

The “silent gap”: Geographic and socioeconomic disparities in Singapore’s cardiometabolic screening

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Dear Editor,

Type 2 diabetes mellitus (T2DM), hypertension and hyperlipidaemia (collectively DHL) are longstanding cardiometabolic risk factors contributing to premature morbidity and mortality globally.¹⁻³ Despite clear guidelines on early screening, coverage remains sub-optimal in many healthcare systems, with disproportionate gaps in lower socioeconomic groups.⁴⁻⁶ Socioeconomic status (SES) is a multifaceted construct that often influences how much access an individual or community has to essentials such as healthcare, housing, transportation and nutritious food, as well as social resources like political influence, social engagement and autonomy.⁷ In this letter, the authors present key findings from a recent cross-sectional analysis of over 1.1 million residents in western Singapore that highlight missed opportunities for prevention and propose pragmatic implications for clinical practice and health policy.

A cross-sectional study was conducted using anonymous demographic and clinical patient data extracted on 6 May 2024 from the Healthier SG Customer Relationship Management and New Generation Electronic Medical Record. Age, sex, race, housing type and residential postal codes, DHL diagnoses and DHL screening tests were extracted. Postal codes were recoded into the 97 respective subzones grouped into planning areas based on Singapore’s Urban Redevelopment Authority’s Master Plan 2019.⁸ Planning areas are geographical boundaries for urban development. SES was estimated using the Housing Index (HI), a measure of the weighted average number of rooms per unit, where a larger value represents a higher SES.⁹

Among residents with a touchpoint in the regional public health system, DHL screening uptake was 40% for diabetes, 46% for hypertension and only 24%

for hyperlipidaemia, substantially lower than national self-reported rates (79%, 86% and 77%, respectively).¹⁰ Prevalence of hypertension, hyperlipidaemia and T2DM were 13%, 15% and 8%, respectively. Hyperlipidaemia, despite being the most prevalent of the 3 conditions, had the lowest screening uptake.

Screening and prevalence patterns were not uniform across the region. Excluding zones with <100 residents, Bukit Panjang (36.3%), Bukit Batok (36.3%), and Queenstown (35.8%) achieved the highest average DHL screening numbers while Western Water Catchment (18.8%), Sungei Kadut (20.5%) and Jurong East (24.2%) achieved the lowest average DHL screening numbers. Certain residential subzones such as Tengah (19.8%), Bukit Batok (12.9%) and Choa Chu Kang (12.0%) showed high cardiometabolic disease burden, whereas areas like Bukit Timah (5.0%), Sungei Kadut (8.2%) and Queenstown (8.4%) had relatively low prevalence.

Higher socioeconomic status (SES) predicts better screening. The authors’ analysis found that individuals living in higher housing index (HI >5, the proxy for private housing) were less likely to undergo screening within the public system (Table 1). Older age and ethnicity significantly predicted screening and disease prevalence.

The relatively lower screening numbers despite higher prevalence in hyperlipidaemia highlights hyperlipidaemia as the “silent gap” in preventive care, suggesting systemic barriers in preventive lipid screening. While hypertension and diabetes are more readily detected, dyslipidaemia requires a blood test, often fasting, which may discourage participation. The differences in area-specific screening and prevalence numbers underscore the value of granular, subzone-level data in guiding targeted interventions. Interestingly, increasing HI was associated with lower DHL

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Table 1. Housing index-stratified, DHL screening numbers, DHL prevalence numbers and logistic regression results for the association between housing index, age, sex and race.

Screening numbers (%) of residents with:			
	Diabetes	Hypertension	Hyperlipidaemia
HI ≤2	45%	50%	28%
HI >2 to 3	42%	46%	25%
HI >3 to 4	42%	45%	25%
HI >4 to 5	41%	47%	25%
Prevalence numbers (%) of residents with:			
HI ≤2	12%	19%	19%
HI >2 to 3	10%	16%	18%
HI >3 to 4	10%	17%	18%
HI >4 to 5	8%	14%	15%
Odds ratio (95% confidence interval), z-score			
HI ≤2	1.29 (1.23–1.35), 10.09 ^c	1.17 (1.11–1.23), 6.00 ^c	1.32 (1.25–1.40), 9.23 ^c
HI >2 to 3	1.24 (1.20–1.29), 11.94 ^c	1.02 (0.98–1.06), 0.95	1.19 (1.14–1.24), 7.83 ^c
HI >3 to 4	1.27 (1.25–1.30), 23.59 ^c	0.98 (0.96–1.00), -1.79	1.20 (1.17–1.23), 14.36 ^c
HI >4 to 5	1.32 (1.29–1.34), 29.11 ^c	1.06 (1.04–1.08), 5.82 ^c	1.23 (1.21–1.26), 17.92 ^c
Age	1.05 (1.05–1.05), 178.33 ^c	1.02 (1.02–1.02), 50.74 ^c	1.04 (1.03–1.04), 99.41 ^c
Male	1.02 (1.00–1.03), 2.30 ^a	0.87 (0.86–0.88), -20.05 ^c	0.95 (0.94–0.97), -5.63 ^c
Indian	0.95 (0.93–0.98), -3.40 ^b	0.89 (0.87–0.91), -8.87 ^c	1.03 (1.00–1.06), 1.76 ^c
Malay	0.90 (0.88–0.92), -9.53 ^c	0.89 (0.87–0.91), -10.63 ^c	0.86 (0.84–0.88), -10.95 ^c
Others	0.85 (0.82–0.88), -8.33 ^c	1.03 (0.99–1.07), 1.54	0.92 (0.87–0.96), -3.73 ^c

DHL: type 2 diabetes mellitus, hypertension and hyperlipidaemia; HI: housing Index

^a P value<0.05^b P value<0.01^c P value<0.001

Reference group for race is Chinese race.

screening, which contradicts existing understanding that higher SES leads to higher screening numbers due to better health literacy, education levels, job security, income and healthcare access.^{11–14} One speculation could be that residents with a higher SES may prefer to visit private hospitals and clinics for their screening and were hence not captured within the authors' data but captured within the National Population Health Survey data. A previous study has also shown that persistent high utilisers of hospital services are more likely to be of lower SES.¹⁵ This high-lights the need for better inte-gration of private sector data into national surveillance. For lower-SES populations, community-based and after-hours programmes may help overcome barriers.¹⁶ Persistent ethnic differences emphasise the importance of

culturally tailored health promotion where clinicians could adapt communication and leverage community champions to enhance participation.¹⁷ The divergence between EHR-based and self-reported national survey estimates underscores the need for harmonised data sources to better capture the true disease burden.

This analysis benefits from a very large, diverse dataset and granular subzone-level mapping. However, limitations include incomplete capture of private primary care data, cross-sectional design and reliance on housing index as a proxy for SES. Despite these caveats, the findings provide actionable insights for clinical and public health practice.

Despite Singapore's well-developed health system, DHL screening rates in the western region remain

suboptimal, with hyperlipidaemia particularly neglected. Prevalence patterns reveal striking geographic and socioeconomic disparities that call for targeted, area-specific interventions. Clinicians play a pivotal role in closing screening gaps by proactively recommending tests, tailoring interventions to patients' contexts and advocating for better integration of private sector data. Area-specific interventions may be needed to enhance screening uptake and reduce disease burden, regardless of socioeconomic class. These findings can guide resource allocation and SES-specific public health strategies. Achieving equitable prevention of cardiometabolic disease in Singapore requires moving beyond national averages to neighbourhood-level action.

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Ethics statement

The study was approved as a Review Not Required study by the NUHS Research Office and exempted from ethics board review (NUH-RNR-2024-0031).

Declaration

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