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ORIGINAL ARTICLE

Can Australia afford the costs of cardiology guidelines? True costs and strategies for reduction

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Abstract

Aim: To estimate the 10-year Australian healthcare system cost of full implementation of evidence-based guidelines across five common cardiovascular conditions.
Background: Healthcare spending in Australia continues to rise as the population ages and treatment options become increasingly advanced and costly. However, assessment of cost remains conspicuously absent from national and international clinical guidelines, and the implications of such costs for the equity and sustainability of healthcare have not been evaluated in the Australian context.
Methods: Using national population estimates and Pharmaceutical Benefits Scheme (PBS) and Medicare Benefits Schedule (MBS) data, we modelled the projected 10-year cost of full guideline implementation for all eligible or indicated Australians across five common cardiovascular conditions: dyslipidaemia, hypertension, obesity, type 2 diabetes with heart failure or chronic kidney disease, and atrial fibrillation/flutter. These costs were compared against PBS/MBS expenditure from 2024 to 2025.
Results: In total, the projected 10-year cost for only these five cardiovascular conditions is estimated at $45–50 billion (at 2025 prices), which is 3.4–3.9 times higher than the current national expenditure for these conditions. This also highlights the poor uptake of, or access to, evidence-based care among certain Australian populations.
Conclusions: Our analysis highlights the complex balance between efficacy, cost and equity in healthcare. We propose two practical strategies to address these challenges: embedding cost-effectiveness analyses into guideline formulation and promoting greater use of generic medications. Through these measures, we hope to prioritise cost-effective, evidence-based care and make it accessible to all Australians, while maintaining the long-term financial sustainability of the healthcare system.

Introduction

Healthcare spending in Australia continues to rise as the population ages, comorbidities become more complex, and diagnostic and therapeutic options are increasingly more sophisticated and costly. In line with this, during the 2023–2024 financial year, expenditure through the Pharmaceutical Benefits Scheme (PBS) reached $17.7 billion, almost doubling from $9.1 billion a decade earlier. Likewise, contributions through the Medicare Benefits Schedule (MBS) increased from $19.3 billion in 2013–2014 to $29.9 billion in 2023–2024. In contrast to these 50% increases in that decade, Australian gross domestic product over the same period grew by only ~27%.[1]

In parallel, evidence-based recommendations in national and international guidelines have expanded across almost all disciplines, improving health outcomes for many Australians. However, most guidelines focus on efficacy and safety rather than the cost of medications or services to patients and the government. This omission poses major challenges. Full implementation of every evidence-based recommendation would create a large, and in some areas unsustainable, gap between current and potential expenditure. Meanwhile, the

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incomplete uptake of proven therapies disproportionately affects socioeconomically disadvantaged populations,[2] meaning the dollars spent often do not reach those in greatest need.

Cardiovascular disease remains a major cause of morbidity and mortality in Australia

To illustrate these challenges, we examined five common cardiovascular conditions to address the fundamental question: what would be the projected cost of implementing evidence-based guidelines across the Australian community? Understanding this is essential for evaluating the sustainability and equity of healthcare delivery in Australia.

Methods

We evaluated five common cardiovascular conditions selected for their high prevalence, substantial impact on longevity and quality of life and the availability of clear evidence-based treatment guidelines. These include (1) dyslipidaemia, (2) hypertension, (3) obesity, (4) type 2 diabetes (T2D) with consequent heart failure or chronic kidney disease (CKD) and (5) atrial fibrillation (AF) or atrial flutter.

Analyses used population-level estimates based on an Australian population of 27 million, including 22 million adults aged ≥18 years. Therapeutic recommendations were drawn from PBS eligibility criteria or, where available, Australian guidelines. In their absence, relevant European or North American guidelines were used. Disease prevalence was estimated from population-based studies or general practice cohorts, recognising that 85%–90% of Australians see a general practitioner annually, providing a reasonable population surrogate.

Included PBS and MBS costs were analysed from a healthcare funder perspective, over a projected 10-year time horizon. All costs are reported in 2024–2025 Australian Dollars, with no discounting applied. Cost estimations used the Dispensed Price for Maximum Quantity listed on the PBS website (www.pbs.gov.au), applying the lowest cost per unit when multiple pack sizes were available. Conservative estimates included only those for whom treatment is strongly recommended, while expanded estimates encompassed all individuals who may be eligible based on individualised assessment. For conditions with multiple indicated therapeutic options (e.g., atorvastatin vs rosuvastatin), weighted costs were derived from the 2024–2025 Pharmaceutical Benefits Schedule Item Reports. Estimated costs were then compared with actual 2024–25 PBS expenditure[3] to assess alignment between theoretical full implementation and real-world spending and, by extension, uptake of evidence-based practice. Individual PBS item numbers used to derive the actual cost are listed in the supporting information. The actual expenditure included combination formulations if these contained the medication under review.

This study was reported according to the CHEERS guidelines[4] (supporting information).

Condition-specific cost estimations

The estimated 10-year cost compared to actual PBS spending is presented in Figure 1. The cost and population estimations compared to actual spending are summarised in Table 1, with condition-specific breakdowns detailed in the following sections.

Dyslipidaemia

Scope

This analysis focused on the utilisation of statins and proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors for the management of dyslipidaemia in Australia, according to current guidelines.[5] This estimation does not include other lipid-lowering therapies such as ezetimibe and fibrates.

Population

The population requiring lipid-lowering therapy was divided into primary (no known atherosclerotic cardiovascular disease (ASCVD)) and secondary prevention (known ASCVD) cohorts.

For primary prevention, contemporary Australian cardiovascular disease (CVD) risk tools were used. Based on the 2012 CVD risk calculator, 8.2% of adults were classified as high risk and 4.8% as intermediate risk.[6] A 2023 primary care dataset applying the updated calculator identified 9.7% of adults aged 45–74 years as high risk and 26.4% as intermediate risk.[7] Using these estimates and the current Australian population aged 45–74 years (9.1 million; Australian Bureau of Statistics, 2024), this corresponds to ∼1.8–2.1 million adults at high risk and 1.1–2.4 million at intermediate risk.

For secondary prevention, data from the 2025 Australian Institute of Health and Welfare report and international registries identified 600 000 adults with coronary artery disease, 387 000 with prior stroke and 2.2 million with peripheral vascular disease.[8] Given overlap between subgroups, the Reduction of Atherothrombosis for Continued Health Registry found that 16.8% of those with coronary artery disease had a history of stroke and 10.8% had peripheral vascular disease.[9] Adjusting for

Internal Medicine Journal (2026) 1–8

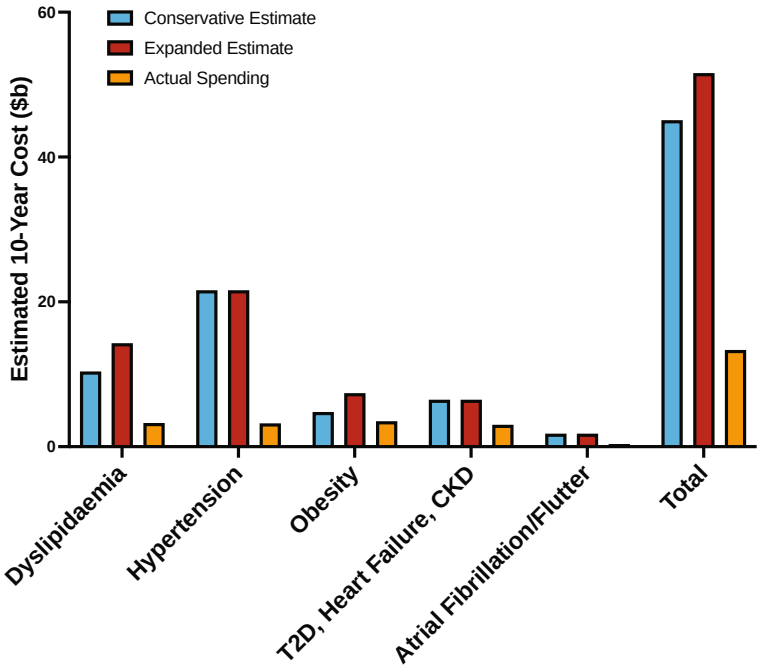

Figure 1 Projected 10-year cost of common cardiovascular conditions, showing conservative and expanded estimates, compared with actual Pharmaceutical Benefits Scheme (PBS) expenditure in 2024–2025. CKD, chronic kidney disease. T2D, type 2 diabetes.

Table 1 Summary of population and cost estimations and actual cost spending (2024–2025 financial year) from five common cardiovascular conditions

Condition and scope	Estimated population	Cost of medication (per day)	Estimated annual cost	Actual annual cost (2024–2025)
Dyslipidaemia: (1) high risk primary prevention; (2) secondary prevention[6,8,9]	4 800 000	$0.37 (atorvastatin 80 mg) $0.41 (rosuvastatin 40 mg)	$690 m	$265 m
Dyslipidaemia: (1) ≥ intermediate risk primary prevention; (2) secondary prevention[6,8,9]	7 500 000	$0.37 (atorvastatin 80 mg) $0.41 (rosuvastatin 40 mg)	$1080 m	$265 m
Dyslipidaemia: non-familial hypercholesterolaemia in patients with T2D and inadequate LDL control[11–13]	80 000	$12.13 (evolocumab, 140 mg/mL, 1 mL pen)	$350 m	$63 m
Hypertension: all guideline-recommended indications[15]	9 000 000	~$0.32–0.35 (varying with dose and medication)	$2160 m	$322 m
Obesity: BMI ≥30 kg/m^2 with T2D[10,19]	277 000	$6.41 (semaglutide 1.34 mg/mL, 3 mL pen)	$480 m	$351 m
Obesity: BMI ≥27 kg/m^2 with T2D[22]	526 000	$6.41 (semaglutide 1.34 mg/mL, 3 mL pen)	$740 m	$351 m
Heart Failure: symptomatic with echocardiography documenting reduced ejection fraction or diastolic dysfunction[23] *CKD*: estimated glomerular filtration rate 25–75 with significant albuminuria[24] *T2D*: established ASCVD with HbA1c ≥7%[10,25]	494 000 22 000 720 000 Overlap: 141000	$1.65(dapagliflozin 10 mg) $1.63(empagliflozin 10 mg)	$654 m	$303 m
Atrial fibrillation or atrial flutter ablation: young, symptomatic patients with no significant comorbidities[8,29]	61 000	Cost per procedure: $3117.05 (atrial fibrillation ablation) $2448.10 (atrial flutter ablation)	$183 m	$34 m

ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; CKD, chronic kidney disease; LDL, low-density lipoprotein; T2D, type 2 diabetes.

overlap yields an estimated secondary prevention population of about 3.0 million adults.

To estimate the population eligible for the PCSK9 inhibitor evolocumab, we focused on non-familial hypercholesterolaemia. Although several PBS criteria allow for evolocumab prescription, we restricted our analysis to individuals with ASCVD and diabetes (with microalbuminuria or age ≥ 60 years) whose low-density lipoprotein (LDL) remains >1.8 mmol/L despite statin and ezetimibe therapy. Of 1.2 million Australians with T2D, around 700 000 are aged ≥65 years and 300 000 have albuminuria, with substantial overlap, yielding a conservative net estimate of 800 000 patients. Among these, 25% have ASCVD, meaning 200 000 should already be receiving lipid-lowering therapy.[10] Studies suggest that 40–50% of such patients on oral lipid-lowering therapy do not achieve LDL <1.8 moml/L.[11–13] Therefore, using the lower 40% rate, approximately 80 000 would meet the criteria for evolocumab.

Cost

Statin costs were estimated based on rosuvastatin 20 mg daily and atorvastatin 40 mg daily, representing intermediate doses of high-potency statins. During 2024–2025, there were 9.2 million atorvastatin prescriptions ($22.40 for 60 tablets) and 11.0 million rosuvastatin prescriptions ($24.68 for 60 tablets), giving atorvastatin a 46% share of use. The 10-year cost was calculated using the following formula:

$$(\text{number of patients} \times 0.46 \times 22.40/60 \times 365 \times 10) + (\text{number of patients} \times 0.54 \times 24.68/60 \times 365 \times 10)$$

If fully implemented, the projected 10-year cost of statin therapy for all Australians meeting treatment indications would be $6.9 billion under a conservative estimate (high-risk primary and secondary prevention) and $10.8 billion under an expanded estimate (intermediate- and high-risk primary and secondary prevention). These figures represent 2.6–4.1 times the current PBS expenditure on atorvastatin and rosuvastatin.

For evolocumab, the PBS-listed price is $339.58 for two prefilled pens administered every 2 weeks. Based on an estimated 80 000 eligible individuals, the 10-year cost is estimated at $3.5 billion, which is 5.6 times the current PBS expenditure on evolocumab.

Hypertension

Population

While lifestyle modification can improve blood pressure control, both Australian and international guidelines recommend pharmacological therapy, even for individuals with low cardiovascular risk.[14,15] Current estimates suggest that approximately 9 million Australians have hypertension,[8] highlighting the substantial population potentially eligible for treatment.

Cost

International registry data suggest that patients treated for hypertension typically take two agents.[16] In Australia, the three most commonly used anti-hypertensive medications are perindopril, amlodipine and telmisartan, and each costs approximately $0.33 per day under current PBS pricing for generic forms. Assuming dual therapy for most patients, this corresponds to a 10-year projected cost of $21.6 billion, which is 6.7 times the current PBS expenditure on the five most commonly prescribed anti-hypertensive agents in Australia (perindopril, amlodipine, telmisartan, irbesartan, candesartan).

Glucagon-like Peptide-1 receptor agonist (GLP1RA) in obesity

Population

GLP1RAs are approved for T2D when glycaemic control remains inadequate with metformin, sulphonylurea or insulin plus sodium glucose co-transporter 2 (SGLT2) inhibitor. We defined inadequate response as HbA1c ≥7% on therapy, a common clinical target. While PBS criteria do not specify a body mass index (BMI) threshold for semaglutide, BMI ≥ 30 kg/m^2 is commonly used in trials[17] and international guidelines.[18]

Approximately 1.2 million Australians have T2D,[10] the majority managed with pharmacotherapy. Among adults with T2D, 31.7% have BMI ≥ 30 kg/m^2 (∼380 000 individuals).[10] In a large US registry of nearly 3000 patients (94% with obesity, mean HbA1c 7.9%), 68.5% failed to achieve HbA1c <7% after 12 months of metformin + SGLT2 inhibitor therapy.[19] Discontinuation due to adverse effects occurred in 4–5% of major trials.[20,21] Together, these data suggest that 73% of obese individuals with T2D may meet PBS criteria for GLP1RA, equating to approximately 277 000 eligible patients.

Outside Australia, semaglutide is also approved for individuals with a BMI ≥ 27 kg/m^2 who have weight-related comorbidities such as T2D.[22] In Australia, 34% of people with T2D are overweight (BMI 25–30 kg/m^2).[10] Assuming that half of this group has a BMI ≥ 27 kg/m^2, this would correspond to an additional 149 000 patients who could potentially meet eligibility criteria for semaglutide therapy under international standards.

Cost

Semaglutide cost was estimated using the 3 mL pen (1.34 mg/mL) formulation, which is PBS-listed at $134.60 per pen. Under PBS criteria, the maximum reimbursed dose for T2D is 1 mg per week, whereas clinical trials in obesity commonly use 2–2.4 mg per week. Accordingly, the analysis assumed all overweight or obese patients with T2D would receive the maximal 1 mg weekly dose.

A conservative estimate of 277 000 patients (BMI ≥ 30 kg/m^2) yielded a 10-year cost of $4.8 billion, while an expanded estimate of 426 000 patients (BMI ≥ 27 kg/m^2) produced a 10-year cost of $7.4 billion. These figures are 1.4–2.1 times the current PBS expenditure on these drugs.

SGLT2 inhibitor in heart failure, CKD and T2D

The eligible population for SGLT2 inhibitor therapy was estimated across three major clinical groups: heart failure, CKD and T2D. For heart failure, self-reported prevalence data indicate 144 000 adults (0.7%) aged ≥18 years, although higher estimates from primary care data suggest a prevalence of 1.83%,[23] corresponding to ~494 000 individuals nationally. Given the limitations of self-reported data and the likelihood of underdiagnosis in community surveys, the latter figure was considered to be more accurate for our population estimate.

For CKD, PBS eligibility criteria require an estimated glomerular filtration rate (eGFR) of 25–75 mL/min/1.73 m^2 and a urine albumin-to-creatinine ratio (UACR) of 22.6–565 mg/mmol. The prevalence of CKD Stage 3 (eGFR 30–60 mL/min/1.73 m^2) was reported as 540 000 in 2011, which, when adjusted for population growth, corresponds to ~660 000 individuals in 2025. Among these patients, an estimated 3.3% have macroalbuminuria (UACR >37.8 mg/mmol),[24] equating to ~22 000 individuals who meet PBS criteria for SGLT2 inhibitor therapy.

For T2D, data from an Australian primary care cohort indicate that 45% of patients treated with a single oral agent had HbA1c levels >7%[25] and 25% had established ASCVD.[10] Accounting for an estimated 10% overlap between these groups, approximately 720 000 individuals with T2D are likely to meet PBS eligibility criteria for SGLT2 inhibitor therapy.

To account for overlap between the three domains, 9% of heart failure patients with T2D (44 000 individuals)[23] and 8.1% of T2D patients with CKD Stage 3 (97 000 individuals)[24] were removed. Combining these categories, the total estimated eligible population for SGLT2 inhibitor therapy is ~1.1 million Australians.

Cost

PBS lists empagliflozin at $97.70 for 60 tablets and dapagliflozin at $92.52 for 56 tablets, both representing a 2-month supply at standard dosing. Between 2024 and 2025, 3.4 million empagliflozin and 2.5 million dapagliflozin prescriptions were dispensed. Using the same calculation approach applied for statins, the projected 10-year cost for SGLT2 inhibitors is approximately $6.5 billion, which is 2.2 times the current PBS expenditure on these medications.

AF and atrial flutter ablation

Population

Based on current international and Australian guidelines, catheter ablation is recommended for selected patients with AF or atrial flutter. The 2023 American guidelines give a Class I recommendation for ablation in three groups: young, otherwise healthy patients with paroxysmal AF; patients who have failed medical therapy in whom rhythm control is preferred; and those with symptomatic atrial flutter.[26] The 2023 Australian guidelines align with these indications and additionally support ablation in patients with concurrent heart failure with reduced ejection fraction and AF.[27]

In the Australian context, ~500 000 individuals are living with AF,[8] of whom around 11 000 are young patients (≤45 years) with paroxysmal AF.[28] Atrial flutter is estimated to be 10 times less common than AF,[29] suggesting a population of approximately 50 000 with atrial flutter. Although a large group of patients with heart failure with reduced ejection fraction may have coexisting AF, this likely overestimates the true number eligible for ablation and was therefore excluded from cost projections. The subgroup of patients who have failed medical therapy but prefer rhythm control could not be reliably quantified, given the subjective nature of this indication. Altogether, this suggests an estimated 61 000 Australians may be potential candidates for AF or flutter ablation.

Cost

The MBS does not currently differentiate between ablation energy sources (e.g. radiofrequency vs. pulse-field ablation). For cost estimation, MBS item 38 290 ("Ablation of arrhythmia circuits or foci, or isolation procedure involving both atrial chambers, including curative procedures for AF"; benefit $3117.05) was used for AF and item 38 287 ("Ablation of arrhythmia circuit or focus or isolation procedure involving one atrial chamber"; benefit $2448.10) for atrial flutter. Applying these unit costs

to the estimated cohort yields a 10-year cost of ~$1.8 billion, which is 5.4 times the current MBS expenditure on AF or atrial flutter ablation.

Discussion

The results of our analyses highlight the complex balance between efficacy, cost and equity in healthcare. We estimated that, across only five common cardiovascular conditions, the projected 10-year cost of full guideline implementation would total ~$45–50 billion (at 2025 prices). Such calculations are, in our view, conspicuously absent from national and international guidelines, and we argue that cost-related factors should be well understood by consumers, providers and governments. These analyses further highlight the difference between therapy recommendations and utilisation, raising questions about the affordability and prioritisation of equitable evidence-based care.

Advances in diagnostics and therapeutics have transformed outcomes for those able to access evidence-based care. However, by comparing actual and projected costs for common cardiovascular interventions, we identified two major challenges in the current system. First, universal implementation of guideline-recommended care would drive national expenditure to levels several times higher than current spending. Second, despite well-established recommendations, many Australians remain unable to access or benefit from these therapies. Collectively, these findings raise important questions about the long-term equity and sustainability of the Australian healthcare system, even using a limited example of five drugs/procedures from just one body system – the heart.

Most clinical guidelines are developed with a strong emphasis on efficacy and safety, yet they rarely incorporate cost assessment. Within the context of finite healthcare resources and an expanding range of new therapies, two key considerations may help address this disconnect. First, cost-effectiveness should be explicitly integrated into the development of clinical guidelines. For example, SGLT2 inhibitors are the first drug class to show benefit in heart failure with preserved ejection fraction.[30,31] Despite these advances, an economic analysis estimated the cost per quality-adjusted life-year (QALY) for SGLT2 inhibitors in this population to be approximately USD$141.00,[32] placing it at the upper limit of cost-effectiveness.[33] This contrasts sharply with statins in secondary prevention, which cost around USD$10000 per QALY (except in younger women under 45 years),[34] even though both therapies carry strong recommendations in international guidelines. The growing recognition of this imbalance is reflected in the recent American Heart Association/American College of Cardiology Cost/Value Methodology in Clinical Practice Guidelines,[35] which outlines a structured framework for incorporating economic value assessments into clinical recommendations and should serve as a model for future Australian guidelines.

Secondly, greater promotion and uptake of generic medications should be prioritised. Among the most commonly prescribed drugs, the generic forms of rosuvastatin 40 mg, perindopril 10 mg and amlodipine 10 mg were 29%, 47% and 54% cheaper than their branded equivalents, respectively, based on PBS pricings. An Australian study in 2011 similarly demonstrated a 21% cost saving for patients switching from brand to generic products, but only three in four accepted the change, despite more than 95% of pharmacists recommending it.[36] This gap highlights the need for more transparent communication to reassure and educate patients on the equivalence of generics, alongside stronger policy measures to encourage their use.

The above two strategies may also help improve the penetration of evidence-based care within the community. Our estimates clearly do not capture the nuances of individualised decision-making, and the real-world application of guidelines likely differs from our modelling. Nonetheless, our data and the literature indicate persistent gaps. For instance, prescription rates *per capita* remain lowest in the Northern Territory,[37] likely due to geographic and socio-economic disparities, although these rates may be underestimated due to alternative medication supply through the Remote Area Aboriginal Health Services Program. Similarly, a recent study demonstrated that statin use for secondary prevention is less common in remote and regional Australia.[38] Embedding cost-effectiveness analyses into funding decisions could help strengthen implementation by directing resources towards interventions with the highest health and economic returns. Furthermore, increasing the use of generic medications could reduce out-of-pocket costs for patients, thereby improving uptake of proven therapies.

Several limitations of this study should be acknowledged. First, population estimates and cost inputs were derived from published sources rather than individual-level data. Although Australian data were used where available, this was not feasible in all cases. Second, our 10-year projections assume stable disease prevalence, treatment uptake and medication pricing, which may not reflect real-world trends and would require more detailed disease- and therapy-specific modelling. Thirdly, our analysis assumes full guideline-recommended implementation, whereas in practice, some patients have contraindications or develop adverse effects that preclude therapy, necessitating individual-level data to estimate

more accurately. Fourthly, our analysis of atrial fibrillation and atrial flutter focused on catheter ablation costs and did not model medical therapy, as treatment strategies are heterogeneous and difficult to capture at the population level. Finally, we did not account for potential long-term cost savings, such as reductions in downstream healthcare utilisation or adverse cardiovascular events,[39,40] which would be required to estimate incremental cost-effectiveness ratios in future analyses.

Conclusion

Our analysis highlights the growing mismatch between evidence-based recommendations and the financial realities of the Australian (and indeed almost any national) healthcare system. By illustrating the scale of the upfront budgetary impact of universal guideline implementation, this work underscores the need for more explicit consideration of economic value alongside clinical benefit. To help preserve long-term equity and sustainability, we propose two key considerations: embedding cost-effectiveness more systematically into future clinical guidelines and funding frameworks and promoting wider use of generic medications. Together, these approaches may better align evidence-based care with what healthcare systems can realistically support.

Data Availability Statement

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

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Data S1 Supporting Information.