


BMJ Open Cross-sectional survey describing general practitioners' absolute cardiovascular disease risk assessment practices and their relationship to knowledge, attitudes and beliefs about cardiovascular disease risk in Queensland, Australia

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ABSTRACT

Objectives To describe general practitioners' (GPs') absolute cardiovascular disease risk (ACVDR) self-reported assessment practices and their relationship to knowledge, attitudes and beliefs about ACVDR.

Design Cross-sectional survey with opportunistic sampling (October–December 2017).

Setting Sunshine Coast region, Queensland, Australia.

Participants 111 GPs responded to the survey.

Primary and secondary outcome measures Proportion of GPs reporting a high ($\geq 80\%$) versus moderate (60%–79%)/low ($< 60\%$) percentage of eligible patients receiving ACVDR assessment; proportion agreeing with statements pertaining to knowledge, attitudes and beliefs about ACVDR and associations between these factors.

Results Of the 111 respondents, 78% reported using the Australian ACVDR calculator; 45% reported high, 25% moderate and 30% low ACVDR assessment rates; $> 85\%$ reported knowing how to use ACVDR assessment tools, believed assessment valuable and were comfortable with providing guideline-recommended treatment. Around half believed patients understood the concept of high risk and were willing to adopt recommendations. High assessment rates (vs moderate/low) were less likely among older GPs (≥ 45 vs ≤ 34 years, age-adjusted and sex-adjusted OR (aOR) 0.36, 95% CI 0.12 to 0.97). Those who answered knowledge-based questions about the guidelines incorrectly had lower assessment rates, including those who answered questions on patient eligibility (aOR 0.13, 95% CI 0.02 to 1.11). A high assessment rate was more likely among GPs who believed there was sufficient time to do the assessment (aOR 3.79, 95% CI 1.23 to 11.61) and that their patients were willing to undertake lifestyle modification (aOR 2.29, 95% CI 1.02 to 5.15). Over 75% of GPs agreed better patient education, nurse-led assessment and computer-reminder prompts would enable higher assessment rates.

Conclusions Although the majority of GPs report using the ACVDR calculator when undertaking a CVD

Strengths and limitations of this study

- First survey to assess the proportion of eligible patients undergoing absolute cardiovascular disease risk score assessment as self-reported by general practitioners (GPs).
- Ability to examine the association between CVD assessment rates by GPs, and GP knowledge, attitudes and beliefs about CVD risk.
- Limited to GPs in Queensland, Australia.
- Relies on self-reporting by GPs rather than objective measures.

risk assessment, there is a need to increase the actual proportion of eligible patients undergoing ACVDR assessment. This may be achieved by improving GP assessment practices such as GP and patient knowledge of CVD risk, providing sufficient time and nurse-led assessment.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in Australia, and its prevention is a national health priority.^{1–3} A large proportion of CVD is preventable by appropriate population-level interventions and individual management of risk.⁴ The potential benefit of treatments to reduce CVD events are closely related to an individual's absolute or total cardiovascular disease risk (ACVDR).^{5,6}

The National Vascular Disease Prevention Alliance (NVDPA) of Australia guidelines recommend calculating risk using the ACVDR Score.⁷ Factors included in the risk score are age, gender, smoking, systolic blood pressure,

total cholesterol to high density lipoprotein (HDL) ratio and diabetes. A 5-year risk for the development of CVD is calculated and categorised according to whether a patient has low (<10%), moderate (10%–15%) or high (>15%) risk. Certain groups of patients are automatically considered at high risk and do not need to have their risk calculated. For example, those patients with known CVD, who are diabetic and over 60 years of age, or who have a cholesterol equal to 7.5 mmol/L or higher. A version of the risk score calculator is usually embedded in the general practitioner (GP) patient management software or can be accessed directly at the Heart Foundation's website.⁸ Patients without prior CVD and a high ACVDR score, or moderate risk with additional risk factors, are recommended to receive lifestyle modification advice and be prescribed both lipid and blood pressure-lowering therapy. However, most Australians at high CVD risk are not receiving recommended combination therapy.⁹ This treatment gap is likely due to multiple factors, including lack of assessment by GPs.^{9–12} Studies examining ACVDR assessment in general practice report anywhere between 17% and 85% of GPs use risk assessment tools.^{9 12 13} However, the actual proportion of eligible patients that have their ACVDR calculated by their GPs is unknown.

The barriers to risk assessment faced by GPs, particularly those based in Europe, are well described.^{11 13} These include lack of time to undertake risk assessment, incentives and GP–patient knowledge regarding cardiovascular risk. However, whether these known barriers or other GP characteristics are associated with the proportions of eligible patients undergoing ACVDR score assessment self-reported by GPs in Australia are unknown.

The aims of this study were to describe Australian GPs' self-reported ACVDR assessment practices, and knowledge, attitudes and beliefs about ACVDR; examine associations between ACVDR assessment rates and GP characteristics, and knowledge, attitudes and beliefs about ACVDR; and report on GP ratings of potential barriers and enablers of ACVDR assessment.

METHODS

Study design and population

We undertook a cross-sectional survey with opportunistic sampling of participants. During October–December 2017, the survey was made available to actively practising GPs on the Sunshine Coast region of Queensland in electronic and hard copy format. Distribution lists of GP practices were obtained from the Primary Healthcare Network. The web-based survey was also placed on a Survey Monkey platform, and this link was circulated via email and on social media to GPs. Hard copies of the surveys were also provided to GPs in person to complete the survey at their workplace. Additionally, the survey was distributed at GP education events.

The total number of GPs approached was not measured. Online sharing of the survey web link by GPs meant that practitioners outside the Sunshine Coast region also

completed the survey and, provided they were from Queensland, were accepted into the study.

Survey questionnaire

The survey questionnaire was developed from information in the existing literature, previous surveys (online supplementary figure 1) as well from the direct experiences expressed by GPs to the investigators.^{12 14–18} This was then refined several times following consultation with two cardiologists (KG and TS), three GPs, two primary healthcare network staff, a senior member of the Heart Foundation and an epidemiologist (RK). The survey used closed-ended questions to collect self-reported information on GP and workplace characteristics (questions 1–8, 16–18) and on perceived ACVDR knowledge (questions 9 and 10) and assessment practices, including a question on the proportion of eligible patients assessed (response categories: all (ie, 100%), 80%–99%, 60%–79%, 40%–59%, 30%–39%, 1%–19%, never (0%), 'I do not assess total CVD risk in general', 'I assess treat each factor individually', 'I am unsure who an eligible patient is for total CVD disease risk assessment' and 'Other'). For information on attitudes, beliefs (question 21.1, 21.4–21.15 and 22.13) and further perceived knowledge (questions 13–15, 20, 21.1 and 21.2) in relation to ACVDR risk assessments, GPs were asked to rate their responses to 15 separate items relating to GP, patient and organisational/structural factors, using a 7-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. In addition, GPs were asked to rate potential barriers and enablers to performing ACVDR assessments, using a 7-point Likert scale (question 22.1–22.12). The full survey can be accessed in the online supplement (online supplementary figure 1). Information on the time taken explaining the meaning of the risk score to patients (question 23) and also referral practices (question 24) were also recorded.

Analysis

Assessment practices were described in terms of number and proportion (%) of GPs. For the analysis, we dichotomised assessment rates—the main outcome variable—into high ($\geq 80\%$ eligible patients receiving ACVDR assessment) versus moderate (60%–79%)/low (<60%) and proportion agreeing into yes (includes those who reported 'strongly agree', 'agree' and 'agree somewhat') or no ('strongly disagree', 'disagree', 'disagree somewhat' or 'undecided') for statements pertaining to knowledge, attitudes and beliefs about ACVDR and proposed barriers and enablers. We used logistic regression to quantify the association between GP characteristics, knowledge, attitudes and beliefs and ACVDR assessment rates, reporting both crude and age-adjusted and sex-adjusted ORs with 95% CIs. For several of the variables on GP characteristics, response categories were combined due to small numbers.

A sensitivity analysis was performed whereby the assessment rate variable was recategorised as high/moderate

combined (ACVDR assessed in $\geq 60\%$ of eligible patients) versus low. Stata V.15.1 was used for statistical analyses.

A verbal and/or written explanation of the purposes of the survey was given to GPs prior to completing the survey. No identifying details of participants were recorded. All data reported were aggregate. This study was considered to be low risk. The ethics committees did not require a consent form to be signed by participants as completion of the survey was considered as consent to participate.

Patient and public involvement

Patients and the public were not involved in the design, conduct, reporting or dissemination of our research.

RESULTS

GP characteristics and ACVDR assessment practices

A total of 111 GPs responded to the survey of whom 78 (70%) were based on the Sunshine Coast, which represents 13% of the approximately 600 GPs registered on the Sunshine Coast. Fifty-three per cent were male and 43% were aged ≥ 45 years (see [table 1](#)).

Nearly all GPs (108/111, 96%) reported being aware of ACVDR assessment and around half (46%) had heard of the Guidelines for the Management of Absolute CVD Disease Risk as issued by the NVDPA.

Fifty (45%, 95% CI 36% to 55%) GPs were high assessors with 19 (17%) reporting assessing 100% of eligible individuals; 28 (25%, 95% CI 17% to 34%) GPs were moderate assessors and 33 (30%, 95% CI 21% to 39%) low assessors. Within the low assessment group, six (5% of all GPs respondents) assessed $< 20\%$ eligible patients; six (5%) were unsure of who an eligible patient was, did not assess CVD risk or treated risk factors individually; overall, this was equivalent to 1 in 10 GPs. The eight (7%) written responses in the 'Other' section were categorised as low assessors. The full range of assessment rates is shown in [table 2](#). Most GPs (78%) used the Australian ACVDR calculator, either alone (72%) or in combination with another risk system (6%), with a small minority using Q-risk (4%). Nine per cent used either their own clinical judgement, did not use a risk score system or did not know. The remaining (9%) used other algorithms. Nearly half (48%) of GPs spend between 5 min and 9 min explaining the score, 28% 0–4 min and 15% 10–15 min.

Referral patterns of GPs for lifestyle modification are shown in online supplementary table 1. The most commonly referred to practitioners are dietitians (76%), exercise physiologists (68%) and creation of a chronic disease management plan (60%).

[Table 3](#) shows crude and age-adjusted sex-adjusted ORs for the association between GP characteristics and high assessment rates. Increasing age and years worked were associated with lower assessment rates, but only age remained associated in the adjusted analysis, with older GPs less likely to assess a high proportion of

Table 1 GP characteristics for high and moderate/low assessors

	High assessors % (n), n=50	Moderate/low assessors % (n), n=61	Total N (%), n=111
Age range (years)			
≤ 34	26 (13)	16 (10)	23 (21)
35–44	46 (23)	28 (17)	40 (36)
≥ 45	28 (14)	57 (34)	48 (43)
Gender			
Female	62 (31)	46 (28)	59 (45)
Male	36 (18)	52 (32)	50 (53)
Intersex/ indeterminate	50 (1)	50 (1)	2 (2)
Years worked as GP			
≤ 5	44 (22)	21 (13)	35 (32)
6–15	30 (15)	36 (22)	37 (33)
≥ 16	26 (13)	43 (26)	39 (35)
Employment status			
Full time	60 (30)	61 (37)	67 (60)
Part time/casual	40 (20)	39 (24)	44 (40)
Hours worked per week			
≤ 29	16 (8)	18 (11)	19 (17)
30–39	40 (20)	20 (12)	32 (29)
40	20 (10)	18 (11)	21 (19)
≥ 41	24 (12)	44 (27)	39 (35)
Number of GPs in workplace			
< 10	62 (31)	59 (36)	67 (60)
≥ 10	30 (15)	38 (23)	38 (34)
Work at > 1 practice	8 (4)	4 (2)	6 (5)
Role in practice			
Registrar/in training	20 (10)	8 (5)	15 (14)
Contractor/ sessional/ retainer/salaried	66 (33)	70 (43)	76 (68)
Partner/principal	14 (7)	21 (13)	20 (18)

High assessors assessed CVD risk scores in $\geq 80\%$ of their eligible patients. Moderate and low assessors assessed absolute CVD risk in $\leq 79\%$ of their eligible patients. Total questionnaires completed 111. No missing data.

CVD, cardiovascular disease; GP, general practitioner.

patients (aOR ≥ 45 vs ≤ 34 years=0.36, 95% CI 0.12 to 0.97).

GP knowledge, attitudes and beliefs about ACVDR assessment and associations with assessment rates

Around 1 in 10 GPs (11%) were not aware that ACVDR assessment should be performed in all eligible patients.

Table 2 Assessment rates for CVD risk by GPs in eligible patients

In what percentage of eligible patients do you assess total CVD risk?	Number	Per cent
100%	19	17
80%–99%	31	28
60%–79%	28	25
40%–59%	6	5
20%–39%	9	8
1%–19%	5	5
I do not assess CVD risk	2	2
I assess and treat each risk factor individually	2	2
I am unsure who an eligible patient is	1	1
Other	8	7
Total	111	100

'Other': written text responses from GPs, which were a combination of assessing each factor individually and using ACVDR risk calculator; different age category and >1 risk factor. ACVDR, absolute cardiovascular disease risk; CVD, cardiovascular disease; GPs, general practitioners.

GPs were asked how regularly they should reassess an individual's ACVDR if low, moderate or high risk according to NVDPA risk guidelines (7). The proportions of GPs that correctly answered were 13 (11%), 56 (42%) and 12 (11%), respectively. GPs were asked about the age range at which patients became eligible for ACVDR assessment: 48 (43%) answered correctly and the remaining were incorrect (10%) or did not respond (47%).

A high proportion of GPs (>85%) reported they knew how to use ACVDR assessment tools, how to proceed after assessment, believed ACVDR assessment valuable and were comfortable with prescribing dual medications for high and moderate risk patients (table 4). A third of GPs agreed ACVDR assessment was accurate in the elderly, and one in eight GPs referred patients for a calcium score. The questions relating to GP perceived knowledge, attitudes and beliefs can also be found in table 4.

Around half of GPs believed their patients understood the concept of high risk and would adhere to medications (59%) and would participate in lifestyle modification services (52%). The majority of GPs (77%) agreed there was sufficient time to undertake ACVDR assessment during a routine appointment, while 29% reported opportunistic assessments were difficult. Almost 40% of GPs agreed there was a lack of incentives to undertake ACVDR assessment, and 20% reported cholesterol results were not available in those who needed ACVDR assessment.

Several factors relating to GPs' self-reported perceived knowledge, attitudes and beliefs were associated with assessment rates. Lack of knowledge that assessment

was recommended in all eligible patients was associated with lower assessment rates (OR 0.09, 95% CI 0.1 to 0.76; aOR 0.13, 95% CI 0.02 to 1.11). A high assessment rate (vs moderate/low) was also associated with knowledge of how to proceed after the ACVDR assessment (OR 8.47, 95% CI 1.03 to 69.38; aOR 7.35, 95% CI 0.76 to 71.35). A high (vs moderate/low) assessment rate was associated with belief that: there was sufficient time to do the assessment (aOR 3.79, 95% CI 1.23 to 11.61); their patients would participate in lifestyle modification services (aOR 2.29, 95% CI 1.02 to 5.15); and their patients understood the concept of being at high risk and adhere to medications (aOR 2.00, 95% CI 0.88 to 4.58). High assessors were more likely to take a longer time with their patients explaining ACVDR (aOR 3.95, 95% CI 1.33 to 11.7). High assessment rates were less likely among GPs who agreed it was difficult to opportunistically assess ACVDR during routine consultations (aOR 0.42, 95% CI 0.16 to 1.11) and also agreed that the ACVDR score estimated risk over too long a time (aOR 0.24, 95% CI 0.07 to 0.78). Clinical practice software, inbuilt calculator availability and the use of these tools were not associated with assessment rates. Views regarding lack of incentives, funding and effective lifestyle modification services were also not associated with assessment rates (table 4).

Perceived barriers and enablers to ACVDR assessment

Almost 80% of GPs agreed better consumer education for patients could increase uptake, and that nurses could prescreen eligible patients prior to their GP appointment (table 5), with 71% also believing practice nurses could undertake assessment themselves. Three-quarters felt computer prompt reminders would be helpful. Over 70% felt a recall of all eligible patterns in their registry would be effective, and that adequate funding or incentives would increase uptake. Sixty-five per cent agreed dedicated assessment time in their schedule would increase assessments, and 62% reported the best way to undertake assessments was opportunistically. The questions relating to enablers can also be found in table 5.

Sensitivity analysis

The analyses examining associations between assessment rate and GP characteristics, knowledge attitude and beliefs were repeated with the binary outcome variable redefined as 'high/moderate assessors' (risk scores assessed in $\geq 60\%$ eligible patients, 70% of GPs) versus low assessors (<60% eligible patients, 30% of GPs) and did not differ materially from the main analyses.

DISCUSSION

This study on self-reported practices of regional GPs on CVD risk showed the vast majority use ACVDR assessment, but less than half assess $\geq 80\%$ of eligible patients, and 1 in 10 is assessing ACVDR in a low proportion of their patients (<20%) or not at all. GPs who are older, have a lower knowledge of ACVDR guidelines and/or believe

Table 3 Crude and age-adjusted sex-adjusted ORs for the association between GP and practice characteristics, and high versus moderate/low rates of assessment for absolute CVD risk (ACVDR)

Independent variable	Percentage per category (n) that are high assessors	Crude OR	95% CI	Ageadjusted and sex-adjusted OR	95% CI	P value
Age range (years)						
≤34	57(13)	1.0	–	–	–	0.03
35–44	58(23)	1.04	0.37 to 2.93	1.07	0.36 to 2.90	–
≥45	29(14)	0.31	0.11 to 0.89	0.36	0.12 to 0.97	–
Gender						
Female	53(31)	1.0	–	–	–	0.25
Male	36(18)	0.51	0.24 to 1.10	0.72	0.34 to 1.54	–
Years worked						
≤5	63(22)	1.0	–	1.0	–	0.08
6–15	41(15)	0.40	0.16 to 1.04	0.23	0.15 to 1.46	–
≥16	33(13)	0.30	0.11 to 0.77	0.49	0.11 to 2.15	–
Employment status						
Full time	45(30)	1.0	–	1.0	–	0.80
Not full time	45(20)	1.02	0.48 to 2.21	0.90	0.40 to 2.02	–
Hours worked/week						
≤29	42(8)	1.0	–	1.0	–	0.27
30–39	63(20)	2.29	0.72 to 7.30	2.29	0.63 to 6.84	–
40	48(10)	1.25	0.36 to 4.36	1.36	0.35 to 4.90	–
≥41	31(12)	0.61	0.20 to 1.90	0.86	0.22 to 2.32	–
Number of GPs in workplace						
≤4	44(8)	1.0	–	1.0	–	0.41
5–9	47(23)	1.11	0.37 to 3.28	1.14	0.36 to 3.61	–
10–19	44(11)	0.98	0.29 to 3.33	1.44	0.39 to 5.27	–
≥20	31(4)	0.56	0.12 to 2.49	0.80	0.16 to 3.97	–
Role in practice						
Registrar/in training	68(10)	1.0	–	1.0	–	0.58
Contractor/sessional/retainer/salaried	43(33)	0.38	0.12 to 1.23	0.49	0.15 to 1.78	–
Partner/principal	35(7)	0.27	0.07 to 1.11	0.51	0.11 to 2.61	–
ACVDR risk score						
Used	45(36)	1.0	–	1.0	–	0.22

Continued

Table 3 Continued

Independent variable	Percentage per category (n) that are high assessors	Crude OR	95% CI	Ageadjusted and sex-adjusted OR	95% CI	P value
Other score used/not used	45 (14)	0.99	0.41 to 1.67	0.54	0.20 to 1.43	–
Type of practice clinical software used						
Medical director	57 (13)	1.0	–	1.0	–	0.37
Best practice	46 (32)	0.65	0.25 to 1.67	0.68	0.25 to 1.83	–
Not applicable	28 (5)	0.30	0.08 to 1.11	0.38	0.09 to 1.50	–
Inbuilt calculator availability						
Available	47 (37)	1.0	–	1.0	–	0.60
Not available/unsure	39 (13)	0.72	0.31 to 1.64	0.79	0.32 to 1.92	–
Use of inbuilt calculator						
Yes	46 (30)	1.0	–	1.0	–	0.85
No	44 (7)	0.91	0.30 to 2.73	0.89	0.29 to 2.81	–
Knowledge of correct age eligible for assessment						
Incorrect/missing	41 (26)	1.0	–	1.0	–	0.90
Correct	50 (24)	0.70	0.67 to 3.03	1.06	0.46 to 2.42	–
Time spent explaining ACVDR risk to patient						
0–4 mins	24 (27)	1.0	–	1.0	–	0.02
>5 mins	58 (65)	3.84	1.37 to 10.7	3.63	1.26 to 10.4	–

High assessors assessed cardiovascular disease risk scores in ≥80% of their eligible patients. Moderate/low assessors assessed ACVDR risk in ≤79% of their eligible patients. Total questionnaires completed 111. No missing data except 'time spent explaining ACVDR risk to patient': never undertake/other/missing n=20 (18%). ACVDR, absolute cardiovascular disease risk; GPs, general practitioners.

Table 4 GP knowledge, attitudes and beliefs in relation to absolute CVD risk (ACVDR) assessment: percentage agreeing with statements overall, and agreeing by ACVDR assessment rates (high vs moderate/low assessors), and associated crude and age-adjusted and sex-adjusted ORs

	Agree (%)	High assessors (%)	Moderate/low assessors (%)	Crude OR	95% CI	Age-adjusted and sex-adjusted OR	95% CI	P value
GP factors								
I know how to use total CVD assessment tools	90	96	88	3.1	0.61 to 15.68	2.31	0.40 to 13.50	0.35
I know how to proceed after the total CVD risk assessment	89	98	85	8.47	1.03 to 69.38	7.35	0.76 to 71.35	0.09
The total CVD risk assessment allows for accurate calculation of CVD risk in elderly patients	32	33	32	1.05	0.47 to 2.35	1.21	0.51 to 2.88	0.66
The total CVD risk assessment estimates risk over too long a time period	18	10	25	0.34	0.11 to 1.02	0.24	0.07 to 0.78	0.02
I prefer to refer patients for a calcium score	12	10	13	0.74	0.23 to 2.42	1.09	0.30 to 4.03	0.81
I am comfortable with prescribing blood pressure and lipid lowering medications for patients identified at high total cardiovascular risk	97	98	100		Only 1 GP disagreed so no result	–	–	–
I am comfortable with prescribing blood pressure and lipid lowering medications for patients identified at moderate total cardiovascular risk for whom despite lifestyle changes have not improved	89	94	88	2.03	0.49 to 8.29	2.87	0.64 to 12.88	0.17
I believe the total CVD risk assessment is a valuable tool for decision making	86	95	93	1.56	0.27 to 8.90	1.48	0.21 to 10.62	0.70
Patient factors								
Patient's understand the concept of being at high risk of a chronic disease and are adherent to prescribed medications	59	69	52	2.12	0.96 to 4.68	2.00	0.88 to 4.58	0.10
Patients are willing to participate in lifestyle modification services	52	63	45	2.10	0.97 to 4.55	2.29	1.02 to 5.15	0.05
Organisational and structural factors								
I think there is sufficient time during a routine appointment to calculate total CVD risk	77	90	70	3.77	1.28 to 11.08	3.79	1.23 to 11.61	0.02
There are a lack of incentives for me to perform total CVD risk assessments	39	41	38	1.11	0.51 to 2.40	1.15	0.51 to 2.61	0.74

Continued

Table 4 Continued

	Agree (%)	High assessors (%)	Moderate/low assessors (%)	Crude OR	95% CI	Age-adjusted and sex-adjusted OR	95% CI	P value
Total CVD risk assessments are difficult to incorporate opportunistically during patient consultations	26	16	35	0.36	0.14 to 0.91	0.42	0.16 to 1.11	0.08
Total cholesterol and HDL results are often not available for patients requiring total CVD risk assessment	20	18	18	1.00	0.38 to 2.66	0.93	0.33 to 2.58	0.88
There are a lack of effective lifestyle modification services to refer on to	59	65	57	1.44	0.66 to 3.14	1.23	0.54 to 2.82	0.62
There is lack of funding for lifestyle modification services to refer on to	18	84	75	1.71	0.66 to 4.45	1.39	0.51 to 3.81	0.52

High assessors assessed cardiovascular disease (CVD) risk scores in $\geq 80\%$ of their eligible patients. Moderate/low assessors assessed ACVDR in $\leq 79\%$ of their eligible patients. Total questionnaires completed $n=111$. Data were incomplete in two (2%) patients, except for the question 'I believe the total CVD risk assessment is a valuable tool for decision making', which had nine (8%) missing. Percentage agreeing=proportion of GPs who 'strongly agreed', 'agreed' or 'somewhat agreed'/total GPs who responded $\times 100$. GPs, general practitioners.

their patients lack understanding of CVD risk have lower assessment rates. GPs with higher assessment rates are more likely to report having sufficient time in consultations and spend more time explaining ACVDR risk to

their patients. There was high agreement among GPs that actions that would enable ACVDR assessment were better patient education, nurse-led assessment and computer-reminder prompts.

Table 5 Potential enablers to increase absolute CVD risk assessments: percentage of GPs agreeing with statements

	Agree (%)
Better consumer education for patients about having their total CVD risk checked could increase uptake of assessments.	86
Patients eligible for a total CVD risk assessment could be prescreened by the practice nurse prior to their GP appointment.	86
Computer prompt reminders for patients due for a total CVD risk assessment could increase uptake.	82
If adequate government funding/incentives were available for completing total CVD risk assessments, I would be more likely to complete these assessments.	78
Practice nurses are well suited to perform total CVD risk assessments.	78
A recall of all eligible patients in the GP registry due for a total CVD assessment would be an effective method of increasing uptake.	77
If I was allocated dedicated screening time in my schedule, I could complete more total CVD risk assessments.	73
GPs should continue to be the health professional that completes total CVD risk assessments.	69
The best way for me to complete total CVD risk assessments is opportunistically.	70
Point of care testing for cholesterol and HDL would enable more total CVD risk assessments.	63
Total CVD risk assessments performed within a workplace setting could be an effective means of increasing uptake.	63
If appointment time slots were increased, this could enable more total CVD risk assessments.	61

Total $n=111$, 8%–10% missing for each statement. Percentage agreement=proportion of GPs who 'strongly agreed', 'agreed' or 'agreed somewhat'/total GPs who responded $\times 100$. CVD, cardiovascular disease; GPs, general practitioners.

There are limited data published in Australia and internationally on ACVD assessment coverage in general practice. A 2012 survey of 806 physicians across 12 European countries found 85% reported following at least one set of CVD risk guidelines, but there was no indication as to what proportion of their eligible patients underwent risk assessment.¹³ The 2006 National (USA) Research network Survey on CVD risk assessment found 92% of GPs reported 'usually' or 'always' assessing for CVD risk factors; however, only 17% used a risk calculator.¹⁹ Our study is consistent with these findings in that although the majority of GPs were aware of the absolute CVD risk concept, less than half had heard of the NVDPA guidelines and 11% were unaware CVD risk assessment should be carried out in all eligible patients. However, in our study, around 90% of GPs reported using a risk calculator of some kind. To our knowledge, our study is the first in Australia on self-reported assessment rates for CVD risk among individual GPs, finding they are relatively low. Although the AusHEART study reported almost 90% of GPs provided an estimate of absolute risk, the provision of this estimate was a mandatory part of the protocol.¹²

A lack of knowledge by GPs is known to be a barrier to the use of guidelines. The EURIKA study reported 12% of GPs did not use guidelines, of whom 28% cited 'not knowing the guidelines' as the reason why.¹³ A study of 25 Australian GPs reported that those not familiar with the guidelines or use of the tools did not calculate CVD risk.¹⁵ In our study, incorrect answers on patient eligibility and assessment intervals for risk scoring were associated with lower assessment rates. Those who knew how to use and proceed after using the guidelines had high assessment rates. Previous studies have documented that a small proportion of GPs still base their assessment of CVD risk on a single risk factor and this is also consistent with our findings.²⁰ The difference between the number of GPs who had heard of the ACVD risk guidelines (96%) and who had heard of the NVDPA (45%) is perhaps not unexpected. While the NVDPA guidelines form the basis of CVD risk assessment in Australia, GPs may get advice from preventive health guidelines such as the RACGP Red Book, which includes the NVDPA algorithm.

Patient knowledge and behaviour is also known to influence a GP's assessment of CVD risk. A systematic review on GP perspectives of CVD prevention found lack of patient motivation for behavioural change and a capacity for lifestyle change to be important practice influencers.⁹ Our study revealed this too, and most GPs believed better consumer education for patients would increase CVD risk assessment.

Time availability is also known to be a significant factor affecting ACVDR assessment and is consistent with our findings that GPs who felt there was sufficient time for assessment had higher assessment rates.^{13 21}

There was high agreement on a number of possible strategies to increase assessment. These included pre-assessment of patients prior to their appointment, which could be nurse led, and recall of known high-risk patients

not appropriately treated. Nurse-led interventions have been shown to be successful in cardiovascular care.²²

To encourage increased uptake of ACVDR, the Australian government introduced a Heart Health Assessment, which requires ACVDR assessment, to the Medicare Benefits Schedule (MBS) in April 2019.²³ While our study preceded the new MBS Heart Health Assessment, this new MBS item addresses some enablers identified in our study that may increase ACVDR assessment such as preassessment by practice nurses and a modest financial incentive.²³ However, our results indicate that consumer education needs to accompany this new item.

This study was limited to GP practices in Queensland with opportunistic sampling of a small percentage of GPs predominantly from the Sunshine Coast, which itself has different demographics to other areas within Australia. Therefore, its applicability to other regions and countries should be considered. Our study also relies on GPs self-reporting rather than objective measurements of behaviour, which is an inherent problem with questionnaire-based surveys and should be taken into account when interpreting the results. It is also worth noting that apart from age eligibility for screening, our survey measured GPs perceived rather than factual knowledge of CVD risk assessment. Another point is that there is likely bias in the self-reported *assessment rates* (probably overestimated), and hence these may not be generalisable to the GP population. However, representativeness is not necessary for valid internal comparisons, that is, our estimates of the associations between factors (GPs knowledge, attitudes and beliefs) and assessment rates are internally valid, and thus also our conclusions regarding barriers and enablers. We did not define the eligible population for ACVDR assessment in the survey as we wished to understand GPs knowledge on this topic. Only 43% answered correctly on the age patients became eligible for assessment. It is therefore likely that a proportion of GPs may be assessing the incorrect patients. However, we would not expect this fact to alter the conclusions of our study given it was not the purpose of the study to assess what proportion of eligible patients are actually assessed in primary care (this would obviously require a different study design), rather the purpose was to better understand enablers and barriers to assessment (by examining factors associated with assessing/not assessing patients deemed eligible for assessment).

CONCLUSION

This study showed that although the majority of GPs report using the ACVDR calculator when undertaking a CVD risk assessment, there is a need to increase the actual proportions of eligible patients undergoing ACVDR assessment. This might be achieved by improving GP assessment practices, including through increasing GP and patient knowledge of CVD risk, nurse-led assessment and providing sufficient time for GP ACVDR assessment. Addressing these issues could lead to increased

identification and treatment of at-risk patients and the reduction of CVD.

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