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Can general practitioners provide effective cardiovascular disease (CVD) prevention? Dreams and realities of CVD prevention

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Abstract

Aims This study explores how the New Zealand (NZ) population experiences approaches to cardiovascular disease (CVD) risk management: (1) the Primary Health Organisation (PHO) CVD risk performance indicator programme in Akaroa, Canterbury NZ and (2) consumer use of community services that promote healthier lifestyles.

Methods An audit identified patients enrolled at the Akaroa Health Centre eligible for CVD risk assessments and the portion with completed formal assessments. This was compared with the standard PHO performance tool for assessing CVD. An exploratory survey identified awareness of and barriers to use of local lifestyle resources that may directly or indirectly reduce CVD risk, in respondents over the age of 45 years.

Results Distinguishing the eligible population who had not already had their CVD risk calculated required complex database analysis. As of April 2009 11.8% of the eligible population had a CVD risk calculated using the PHO performance tool. However, another 10.1% had had these risks assessed through other tools. The combined total of 21.9% meets the minimum target of 21.7% for the year ending June 30th 2009. The community survey found around a third (36%) of lifestyle promoting resources available were recognised with about half (56.9%) of respondents participating in the activities. Barriers to use included lack of time and perceived need of the service.

Conclusions The current performance indicator approach is not practical, subject to error and may have significant opportunity costs. Furthermore, barriers exist in engaging the population identified as at risk in health-promoting activities.

Reducing the impact of cardiovascular disease (CVD) is one of the 6 health targets of the New Zealand (NZ) Ministry of Health (MOH).[1] This encourages at-risk individuals to modify lifestyle through smoking cessation, improving nutrition, increasing exercise and weight loss and to consider pharmacological treatment for blood pressure, cholesterol and blood sugar levels.

Patients experience healthcare through individual consultations and community activities. The complexity of CVD impact reduction is best understood through patients' perspectives, which include individual and community approaches to non-pharmacological lifestyle modification and pharmacological treatment.

Increasingly, database analysis for indicators of the provision of quality care is used in NZ and international primary care settings to evaluate practitioner or practice

performance. The NZ CVD indicator defines the well population eligible for 'CVD risk assessment' based on the NZ CVD guidelines[2] and is evaluated by counting recorded CVD risk percentages.

The specific MOH target is to 'increase the percent of eligible adults who have their CVD risk assessed' which assumes that such activity translates to risk modification in currently well individuals and then to improved health outcomes. Non-pharmacological lifestyle modification is difficult to evaluate in a randomised controlled trial (RCT) setting but observational data suggest significant benefits, including all-cause mortality reduction.[3] Pharmacological approaches are amenable to randomised trials but the extent of long-term relevant benefits for primary prevention remains controversial.[4–6]

Individual non-pharmacological lifestyle modification advice complements population-based healthy lifestyle activities. Patients are influenced both through daily contact with their community and intermittent contact with the medical profession but research is limited in addressing which method (individual vs population) is most effective for reducing the impact of CVD. Community-based research indicates multifaceted interventions are more effective[7–9] such as using multimedia (e.g. Internet, videos) and local businesses (e.g. supermarkets) and providing group-based support (e.g. weekly meetings, food planning courses, etc).

The "*exchange concept*, which means people receive valued benefits in return for their efforts and changed behaviours"[11] may explain this success and is part of social marketing strategies such as NZ's recently terminated 'Healthy Eating Healthy Action (HEHA): Oranga Kai – Oranga Pumau'.[10] Understanding whether services and interventions are valued by a population is important.

The study reviews individual and population approaches to reducing the burden of CVD that prevail in a geographically constrained rural community. The challenge is to gauge whether populations gain more through GP performance indicator programmes or by improved access to and use of activities likely to improve lifestyle.

Methods

This study aims to:

- Assess the practical implementation of PHO performance indicators in a rural practice, by evaluating the difference between risk assessment determined through direct record audit and the PHO performance indicator calculated rate for the practice.
- Explore consumer awareness of and barriers to use of existing community activities and services that promote healthy lifestyles.

First aim—The PHO for this practice used the BestPractice CVD risk tool[12] alone to assess performance indicators. An audit of the patient population in Akaroa enrolled with the sole local health centre was conducted to determine the eligible population for CVD risk assessment as defined by the NZ CVD Guidelines (including 'high risk' groups—refer Table 2).[13] The national performance indicator group uses a modified set of criteria based only on gender, age and ethnicity to calculate the 'vast majority' of the eligible population.[2]

Completed formal assessments of CVD risk recorded in the practice management software were counted. These included the 'BestPractice' CVD risk calculation, men and women's 'Wellness Checks'[14] and the Annual Diabetes Review. Both the Wellness Checks and BestPractice CVD risk calculation were initiated in the last 2 years and the diabetes review is annual, so an audit was done of the last 2 years using the MedTech32 query builder in the practice software. MedTech32 is the main software provider for NZ general practices.

Second aim—An exploratory survey was designed to assess awareness, barriers and facilitators of access to services in the same local community likely to promote improved lifestyle. Through discussion with community organisers (e.g. health centre, social service centre, pharmacy, school nutritionist, PHO community service coordinator and community education coordinator) a list of 17 local services potentially associated with CVD risk reduction was built (e.g. nutrition, physical activity and psychological well-being [stress]).

A one-page survey was created with input from these community organisers that asked three questions:

- Which of the 17 services were respondents aware of? (yes/no),
- Whether respondents participated in the listed service? (yes/no), and
- Comments about services and barriers and facilitators to participation? (open-ended). Pre-coded categories were developed during analysis of the free text comments.

The questionnaire also asked participants to record age, gender, whether a participant had children and whether they had a health concern. Ethnicity data was not collected because this study was not designed to assess cultural influences on CVD risk reduction.

Source population—Two anonymous surveys were delivered to all post boxes on Banks Peninsula.

Sample population—CVD risk assessment is generally 10 years later for women but the Wellness Checks begin at age 45 years for both women and men. Analysis was limited to replies from the sample eligible for CVD risk assessment: those 45 years and older.

Data entry and analysis—Data was entered into an Excel spreadsheet and frequencies and proportions and statistical tests were calculated using Excel and OpenEpi Version 2.3 software.[15]

Results

PHO performance CVD risk assessment indicator—The enrolled population of the Akaroa Health Centre is 1684 people. The PHO generated list[16] given to the health centre based on the performance indicator criteria[2] identified 694 people eligible for a CVD risk assessment and 88/694 (12.7%) had a BestPractice CVD risk percentage recorded.

Table 1. Eligible Population for CVD Risk assessment from April 2007–April 2009

CVD risk assessments	Number	Percentage
CVD risk calculated and entered (Best Practice)[1]	88	11.80%
Wellness Checks[2]	50	6.70%
Annual DM review completed[3]	25	3.40%
No CVD risk calculated/WC/DM assessment completed - routine screening (eligible for Wellness Check) - high risk	579 544 (389) 35	78%
Total as counted by query builds:	742	100.00%

[1] may include those who have also had a Diabetes review or Wellness Check

[2] may include those who have also had a Diabetes review

[3] includes those with diabetes who have NOT had CVD risk calculated (i.e. not total population with diabetes).

In contrast, this study found 742 individuals eligible for CVD risk assessment, with 722 over 45 years of age. Of all those eligible (n=742, Table 1), 88/742 (11.8%) had a BestPractice CVD risk percentage recorded. An additional 50/742 (6.7%) had a Wellness Check and 25/742 (3.4%) a Diabetic Review giving a combined total of 21.9% of eligible patients with a CVD risk assessment. The difference between these data from the direct audit (21.9%) and the PHO Performance estimate (12.7%) is significant ($p<0.001$).

The remaining (579/742; 78%) eligible population have not had a CVD risk assessment. About two-thirds (389/579; 67.2%) of this group are of the age group eligible for a Wellness Check (age 45 – 65yrs).

Obtaining the appropriate data was complex and time-consuming: Seven sub-groups were used to determine the 'eligible' population based on the NZ Cardiovascular Guidelines Handbook 2009[13] using variables of gender, ethnicity, 'high risk' factors and age (see Table 2).

More than 15 separate MedTech32 Query builds were required to identify patients in these subgroups. The queries then had to be manually searched to remove duplicates of individuals and combine queries. Table 2 is included solely to illustrate the complexity of this process and contains no additional data.

Community awareness of lifestyle resources—1400 surveys were delivered to households and 385 participants replied who were over 45 years of age (65 replied under 45 years of age). There were 981 enrolled patients in the practice over the age of 45 years. Assuming all survey respondents are enrolled in the practice, this is a response rate of 39.2% (385/981).

Of 17 well-being services offered in the community, respondents of the survey were aware of an average of 6.2 services (6.2/17; 36%). Six respondents recognised no services (6/385; 1.6%). Over half of respondents (219/385; 56.9%) report participating in at least one of these activities and this proportion is the same whether they had a health concern or not.

The potential participation rate drops to 22% (219/981) if non-responders don't participate or increases the rate to 83% (815/981) if they do participate. The best-recognised services are sports groups, dance classes, TaiChi Classes and GP Wellness Checks (n/2369; 9 – 14.1%). Of PHO supported services, awareness was 4.1% (96/2369) for smoking cessation, 2.6% (62/2369) for Green Prescription, 2.5% (60/2369) for falls prevention exercise programme, 1.8% (42/2369) for the 'Appetite for Life' nutrition service, 1.4% (32/2369) for dietician services and 1.3% (30/2369) for the 'Ageing/Changing' fitness programme.

Table 2. Complexity of identifying sub-groups without a BestPractice CVD calculation recorded (n = 742 – 88)

	Age			Total = 654
	30 ↓ 34	(1) High Risk++ (♀+♂): **3**		3
	35 ↓ 44	(2) Maori (♂): **8** -DM review recorded but no BPac risk: -No BPac risk or DM review or M/WWC: (3) High Risk (♀): **8**	0 8	16
Wellness Checks 45 ↓ 54	45 ↓ 54	(4) Maori (♀): **7** - WWC recorded but no BPac risk: - DM review recorded but no BPac risk or WWC: - No BPac risk or DM review or WWC: (5) Eligible (♂): **117** -MWC recorded but no BPac risk: - DM review recorded but no BPac risk or MWC: - No BPac risk or DM review or MWC:	1 0 6 21 4 92	124
Wellness Checks 55 ↓ 65	55 ↓ 74	(6) Eligible (♀+♂): **487** *[NB- Eligible for Wellness Checks (55 – 65yrs): 291]* -**M(♂)WC** recorded but no BPac risk: -DM review recorded but, no BPac risk or MWC: - **W(♀)WC** recorded but no BPac risk: - DM review but no BPac risk or WWC: -No BPac risk or DM review or M/MWC (♀+♂):	21 15 7 6 438	487
	75 ↓ 79	(7) High Risk(♀+♂): **24**		24

'BPac risk'- Best Practice CVD risk calculation; 'DM review'- Annual Diabetes Review' 'M/WWC'- Men's or Women's Wellness Check.

++High Risk sub-groups (1), (3) & (7): read codes- current smoker, diabetes, obesity, [add for (7)- IHD, renal disease]; prescriptions- anti-hypertensives, lipid lowering [not included- gestational diabetes, IGT, renal, family history premature CVD]

Around one-third (142/385; 36.9%) of respondents did not attend any activities. Barriers reported were not enough time (28/142; 19.7%), no need (10/142; 7%) and living too far away (10/142; 7%). Just under half (65/142; 45.8%) gave no reason. Only 2 respondents (1.4%) stated cost as a reason for non-attendance. Other comments were suggestions for services (30/162; 18.5%), positive comments about existing services (30/162;18.5%) and comments about which activities people attended (29/162; 17.9%). Suggestions were mostly about swimming pool and gym services. Table 2 lists the results of the survey.

Table 3: Survey results from respondents over 45 years of age

Variables	Number	%
Characteristics of all participants	385	n=385
Males	157	40.8%
Age: 45-55 yrs 56-66 yrs 67+ yrs	 133 133 150	 34.5% 34.5% 39.0%
Have children	238	61.8%
Health concerns that would benefit from lifestyle modification.	112	29.1%
Attendance at any of the activities If 'yes' had health concern (n=112), and attended activities If had 'no' health concern (n=227), and attended activities	219 64 130	56.9% 57.1% 57.3%
Any comment made	162	42.1%
All activities identified from a list of 17 options Average number of services identified per participant (n=385) Most common services recognised- Sports groups (e.g., bowls, croquet, golf, tennis, walking, golf, badminton, rugby) Dance classes TaiChi classes GP Wellness Checks Wellbeing services (e.g., Akaroa Body Care) Yoga classes Counselling services	2369 6.2 335 322 261 256 231 228 142	n=2369 14.1% 13.6% 11.0% 10.8% 9.8% 9.6% 9.0%
Non-attendance Gave no reason No Time (including 'No time + live too far') No need Live too far away Only recently arrived Cost Other	142 65 28 10 10 5 2 22	n=142 45.8% 19.7% 7.0% 7.0% 3.5% 1.4% 15.5%
Respondents who commented [Some respondents made multiple comments] Reasons for not attending Suggestions - about use of pool - access to a gym Positive comments on services Activities attended	162 77 30 7 5 30 29	n=162 47.7% 18.5% 18.5% 17.9%

Note: Numbers do not all add up to the total due to non-responders.

Discussion

Government health targets to reduce the impact of CVD must be understood from the perspective of patients who experience both individual GP consultations and community activities. The PHO CVD risk performance indicator programme (i.e.

individual focus) monitors CVD risk percentage calculations of patients entered into the screening part of MedTech as proxy for adequacy of care. The accuracy of the numerator and denominator determines the validity of these.

In this study, 11.8% of the eligible population of the Akaroa Health Centre had a risk calculated as of April 2009 using the standard measure. However, another 10.1% have had these risks assessed through other routine care such as Wellness Checks or a Diabetes review. The total of 21.9% meets the minimum target of 21.7% for the year ending June 30th 2009.

This illustrates that consideration of risk percentages entered into one database alone erroneously assesses a practice as under-performing by significantly underestimating the numerator. The complex, manual and name-by-name approach needed to determine who needs a CVD risk assessment is also a source of error in calculating the denominator.

By 2012 the government hopes to have 80% of an eligible population assessed for CVD risks. The audit found more than 500 patients needing a CVD risk assessment at the Akaroa Health Centre. Two-thirds of them (67.2%, n=389) would be eligible for Wellness Checks, though funds are limited for this. Furthermore, data entered into the Wellness Check electronic form are not accessible to the BestPractice CVD risk calculator, requiring the additional cost of manual data-entry for inclusion in CVD risk performance indicator evaluation. The intricate query builds required to truly determine the eligible population let alone the process of contacting these people (e.g., 500 in this study) means this target is logistically difficult and inaccurate with significant costs. Even if identification were feasible and accurate, minimal incentives exist to entice an asymptomatic person to attend and pay for a consultation to have this risk assessed.

Logistical opportunity costs were identified in the OXCHECK trial where improved health outcomes were marginal after 3 years of health checks and were reserved primarily for those already deemed 'high risk' (e.g., established diabetes, CVD and slightly for those with hypertension and hyperlipidaemia).[17] The use of limited resources for opportunistic screening and subsequent lifestyle counselling during primary care consultations offers such small benefit that justifying this activity is debateable. [17–19]

National health targets that rely on clinical assessments of asymptomatic people is a screening programme and yet CVD risk assessment has not been subject to the evaluation process undergone by other screening programs such as breast and cervical cancer. There is debate whether the criteria for a screening program would be met, such as having a suitable test (e.g., CVD risk calculation) that is precise and valid, the process of screening reducing death and illness, cost-effectiveness of the programme and acceptability to the population in terms of follow-up. For instance, this study highlights the significant costs of one practice's accurate population-based screening.

A CVD screening based on the 'at risk' population defined in the NZ CVD Guideline Handbook would have screening start age 45 years for men and 55 years for women though this would be 10 years earlier for some segments of the population. If the cut-off for screening was 74 years as used by the Performance Indicator Programme, national CV screening would need to cover many more people than existing adult

screening programmes (e.g. breast: women aged 45-65 years; cervical: women aged 30-70 years).

Furthermore, the usual screening programme criteria require a reduction in death or illness from CVD as a result.[20] Given the paucity of evidence for the effectiveness of such CVD primary prevention methods and the significant resources required for such a large population 'at risk', CVD screening may not be the most cost-effective approach. (Though one model suggested this CVD risk screening would be the equivalent cost to a cervical screening program. [21])

Pharmacological and non-pharmacological primary prevention of CVD are equally important to reduce the impact of CVD. Since the most effective approach to non-pharmacological management (individual vs population) is not clear both require consideration. In Akaroa, population-based lifestyle modification activities exist alongside GP CVD risk assessments.

Adults over 45 years in the Akaroa community report awareness of 36% of lifestyle promoting resources available with a participation rate of 56.9%, though actual participation may be as low as 22% or as high as 83% depending on the behaviour of non-responders. Most comments from respondents centred on reasons for not attending. Reasons were predominantly a lack of time or need of the service, which suggest these activities are not highly valued or acceptable, despite good levels of awareness.

There are significant flaws in the current performance-indicator approach to individual CVD risk management, including minimal evidence for the suitability of CVD risk calculations, effect on reducing death and illness and the acceptability of this approach. The community survey suggests barriers to participation in health-promoting activities. Effective approaches to CVD impact reduction are likely to be multifaceted,[7–9] acceptable, relevant and valued by the population so that in exchange a population improves their lifestyles.

Alternative use of PHO resources would be to offer extended 'lifestyle consults' (e.g., akin to Mental Health and Sexual Health consults) and provide subsidised pedometers for weight reduction.[22] Funding the cost-effective Green Prescription programme to cover the population eligible for CVD risk assessments may be more efficient at changing outcomes than calculating risk percentages.[23]

There are several limitations of this study. Evaluation only included patients who had a Best Practice CVD risk calculated, a Diabetes Annual Review or a Wellness Check though there are other ways to assess CVD risk, including data not entered into the screening section of the MedTech software. Furthermore, neither this study nor the PHO list of eligible patients excluded those already diagnosed with CVD, which may have falsely inflated both the denominator and the numerator. Interestingly, the BestPractice risk calculator includes a 'personal CVD event' as a risk, though in theory a patient with a personal event has no need for this calculation.

While the response rate was reasonable for a single mailed questionnaire it may not be a representative sample. There was a predominance of female respondents (59.2%).

Conclusion

In a resource-restricted health system there is an obligation to ensure appropriate use of such resources. This study suggests the current performance indicator approach is not practical, subject to error and may have significant opportunity costs. Furthermore, barriers exist to population participation in health-promoting activities, if these are recommended to individuals. Research is limited to guide the most effective approach to CVD prevention. Implementing a population-based screening programme usually requires evidence from pilots conducted as randomised controlled trials.

Evidence for the individual components of treatment is not sufficient, and the limited evidence from primary care RCTs such as the OXCHECK study is not strong. Though an individual approach has a role, especially in secondary prevention, a population-based approach that reflects local interests and contributes to environmental modification may well be the most effective use of money. This approach is the historical foundation of successful population interventions for public health issues such as those aimed at reducing infectious disease.

Competing interests: None.

Note: This study was done as a GP Registrar project as part of the requirements of the academic year.

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References:

1. Website: Ministry of Health; Health Targets: Better diabetes and cardiovascular services, 2009. http://www.moh.govt.nz/moh.nsf/indexmh/healthtargets-targets-diabetes
2. PHO Performance Programme, (DHBNZ); Indicator Definitions: 1 July 2008 Performance Indicator Set. 2008.
3. Stampfer MJ, Hu FB, Manson JE, et al. Primary prevention of coronary heart disease in women through diet and lifestyle. N Engl J Med 2000;343(1):16-22. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10882764
4. Rangno R, McCormack J, Virani A, et al. Therapeutics Education Collaboration: Episodes 1 - 12: Discussions about Cardiovascular Disease; [PodCast]. Canada.. http://therapeuticseducation.org/
5. Baigent C, Blackwell L, Collins R, et al. Aspirin in the primary and secondary prevention of vascular disease: collaborative meta-analysis of individual participant data from randomised trials. Lancet 2009;373(9678):1849-60. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=19482214

6. Abramson J, Wright JM. Are lipid-lowering guidelines evidence-based? The Lancet 2007;369(9557):168.
7. Barton RL, Whitehead K. A review of community based healthy eating interventions. J Hum Nutr Diet 2008;21(4):378-79.
8. Heshka S., Anderson JW, Atkinson RL, et al. Weight loss with self-help compared with a structured commercial program: a randomized trial. JAMA 2003;289(14):1792-8. http://jama.ama-assn.org/cgi/content/full/289/14/1792
9. Roux L, Pratt M, Tengs TO, et al. Cost effectiveness of community-based physical activity interventions. Am J Prev Med 2008;35(6):578-88. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=19000846
10. Website: Ministry of Health; Welcome to HEHA- Healthy Eating - Healthy Action: Oranga Kai - Oranga Pumau. 2009: http://www.heha.org.nz/
11. Quiglet and Watts Ltd, (Health Sponsorship Council); Healthy Eating: Rapid Evidence Review of Nutrition Social Marketing Interventions to Prevent Obesity. 2007.
12. Bestpractice- Decision Support for Health Professionals [program]. Dunedin: Best Practice Advocacy Centre Inc (BPAC Inc), 2008.
13. NZ Guidelines Group, NZ Cardiovascular Guidelines Handbook: A summary resource for Primary Care Practitioners. 2009.
14. Rural Canterbury PHO. Men's and Women's Wellness Checks, 2009. http://www.rcpho.org.nz/services/pho-programmes/women-s-wellness-checks/
15. Dean AG, Sullivan KM, Soe MM. OpenEpi: Open Source Epidemiologic Statistics for Public Health, 2009. http://www.OpenEpi.com
16. Wilkie Alison (Performance Programme Coordinator, Rural Canterbury DHB). New Performance Indicators- PPP 1July 2008 - 30 June 2009; [Letter and emails]. 2009.
17. Imperial Cancer Research Fund OXCHECK Study Group. Effectiveness of health checks conducted by nurses in primary care: final results of the OXCHECK study. BMJ 1995;310(6987):1099-104. http://www.bmj.com/cgi/content/abstract/310/6987/1099
18. Fleming P, Godwin M. Lifestyle interventions in primary care: systematic review of randomized controlled trials. Can Fam Physician 2008;54(12):1706-13.
19. Wood DA, Kinmonth AL, Davies GA, et al. Randomised controlled trial evaluating cardiovascular screening and intervention in general practice: principal results of British family heart study. BMJ 1994;308(6924):313-20. http://www.bmj.com/cgi/content/abstract/308/6924/313
20. Website: National Health Committee; Screening to Improve Health in New Zealand: Summary. 2003: http://www.nhc.health.govt.nz/moh.nsf/0/EFC453A05BDDF425CC2572AA0010F4FE
21. Langham S, Thorogood M, Normand C, et al. Costs and cost effectiveness of health checks conducted by nurses in primary care: the Oxcheck study. BMJ 1996;312(7041):1265-68. http://www.bmj.com/cgi/content/abstract/312/7041/1265
22. Richardson CR, Newton TL, Abraham JJ, et al. A meta-analysis of pedometer-based walking interventions and weight loss. Ann Fam Med 2008;6(1):69-77. http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=18154676
23. Dalziel K, Segal L, Elley CR. Cost utility analysis of physical activity counselling in general practice. Aust N Z J Public Health 2006;30(1):57-63.

