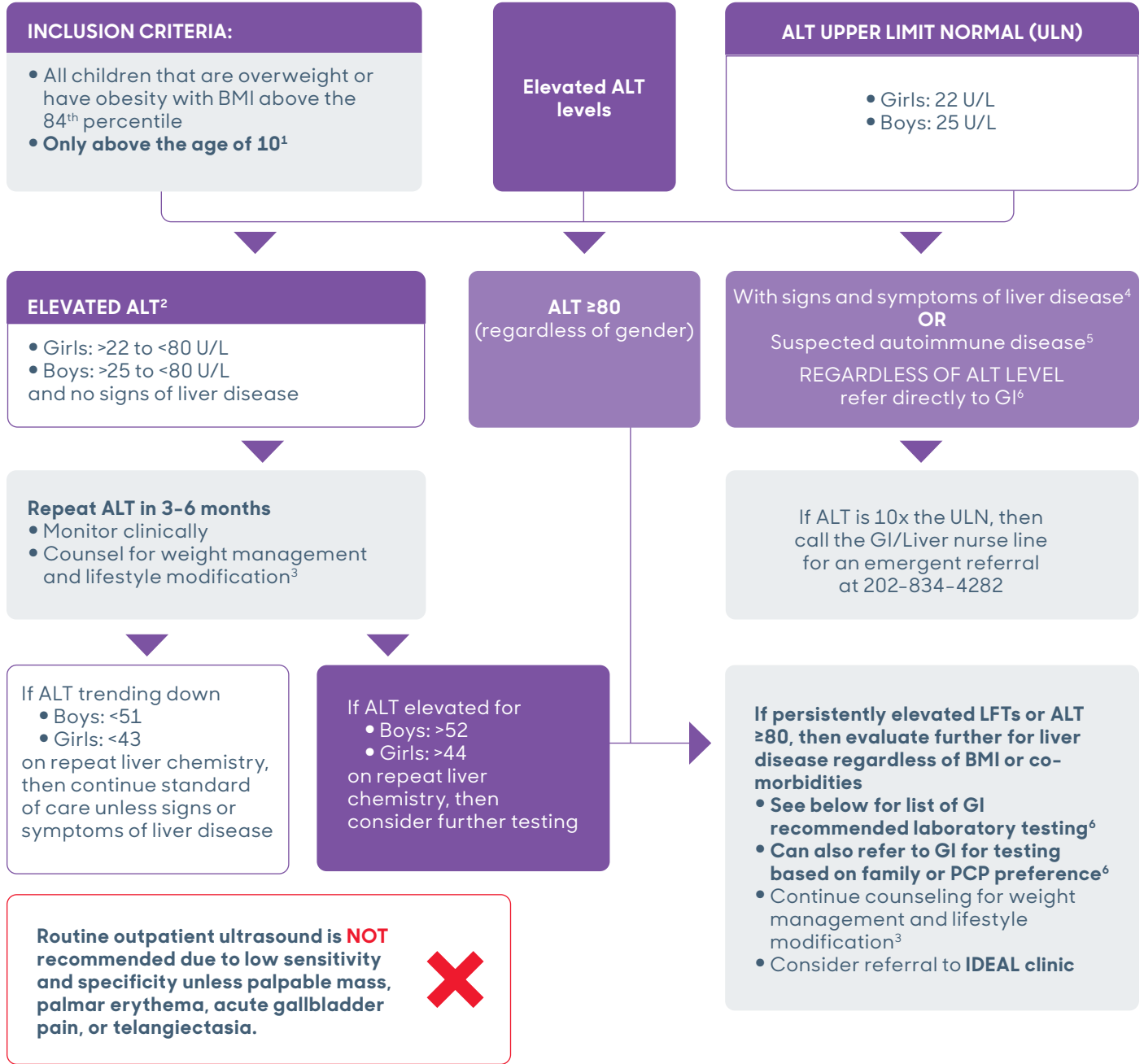




# Algorithm for ALT Lab for Non-Alcoholic Fatty Liver Disease (NAFLD)



## Order of Risk of Liver Damage with NAFLD<sup>7</sup>



#	Subject	Description
1	Inclusion criteria	Inclusion criteria for ALT includes all children who are overweight or have obesity with a BMI over 85th percentile, but <b>only in children ≥ 10 years of age</b> . Data for liver fat/damage is inconsistent for children <10 years of age. <b>*May consider screening in child 2-9yo with Severe Obesity(&gt;99th% BMI)</b>
2	Elevated ALT levels less than 5x ULN	Elevated ALT levels less than 5x ULN do <b>NOT</b> necessarily correlate with level of histological fat in liver. For example, a patient with 5x ULN ALT may have normal liver histology, while a patient with 2x ULN ALT may have a significantly more fat in liver histology. The gold standard for assessing disease severity and amount of fat is liver biopsy. <b>Use clinical judgement in addition to ALT levels for assessment of NAFLD.</b>
3	Weight management counseling and lifestyle modification	Weight management and lifestyle counseling should include nutrition and physical activity recommendations. <b>Aerobic exercise</b> is preferred for decrease in ALT and fat in liver, but resistance training also proven to be beneficial. <ul style="list-style-type: none"> <li>• At least 60 minutes or more of moderate-to-vigorous intensity physical activity daily, with at least 3 days a week including vigorous aerobic activity and resistance activity.</li> </ul>
4	Signs of advanced liver disease	Red flag signs of advanced liver disease include: <ul style="list-style-type: none"> <li>• Chronic fatigue</li> <li>• GI bleeding</li> <li>• Jaundice</li> <li>• Splenomegaly</li> <li>• Firm liver on physical exam</li> <li>• Low platelets</li> <li>• Low white blood cell count</li> <li>• Elevated direct bilirubin</li> <li>• Elevated international normalized ratio (INR)</li> <li>• Long history, &gt;2 years, of elevated liver enzymes</li> </ul> <p>If signs and symptoms of advanced liver disease are present, then likely suggests elevated ALT is not only due to NAFLD and referral directly to GI is recommended.</p>
5	Suspected autoimmune disease	Risk factors for autoimmune disease include hypothyroidism, diabetes, or family history of autoimmune disease, which can be causing elevations in ALT. It is recommended to refer patients to GI earlier than 1 year even for patients with mild ALT elevation for an autoimmune hepatitis screen. <b>This screening is not recommended in a primary care setting.</b>
6	Lab work for referral	Lab work for referral to GI, which PCP can start if comfortable: <ul style="list-style-type: none"> <li>• <b>CBC</b></li> <li>• <b>INR</b></li> <li>• <b>CMP</b></li> </ul> <p><b>Hepatic function panel</b> to check for other hepatic markers</p> <ul style="list-style-type: none"> <li>- Bilirubin, Alkaline phosphatase, GGT, ALT/AST</li> </ul> <ul style="list-style-type: none"> <li>• <b>HbA1c</b></li> <li>• <b>Infectious hepatitis screen (ABC)</b> <ul style="list-style-type: none"> <li>- Screening for hepatitis B (sAg, sAb, cAb)</li> <li>- Screening for hepatitis C (total Ab)</li> <li>- If ordered at Children's National, use Hepatitis Diagnostic Panel + HepBsAb</li> </ul> </li> <li>• <b>Alpha-1 antitrypsin deficiency screen</b> (alpha-1 antitrypsin phenotype)</li> <li>• <b>Wilson disease screen</b> (serum ceruloplasmin)</li> <li>• <b>Autoimmune hepatitis screen</b> (ANA, anti-smooth muscle Ab, liver-kidney microsomal Ab)</li> <li>• <b>Celiac disease screen</b> (tissue transglutaminase IgA, total IgA)</li> <li>• <b>Lysosomal acid lipase deficiency screen</b> (LALD enzyme level)</li> </ul> <p>If all labs negative in absence of signs/symptoms of liver disease acute referral not indicated; can continue lifestyle efforts to support dietary changes and weight loss, if persistent LFT elevation noted &gt;1 year consider referral to GI for imaging</p>
7	Liver damage risk with NAFLD	<b>NAFLD</b> (Non-alcoholic fatty liver disease) is a condition in which excess fat is stored in your liver without inflammation, and is common in patients with obesity, diabetes and high cholesterol. NAFLD puts a patient at higher risk for <b>NASH</b> (non-alcoholic steatohepatitis), a more serious condition in which there is excess fat in the liver with inflammation. NASH then puts the patient at risk for permanent liver damage, such as cirrhosis or liver cancer. <ul style="list-style-type: none"> <li>• <b>NAFLD is reversible.</b> It is crucial to counsel patient on weight management and lifestyle modifications while patient does not have irreversible liver damage.</li> </ul>

**Sources:**

Children's National Hospital Gastroenterology Department, Dr. Mohan and Dr. Vitola  
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<https://www.uptodate.com/contents/nonalcoholic-fatty-liver-disease-in-children-and-adolescents>