph shows MASLD/NAFLD concordance with different CAP thresholds of steatotic liver disease. CAP, controlled attenuation parameter; MASLD, Metabolic dysfunction-associated steatotic liver disease; MetALD, Metabolic dysfunction-associated alcohol-associated liver disease; NAFLD, nonalcoholic fatty liver disease; NHANES, National Health and Nutrition Evaluation Survey.

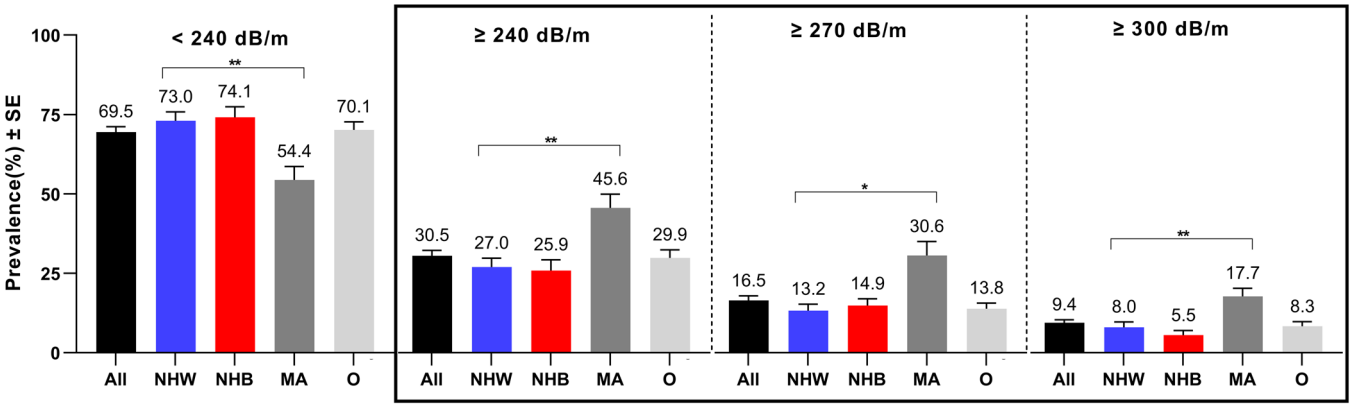

FIGURE 2 The age-standardized-weighted percentage of SLD using different VCTE-CAP thresholds to define SLD, with stratification by race/ethnicity. The age-standardized-weighted prevalence of SLD based on different thresholds of VCTE-CAP were determined for the total cohort (black), non-Hispanic White (NHW, blue), non-Hispanic Black (NHB, red), Mexican American (MA, gray) and other (O, light gray) racial/ethnic groups. Differences between groups were tested by univariate *t* statistic. Statistical significance was a two-sided $p < 0.05$. *$p < 0.05$, **$p < 0.001$. CAP, controlled attenuation parameter; SE, standard error; SLD, steatotic liver diseases; VCTE, vibration controlled transient elastography.

Concordance increased to almost 95% at higher CAP cut points (Figure 1B).

3.2 | The burden of SLD, MASLD, and liver fibrosis in US adolescents

The estimated average number of adolescents in the United States at the time of the NHANES survey in 2017–2020 was 33.8 million.[8] At a threshold VCTE-CAP of 240 dB/m, 10.3 million (95% CI: 9.1–11.5) adolescents had SLD, including 8.5 million (95% CI: 7.4–9.6) with MASLD and 1.7 million (95% CI: 1.2–2.3) with a diagnosis of possible MASLD/Cryptogenic/other SLD. Among adolescents with SLD, 1.0 million (95% CI: 0.3–1.8) had liver stiffness ≥7.4 kPa[6] and 0.7 million (95% CI: 0.2–1.2) had liver stiffness ≥8.0 kPa (Table 1).

TABLE 1 Estimated number of US adolescents with SLD and the number with significant fibrosis.

SLD category		Weighted % (95% CI) in total population	Population estimation of each SLD category, million (95% CI)	Weighted % (95% CI) of LS ≥ 7.4 kPa in each SLD category	Population estimation of LS ≥ 7.4 kPa in each SLD category, million (95% CI)	Weighted % (95% CI) of LS ≥ 8.0 kPa in each SLD category	Population estimation of LS ≥ 8.0 kPa in each SLD category, million (95% CI)
SLD (CAP ≥ 240 dB/m)		30.4	10.3	10.2	1	6.8	0.7
		(27.0–33.9)	(9.1–11.5)	(3.0–17.4)	(0.3–1.8)	(1.8–11.8)	(0.2–1.2)
Subcategories of SLD (CAP ≥ 240 dB/m)	MASLD	25.1	8.5	8.9	0.8	6.5	0.6
		(21.8–28.3)	(7.4–9.6)	(3.7–14.0)	(0.3–1.2)	(2.5–10.6)	(0.2–0.9)
	No CMRF + Cryptogenic/other SLD	5.2	1.7	13.5	0.2	8.5	0.1
		(3.4–6.9)	(1.2–2.3)	(0–32.5)	(0–0.5)	(0–20.0)	(0–0.3)
SLD (CAP ≥ 270 dB/m)		16.4	5.5	14.2	0.8	8.5	0.5
		(13.5–19.3)	(4.6–6.5)	(5.3–23.0)	(0.3–1.3)	(3.5–13.6)	(0.2–0.7)
Subcategories of SLD (CAP ≥ 270 dB/m)	MASLD	15.2	5.1	11.8	0.6	8.1	0.4
		(12.4–17.9)	(4.2–6.0)	(5.4–18.1)	(0.3–0.9)	(3.6–12.7)	(0.2–0.6)

Abbreviations: CAP, controlled attenuation parameter; CI, confidence interval; CMRF, cardiometabolic risk factor; LS, liver stiffness; MASLD, metabolic dysfunction associated liver disease; SLD, steatotic liver disease.

When VCTE-CAP ≥ 270 dB/m was used to define SLD, 5.5 million (95% CI: 4.6–6.5) adolescents had SLD, including 5.1 million (95% CI: 4.2–6.0) with MASLD and 0.8 million (95% CI: 0.3–1.3) with elevated liver stiffness (Table 1). These numbers show that around a million adolescents with SLD have increased liver stiffness and may benefit from referral to hepatology.

The weighted prevalence of fibrosis (liver stiffness ≥7.4 kPa) in the adolescent population was 5.3% (95% CI: 2.5%–8.1%); the prevalence was 8.9% (95% CI: 3.7%–14.0%) among adolescents with MASLD (Table 2). Overall, MASLD accounted for about 50% of fibrosis in adolescents, while about 38% of fibrosis occurred in adolescents without liver steatosis and without viral hepatitis or alcohol exposure (Table 2).

According to the NASPGHAN guidelines,[3] the referral/diagnosis point for NAFLD is ALT ≥ 80 U/L and overweight or obese (BMI ≥ 85th percentile). Among MASLD-fibrosis cases (liver stiffness ≥ 7.4 kPa), only 8.8% (95% CI: 0%–19.3%) had ALT levels ≥80 U/L and elevated adiposity, defined as BMI ≥ 85 th percentile for age/sex (BMI *z*-score ≥ +1) or WC > 95th percentile. At lower cutoffs for ALT elevation (ALT ≥ 52 U/L for boys and ≥44 U/L for girls), 22.4% (95% CI: 11.6%–33.2%) of MASLD-fibrosis cases had elevated ALT and increased adiposity. Most cases of MASLD-fibrosis did not meet referral guidelines (Table 2).

4 | DISCUSSION

The new nomenclature provides a framework for investigating the importance of liver steatosis as a driver of disease progression in patients with all types of liver disease. It does this by making the first branch point in the diagnostic algorithm the distinction between patients with and without SLD. The overarching term, SLD, provides a formal structure for evaluating the clinical ramifications of hepatic steatosis and its drivers.

Many outcomes, such as MASLD/NAFLD concordance, SLD prevalence, and the number of adolescents with MASLD who qualify for referral to a pediatric hepatologist, vary depending on the criteria used to define steatosis. This variation needs to be kept in mind, especially during workforce planning, but regardless of the threshold used to define steatosis, MASLD/NAFLD concordance was always nearly 85% or higher.

Using the supplier-recommended CAP threshold of 240 dB/m, over 30% of adolescents in the United States have SLD and 25.1% have MASLD, which is somewhat higher than in a study of an earlier NHANES

TABLE 2 Weighted prevalence of fibrosis, ALT elevation, and elevated adiposity in each etiology group.

Etiology group			Subjects (*N*)	Fibrosis (liver stiffness ≥ 7.4 kPa)		ALT ≥ 80 U/L		ALT ≥ 52 U/L (boy)/ ALT ≥ 44 U/ L (girl)		Elevated adiposity		Fibrosis cases who need to be referred to hepatology based on NASPGHAN guidelines			
												Participants had fibrosis and ALT ≥ 80 U/L and with elevated adiposity		Participants had fibrosis and ALT ≥ 52 U/L (boy)/ALT ≥ 44 U/ L (girl) and with elevated adiposity	
				n	wt% (95% confidence interval [CI])	*n*	wt% (95% CI)	*n*	wt% (95% CI)	*n*	wt% (95% CI)	*n*	wt% (95% CI)	*n*	wt% (95% CI)
SLD CAP ≥ 240 dB/m	CMRF	MASLD	373	42	8.9 (3.7–14.0)	6	2.1 (0.2–3.9)	29	7.8 (4.7–10.9)	350	94 (91.2–96.9)	3	8.8 (0–19.3)	7	22.4 11.6–33.2
		MetALD	1	0	-	0	-	0	-	1	100	0	-	0	-
		Viral hepatitis	1	0	-	0	-	0	-	1	100	0	-	0	-
	No CMRF	Increased alcohol intake	1	1	100	0	-	0	-	0	-	0	-	0	-
		Cryptogenic/ other	67	8	13.5 (0–32.5)	0	-	3	4.6 (3.2–6.1)	0	-	0	-	0	-
No SLD (CAP < 240 dB/m)		Increased alcohol intake	2	0	-	0	-	0	-	0	-	0	-	0	-
		Viral hepatitis	4	0	-	0	-	0	-	0	-	0	-	0	-
		No etiology identified	961	31	3.2 (1.7–4.6)	1	0.2 (0–0.6)	8	0.9 (0.4–1.5)	292	27 (22.7–31.3)	0	-	0	-
Total			1410	82	5.3 (2.5–8.1)	7	0.7 (0.08–1.2)	40	2.8 (1.7–4.0)	644	42.4 (37.6–47.2)	3	3.7 (0–8.7)	7	9.4 (3.4–15.5)

Abbreviations: ALT, alanine transaminase; CAP, controlled attenuation parameter; CI, confidence interval; CMRF, cardiometabolic risk factor; MASLD, metabolic dysfunction-associated liver disease; MetALD, metabolic dysfunction-associated alcohol-associated liver disease; NASPGHAN, The North American Society of Pediatric Gastroenterology, Hepatology and Nutrition; SLD, steatotic liver disease; wt%, weighted prevalence.

cohort in which the US fatty liver index was used to identify steatosis.[10] The CAP threshold of 240 dB/m is reasonable because it has an area under the receiver operating characteristic curve (AUROC) of 0.82 for detecting steatosis grade ≥1 among patients with chronic liver disease.[9] At a CAP threshold of 270 dB/m, SLD prevalence was about 16% in adolescents.

The results highlight the importance of SLD, the high prevalence of MASLD-defining CMRFs, and the significant burden of disease in children. Our analyses reveal that a significant number of adolescents who meet diagnostic criteria for NAFLD, do not meet diagnostic criteria MASLD and would receive a diagnosis of cryptogenic SLD or possible MASLD. These ambiguous diagnoses will need to be carefully explained to parents and adolescents to minimize confusion and worry. Additionally, our data suggest that current NASPGHAN guidelines, which recommend referral for adolescents with liver steatosis and ALT levels ≥80 U/L and elevated adiposity, may miss a significant number of pediatric MASLD-fibrosis patients, and referral to hepatology should be considered for lower ALT cutoffs (ALT ≥ 52 U/L boys; ≥44 U/L for girls). Research is needed to investigate the merit of referral for pediatric patients with steatosis and fibrosis regardless of the ALT value.

This study has strengths and weaknesses. The strengths include the use of NHANES data that provide nationally representative information, the use of VCTE, a widely-used methodology to estimate steatosis and fibrosis and the use of multiple VCTE-CAP cut points to investigate most endpoints. The limitations include NHANES' cross-sectional design, the lack of biopsy, MRI, or MR elastography data to confirm liver steatosis and liver fibrosis, and the resulting inability to evaluate metabolic dysfunction-associated steatohepatitis. Additionally, NHANES has limited data about the less common liver diseases, such as autoimmune hepatitis; individuals with these diseases may be misclassified.

5 | CONCLUSIONS

The precise and patient-centric nomenclature proposed by a recent consensus panel creates a new diagnostic algorithm that highlights the extraordinary prevalence and importance of SLD and provides a non-stigmatizing alternative to NAFLD. The diagnostic criteria for MASLD capture nearly the same patient population as NAFLD but up to 15% of adolescents with NAFLD lack a CMRF, with the exact percentage varying with the criteria used to define SLD. These adolescents may receive an ambiguous diagnosis of cryptogenic SLD or possible MASLD, which will require special explanations to avoid undue worry about these open-ended diagnoses. Most adolescents with MASLD-fibrosis do not meet criteria for referral to hepatology, suggesting the need to modify the guidelines.

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CONFLICT OF INTEREST STATEMENT

Mount Sinai receives support for Dr. Andrea D. Branch's research from Gilead and Pfizer. Dr. Andrea D. Branch advised the Center for Disease Analysis Foundation. Dr. Jaime Chu has done ad hoc consulting for Albireo Pharma in the last 1 year. Dr. Meena Bansal has done consulting/Ad boards in Kinetix, Madrigal, Pfizer, Theratechnologies, Fibronostics, and NOVO Nordisk; and Mount Sinai receives support for Dr. Bansal's research. Dr. Ning Ma had nothing to report.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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