



# New Martin-Hopkins Method for Low-Density Lipoprotein Calculation

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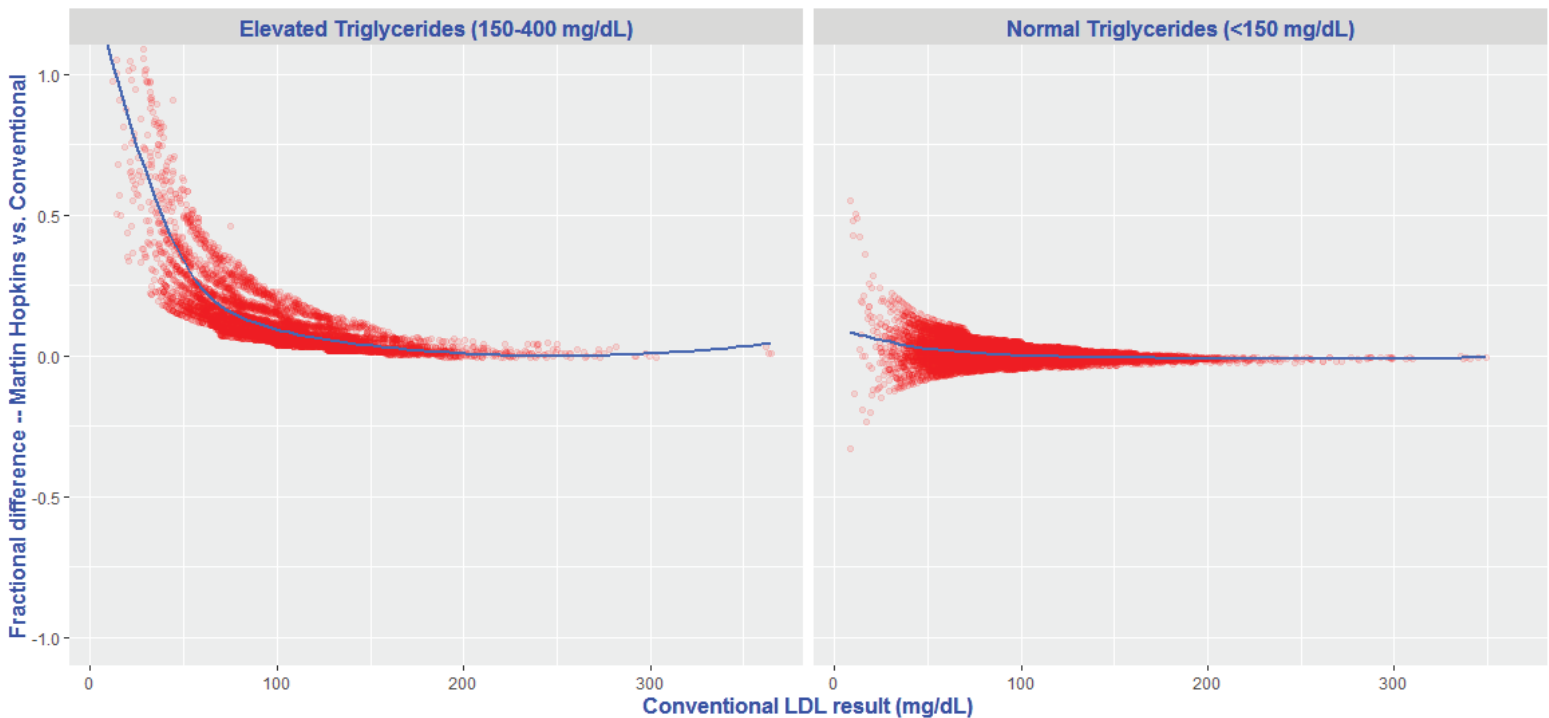
Effective 3/02/2020, CPL will adopt the Martin-Hopkins method for calculated low-density lipoprotein cholesterol (calc. LDL-C). The method replaces the traditional Friedewald formula, which employed a ratio of 5 for triglyceride: very low-density lipoprotein (TRIG/VLDL) in order to compute LDL from total cholesterol, HDL cholesterol and triglycerides according to the following formula:

$$\text{Calc. LDL-C} = \text{CHOL.} - (\text{HDL-C}) - (\text{TRIG}/5)$$

While Friedewald has been the mainstay in LDL-C estimation for more than 40 years, it has been recognized that the equation tends to underestimate directly measured LDL-C when TRIG is significantly elevated. In an evaluation of more than 1 million patients from the Very Large Database of Lipids (VLDL dataset), Martin and colleagues validated a novel equation which replaced the fixed ratio of 5 for VLDL-C with a factor that varied from approximately 3 to 12 based on a patient's individual non-HDL-C and TRIG values.

$$\text{Calc. LDL-C} = \text{CHOL.} - (\text{HDL-C}) - (\text{TRIG}/\text{NOVEL FACTOR})$$

With implementation of the novel factor, Martin-Hopkins shows higher accuracy as triglycerides trend higher and non-HDL cholesterol and LDL-C trend lower. Improved accuracy for lower values of estimated LDL is increasingly important in the 2018 American Heart Association/American College of Cardiology (AHA/ACC) guidance which recommends that many patients be managed at an LDL threshold of 70 mg/dL. The net effect of the transition to Martin-Hopkins will be overall increased calculated LDL-C for patients who have elevated Triglycerides (150-400 mg/dL) and low non-HDL cholesterol. Of note, the reference intervals and guidance from expert groups are not changed. See image below.



As previously noted, the new estimate will not be performed for elevated triglycerides that exceed 400 mg/dL. In this case, directly measured LDL (test code 4228) is recommended. Please contact your CPL Account Representative for more details.

#### REFERENCES:

Martin SS, Blaha MJ, Elshazly MB, et al. Comparison of a Novel Method vs the Friedewald Equation for Estimating Low-Density Lipoprotein Cholesterol Levels From the Standard Lipid Profile. *Jama*. 2013;310(19):2061. doi:10.1001/jama.2013.280532

Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA / ACC / AACVPR / AAPA / ABC / ACPM / ADA / AGS / APhA / ASPC / NLA / PCNA Guideline on the Management of Blood Cholesterol A Report of the American College of Cardiology / American Heart Association Task Force on Clinical Practice Guidelines WRIT.; 2018. doi:10.1161/CIR.0000000000000625

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