

Non-HDL Cholesterol

TECHNICAL UPDATE

DESCRIPTION/BACKGROUND INFORMATION

Non-HDL cholesterol measurement (calculated as total cholesterol minus HDL cholesterol) provides a single index of all the atherogenic, apolipoprotein (apo) B-containing lipoproteins – LDL, VLDL, intermediate-density lipoprotein (IDL), and lipoprotein (a). Although apo B can be assessed directly, measurement of non-HDL cholesterol is more practical, reliable, and inexpensive and is accepted as a surrogate marker for apo B in routine clinical practice. Unlike LDL cholesterol, which can be incorrectly calculated in the presence of postprandial hypertriglyceridemia, non-HDL cholesterol is reliable when measured in the nonfasting state.

Cardiovascular disease (CVD) is currently the primary cause of morbidity and mortality in patients with diabetes. Because individuals with diabetes have greatly increased CVD risk compared with nondiabetic individuals, it is important to identify factors that may increase CVD risk in diabetic patients.

CLINICAL APPLICATION

Patients with type 2 diabetes have high rates of CVD, much of which may be preventable with appropriate treatment of lipid abnormalities. Diabetic dyslipidemia most commonly manifest as elevated triglycerides and low levels of HDL cholesterol, with a predominance of small, dense LDL particles amid relatively normal LDL cholesterol levels. In diabetic patients, non-HDL cholesterol may be a stronger predictor of CVD than LDL cholesterol or triglycerides because it correlates highly with atherogenic lipoproteins. Target goals for LDL and non-HDL cholesterol in patients with diabetes are <100 and <130 mg/dl, respectively.

The Adult Treatment Panel (ATP) III of the National Cholesterol Education Program (NCEP) has recommended that non-HDL cholesterol be used as a secondary target of therapy in people with triglyceride levels >200 mg/dl, especially those with diabetes or metabolic syndrome. See the following table:

Comparison of LDL Cholesterol and Non-HDL Cholesterol Goals for Three Risk Categories

Risk Category	LDL Goal (mg/dL)	Non-HDL Goal (mg/dL)
CHD and CHD Risk Equivalent (10-year risk for CHD >20%)	<100	<130
Multiple (2+) Risk Factors and 10-year risk ≤20%	<130	<160
0-1 Risk Factor	<160	<190

If triglycerides 200-499 mg/dL after LDL goal is reached, consider adding drug if needed to reach non-HDL goal:

- intensify therapy with LDL-lowering drug, or
- add nicotinic acid or fibrate to further lower VLDL.

If triglycerides \geq 500 mg/dL, first lower triglycerides to prevent pancreatitis:

- very low-fat diet (\leq 15% of calories from fat)
- weight management and physical activity
- fibrate or nicotinic acid
- when triglycerides <500 mg/dL, turn to LDL-lowering therapy.

Treatment of low HDL cholesterol (<40 mg/dL)

- First reach LDL goal, then:
- Intensify weight management and increase physical activity.
- If triglycerides 200-499 mg/dL, achieve non-HDL goal.
- If triglycerides <200 mg/dL (isolated low HDL) in CHD or CHD equivalent, consider nicotinic acid or fibrate.

1454 Lipid Panel

SPECIMEN:	Serum or Plasma (Li Heparin or Na Heparin)	
SUBMISSION REQUIREMENTS:	One (1) mL (min: 0.5mL) of serum or plasma in a standard transport tube. Submit at refrigerated temperature.	
SPECIAL HANDLING:	Allow specimen to clot completely at room temperature. Avoid Repeated Freeze/Thaw Cycles. Fasting Specimen is Preferred. Separate from cells ASAP.	
METHODOLOGY:	See individual components	
INTERPRETIVE DATA:	See individual components	
CPT CODE(S):	80061	
TURN AROUND TIMES:	1-3 days	
COMPONENTS:	1032 - TRIGLYCERIDES	1017 - CHOLESTEROL
	2030 - HDL	2056 - LDL
	2057 - VLDL	2485 - CHOL/HDL
	1099 - NON-HDL CHOL	

REFERENCES:

1. Lu, W., Resnick, H.E., Jablonski, K.A., Jones, K.L., Jain, A.K., Howard, W.J., Robbins, D.C., Howard, B.V.: Non-HDL cholesterol as a Predictor of Cardiovascular Disease in Type 2 Diabetes. *Diabetes Care* 26:16-23, 2003.
2. Peters, A.L.: Clinical Relevance of Non-HDL Cholesterol in Patients with Diabetes. *Clinical Diabetes* 26: 3-7, 2008.
3. <http://www.nhlbi.nih.gov/guidelines/cholesterol/atglance.htm>

08/2008