Non-fasting lipids

A change in practice

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OVER THE PAST DECADE, multiple guidelines by cardiovascular societies around the world have advised that testing for non-fasting lipids be recommended in preference to fasting lipids to assess for cardiovascular risk.[1–4] However, Australia's most recent guideline on cardiovascular risk was published in 2012 prior to the aforementioned worldwide changes and continues to suggest the use of a fasting lipid profile to assess absolute cardiovascular risk.[5] Australian general practitioners (GPs) and their patients may not be aware of this global paradigm shift in testing, which has significant benefits to the patient, doctor and society. Indeed, one could argue that the non-fasting state is more representative of cardiovascular risk, as humans spend most time in the postprandial condition. We highlight below current recommendations from around the world and the rationale for shifting from fasting to non-fasting.

There are economic and clinical reasons why testing for non-fasting lipids is superior to fasting lipids. First, there is benefit to the patient by not having to take time out of their schedule expending resources to return on another day after fasting. This also relieves the strain on pathology collection centres in the morning, where it is common to see multiple patients having to wait for extended periods compared to other times due to the fasting testing surge. Second, avoiding unnecessary testing of fasting lipids reduces the risk of symptomatic hypoglycaemia in individuals with diabetes. Third, doctors will find it easier to manage clinical risk and workflow, with fewer patients being lost to follow-up because they are more likely to have tests performed on the same day, increasing compliance. This is especially relevant given that pathology collection services are often co-located in general practice clinics.[1,6]

An argument for the use of fasting lipids is that plasma triglycerides increase following a fat tolerance test. As low-density lipoprotein cholesterol (LDL-C) is commonly estimated by the Friedelwald equation, which is total cholesterol subtracted by high-density lipoprotein cholesterol (HDL-C) subtracted by triglycerides/2.2 mmol/L. Subsequently, an elevated triglyceride level could lead to an underestimation of LDL-C levels.[7,8] Despite this concern, normal food intake has been shown to increase triglyceride and cholesterol levels at a much lower rate than a fat tolerance test, and is considered clinically insignificant. A study of 92,285 individuals from the general population in Denmark recruited from 2003 to 2014 evaluated the maximal mean change of lipids at 1–6 hours following normal food intake. It demonstrated an increase of triglycerides by 0.3 mmol/L, total cholesterol decreased by 0.2 mmol/L, LDL-C decreased by 0.2 mmol/L, and there was no change in HDL-C.[1] Patients found to have elevated triglycerides from non-fasting lipids may warrant a subsequent fasting sample for calculation of LDL-C and triglyceride levels.

Another reported concern with using non-fasting lipids is that they cannot be used for management decisions because previous studies used fasting lipids in their protocols. However, a meta-analysis of 68 long-term prospective studies of more than 300,000 patients found there was no significant difference in using non-fasting lipids compared to fasting lipids for vascular risk assessment. It further concluded that only total and HDL-C cholesterol levels, known to have nonsignificant variations due to fasting, are required for the assessment of cardiovascular risk.[9] In addition, a further three large statin trials with more than 43,000 patients have used non-fasting lipids to assess and manage cardiovascular disease.[1] A recent randomised controlled trial of 8270 patients was the first to measure fasting and non-fasting lipids in the same individual at baseline and found no difference in risk prediction of future coronary or atherosclerotic cardiovascular events.[10]

Table 1 summarises current published consensus statements regarding non-fasting lipid testing. The Canadian Cardiovascular Society, the European

Atherosclerosis Society, the European Federation of Clinical Chemistry and Laboratory Medicine and the National Institute of Health Care and Excellence all recommend non-fasting lipids with a repeat of fasting lipids only if initial triglycerides are above 4.5 mmol/L, 5 mmol/L or 10 mmol/L, respectively.[1,2,4] The American College of Cardiology/American Heart Association Task Force recommends either non-fasting or fasting lipids with a repeat of fasting lipids only if non-fasting triglycerides are >4.5 mmol/L.[3]

Non-fasting lipid testing is now recommended throughout the world. The clinical and economic benefits to individuals and society are not insignificant, especially with everyday lives becoming more complex. As GPs, it is important that we educate patients and other health providers that there is no reason why non-fasting lipids should not become the norm. The early morning queue for fasting lipids at pathology collection sites might then become a relic of the past.

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Table 1. Summary of international guidelines for non-fasting lipid testing

Guideline	Year	Recommendation
Canadian Cardiovascular Society[2]	2021	• Non-fasting lipids recommended • Fasting lipids if individuals with known triglyceride levels >4.5 mmol/L
American College of Cardiology/American Heart Association Task Force[3]	2018	• Non-fasting lipids or fasting lipids for adults not on lipid-lowering therapy • If non-fasting plasma triglycerides >4.5 mmol/L, repeat in fasting state • Adults with a family history of premature atherosclerotic cardiovascular disease (ASCVD) or genetic hyperlipidaemia should have fasting lipids
European Atherosclerosis Society/European Federation of Clinical Chemistry and Laboratory Medicine[1]	2016	• Non-fasting lipids recommended • If non-fasting plasma triglycerides >5.0 mmol/L, repeat in fasting state
National Clinical Guideline Centre (NICE)/Joint British Societies Guidelines[4]	2014	• Non-fasting lipids are recommended • If non-fasting plasma triglycerides ≥10.0 mmol/L, repeat in fasting state • Adults suspected of familial hypercholesterolaemia can have a subsequent fasting sample

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