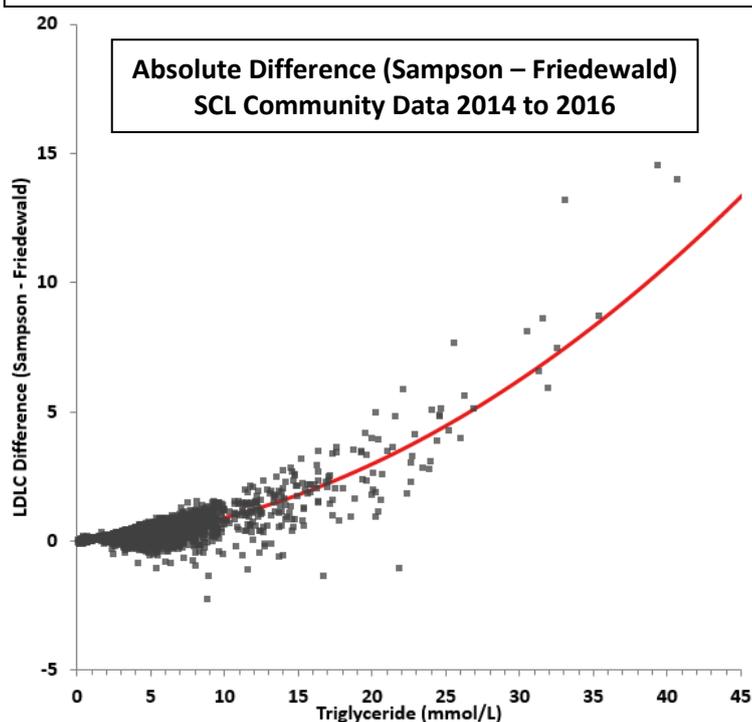


# LDL Calculation Change SDHB

From **11<sup>th</sup> October 2021** the biochemistry laboratory will change the way that LDL Cholesterol (LDLC) is calculated on the lipid profile.

The current calculation (Friedewald's formula) has been in use for almost 50 years. It estimates LDLC from the total cholesterol (TC), HDL Cholesterol (HDL) and triglyceride (TG) concentrations. The calculation assumes that triglyceride-containing lipoproteins contain a constant proportion of LDLC. This has been shown not to be the case and as the plasma concentration of TG rises, so does the proportion of cholesterol in the triglyceride-rich VLDL particles. LDLC calculation using the Friedewald formula becomes increasingly inaccurate above about 2.5 mmol/L TG and sufficiently unreliable to be **not reported when TG >4.5 mmol/L**. In 2020 Sampson et al published a new equation that links TC, HDL, TG and non-HDL in the calculation of LDLC<sup>(1)</sup>. It was compared to the Friedewald equation (among others) and to direct methods of LDLC estimation (including 'gold-standard' ultracentrifugation with cholesterol estimation). This showed better agreement between the Sampson method and direct LDLC methods than the Friedewald formula **up to a TG concentration of 9 mmol/L**. There was good agreement between the current Friedewald formula and the Sampson equation at values of TG <2mmol/L.



Using the Sampson equation will result in fewer LDLC values being unavailable because of high TG (almost 2.5% of Friedewald estimates v 0.2% for Sampson). There is likely to be little difference in LDLC estimation in those with near normal lipid values. Reviewing Southern Community Laboratories community lipid data from 2014 to 2016 we found that over 99% of all Sampson equation values were within +/- 0.5 mmol/L of the current Friedewald calculated value (approximately 69% will be within 0.1 mmol/L). We saw that as TG values increase, the difference between Friedewald and Sampson equations increases with estimated LDLC increasing as TG increases (see graph).

In summary, for most individuals adoption of the Sampson equation will make little difference to their reported LDLC. For a few with hypertriglyceridaemia, more will be able to receive valid results and these results are likely to be more accurate than those that would have been reported by the Friedewald formula. As recommended in the original publication, LDLC results calculated by Sampson will now be reported up to a TG concentration of 9 mmol/L.

If you require more information on this change, please contact the laboratory.

#### Reference

1. A new equation for calculation of low-density lipoprotein cholesterol in patients with normolipidemia and/or hypertriglyceridemia. Sampson M et al (2020). JAMA Cardiol 5(5):540-8.

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