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Implementation and Impact of a Non-Fasting Diabetes Panel with Direct LDL-C at NHGP

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Introduction

Fasting blood tests for diabetes monitoring, including a calculated LDL from a full lipid panel, have long been standard practice in primary care. However, the fasting requirement can be inconvenient and may increase risk of hypoglycaemia. This initiative aimed to increase patient convenience, ensure accuracy in LDL measurement, and optimise resource utilisation, while maintaining appropriate care for patients with type 2 diabetes. We seek to evaluate National Healthcare Group Polyclinics' (NHGP) implementation of a non-fasting diabetes panel with direct LDL measurement on 3 January 2025.

Methods

A workflow revision was introduced in NHGP, supported by updated clinical guidelines and CME sessions. The new non-fasting panel is now routinely offered for yearly diabetes monitoring in patients without a history of hypertriglyceridaemia, using direct LDL measurement to mitigate the risk of underestimating LDL levels in non-fasting samples. This DM monitoring panel omits total cholesterol, triglycerides and HDL measurements as these parameters are not treatment targets according to national guidelines in reducing cardiovascular risk[1]. For LDL monitoring between yearly panel tests, an order for measured LDL alone is available. Utilisation rates of the new orders were tracked from 3 January to 31 July 2025. Cost implications were modelled based on test substitution rates.

Results

At the current conversion rates as of July 2025, 17% of diabetes panels ordered were non-fasting. 72% of patients who would have had a fasting lipid panel alone ordered in-between panel tests for lipid profile monitoring were switched to non-fasting direct LDL testing.

NHGP	DM				Non-DM			
	Fasting DM panel		Non-Fasting DM panel with LDL-M		Fasting Lipid Panel		LDL-M	
Jan-25	8,153	99%	122	1%	13,896	81%	3,185	19%
Feb-25	8,630	98%	170	2%	14,279	74%	5,045	26%
Mar-25	8,054	97%	261	3%	13,382	64%	7,503	36%
Apr-25	8,713	94%	576	6%	13,172	50%	13,425	50%
May-25	8,525	92%	733	8%	13,494	45%	16,366	55%
Jun-25	7,429	89%	956	11%	12,280	36%	21,699	64%
Jul-25	7,337	83%	1,491	17%	12,028	28%	31,068	72%

Table 1. Total electronic orders in NHGP for fasting DM panel, non-fasting DM panel, Fasting Lipid Panel and measured LDL alone ala carte

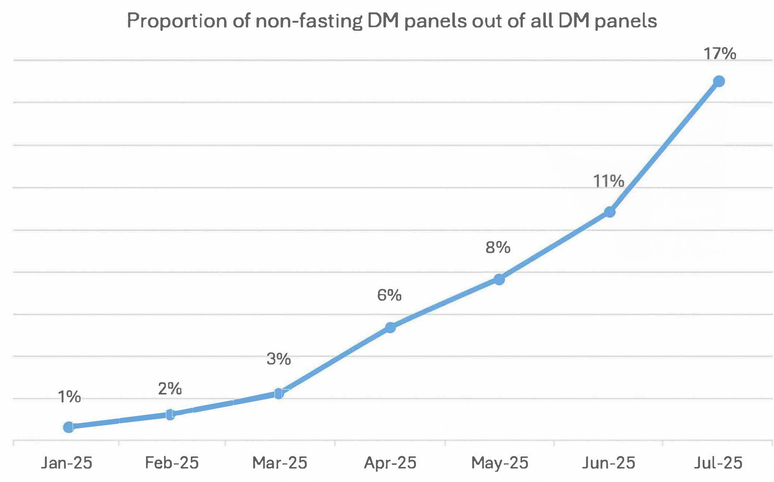

Figure 1. Percentage of DM monitoring panels ordered as non-fasting

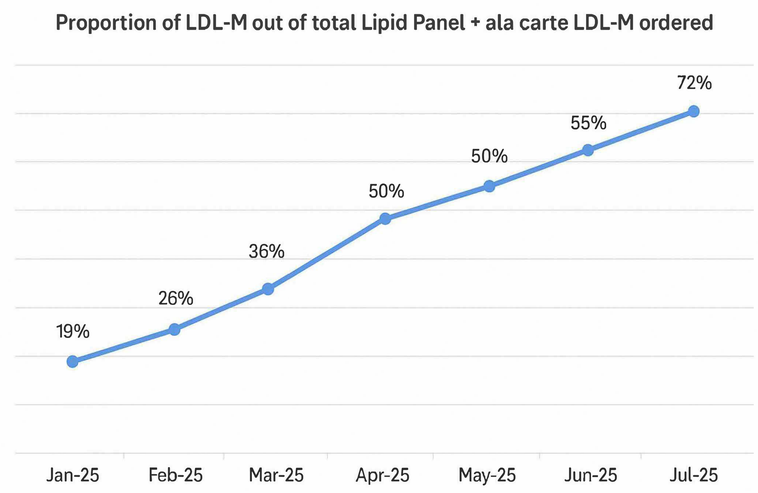

Figure 2. Percentage of full fasting lipid panels converted to LDL measured alone

Discussion

At current conversion rates as of July 2025, projected annual cost savings to the system annually in NHGP is SGD 286,310. With optimal utilisation by clinicians, annual cost savings is projected to be SGD 1.2 million. These cost savings are due to the lower cost of LDL measured alone compared to a conventional full lipid panel. The use of directly measured LDL instead of LDL calculated from a lipid panel reduces the risk of under-estimation of LDL commonly seen in local populations[2].

Conclusion

The introduction of a non-fasting diabetes panel with direct LDL measurement and LDL-M a la carte order at NHGP exemplifies value-based innovation in primary care. This model demonstrates how workflow redesign and evidence-based test selection can deliver cost savings, enhance patient experience, and sustain high standards of care.

Reference

1. Agency for Care Effectiveness (ACE). Lipid management: focus on cardiovascular risk. ACE Clinical Guidance (ACG), Ministry of Health, Singapore. 2023. Available from: go.gov.sg/acg-lipid-management
2. Chai Kheng EY, Chee Fang S, Chang S, Kiat Mun SL, Su Chi L, Lee Ying Y, Xiao Wei N, Wern Ee T, Biing Ming SL, Tavintharan S. Low-density lipoprotein cholesterol levels in adults with type 2 diabetes: an alternative equation for accurate estimation and improved cardiovascular risk classification. Diab Vasc Dis Res. 2014 Nov;11(6):431-9. doi: 10.1177/1479164114547703. Epub 2014 Sep 9. PMID: 25205607.