Low Density Lipoprotein (LDL) Cholesterol Calculation at ChristianaCare Laboratories

On 3/2/2023, laboratories at ChristianaCare started using the Sampson/National Institute of Health (NIH) equation to calculate LDL cholesterol.

The NIH equation provides a more accurate calculated LDL (LDL-C) result than the previously used Friedewald equation, particularly in patients with low LDL-C concentrations (< 70 mg/dL). The NIH equation also provides valid LDL-C results with triglyceride (TG) concentrations up to 800 mg/dL. When the triglyceride concentration is >800 mg/dL, the LDL-C will not be calculated, and a direct LDL-C should be ordered. The NIH equation performs equally well in both fasting and non-fasting states.

NIH equation:

LDL-C = TC/0.948 – HDL-C/0.971 – (TG/8.56 + [TG x NonHDL-C]/2140 – TG^2/16100) – 9.44

Where,

TC = Total Cholesterol
HDL-C = High Density Lipoprotein (HDL) Cholesterol
TG = Triglycerides
NonHDL-C = TC − HDL-C

The following algorithm was implemented for the reporting of calculated LDL-C values:

- For TG value up to 800 mg/dL; the LDL-C will be reported using the NIH equation.
- When the TG value is >800 mg/dL, the LDL-C will NOT be reported.

Reference:

Sampson M, Ling C, Sun Q, Harb R, Ashmaig M, Warnick R, Sethi A, Fleming JK, Otvos JD, Meeusen JW, Delaney SR, Jaffe AS, Shamburek R, Amar M, Remaley AT. A New Equation for Calculation of Low-Density Lipoprotein Cholesterol in Patients With Normolipidemia and/or Hypertriglyceridemia. JAMA Cardiol. 2020 May 1;5(5):540-548.

VERSION: 1; CREATED: 3/2/2023