Population-based CVD risk measurement:

A pragmatic solution for achieving this in primary care

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About the practice

The Doctors Masterton is a 4.5 FTE doctor practice servicing 6356 enrolled and funded patients in the rural town of Masterton, 90 minutes north-east of Wellington. 1994 patients fall within the recommended cardiovascular disease (CVD) risk screening cohort as defined by the New Zealand Guidelines Group.[1]

ABSTRACT

Aims

To collect all the CVD risk data needed for each patient in this cohort by systematic Read-coding and opportunistic collection of information and to do this by using existing staffing resources.

To develop software that would:

- enable simultaneous calculation of the CVD risk for the whole practice population on the latest available data
- facilitate collection of risk data and provide analysis of gaps
- provide analytical tools in order to highlight hard to reach patients and those at high risk of CVD.

To facilitate active management of primary prevention interventions for patients at increased risk of cardiovascular disease.

Methods

A rigorous process of checking, improving and maintaining the accuracy of patient Read-coding with regard to long-term conditions was initiated in early 2004. This process led to the formation of chronic disease registers in all the main long-term medical conditions including: Diabetes, Ischaemic Heart Disease, Hypertension, TIA, CVA. These registers were validated and compared to national prevalence rates. A standard template, *'Routine Health'* was set up in the MedTech 32 practice management system (PMS) and this became the entry point for all routine clinical data and enquiries related to CVD risk. Entering of blood pressure data triggered a request for smoking status and family history of CVD if these had not already been entered.[2,3]

In association with Primary Care IT Solutions Ltd, software (*CD Evolution*) was developed to extract the necessary data from the PMS and calculate the Framingham equation on all patients who had all the necessary data. Additional software tools were employed to provide increased functionality and an application was written to allow the CVD risk register to be updated overnight using the latest available data.

Results

Within three years of commencement, 90% of patients within the cohort (1803/1994 patients) had had their CVD risk calculated and many of the patients from higher-risk cohorts had been offered lifestyle and therapeutic interventions to enable CVD risk reduction.

Conclusions and implications

There is an increasing emphasis on the need for primary care to embrace practice population-based health promotion if the health of the nation is to be improved.

As cardiovascular disease is a significant cause of mortality and morbidity within New Zealand, a population-based approach to CVD risk measurement is required which is effective, efficient and easy to use in the primary care setting. This then allows targeted primary prevention interventions to be offered to the higher risk cohorts.

The enhanced software functionality provided by *CD Evolution* led

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to a clearer understanding of the practice population and more efficient use of existing staffing resources resulting in ongoing improvements in measurable practice performance indicators.

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Background

'Cardiovascular disease is the leading cause of death in New Zealand, accounting for 40% of all deaths. While age-standardised mortality has halved over the past 30 years the total number of deaths from cardiovascular disease has changed little because of the growing number of older people and at-risk individuals. The burden of cardiovascular disease falls disproportionately on Maori and also lower socioeconomic groups at a younger age.'[1]

Twenty years ago treatment decisions were based on the management of individual risk factors such as elevated total cholesterol and hypertension. There is clear consensus today that treatment decisions should be formulated around individual absolute risk of CVD.[4] The Framingham risk equation remains the best predictor of cardiovascular risk and has been shown to have predictive validity in New Zealand.[5]

According to the 2003 New Zealand Guidelines Group (NZGG) guideline, all men over 45 and all women over 55 should have their cardiovascular disease risk assessed. For Maori, Pacific and people from the Indian subcontinent CVD risk assessments are recommended 10 years earlier. Earlier assessments are also recommended for individuals with other known CVD risk factors and those at high risk of developing diabetes. As the whole of the adult population is potentially at risk, the burden of CVD risk assessment and management rests with primary care.[6]

Methods

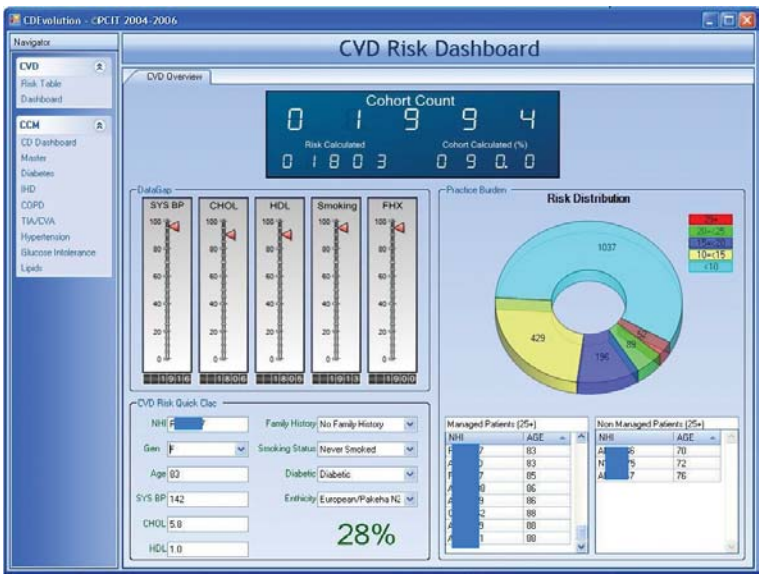
The dataset required for the Framingham equation as it is commonly used in New Zealand requires nine variables: age, gender, ethnicity, diabetic status, total cholesterol, High Density Lipoprotein (HDL), systolic blood pressure, smoking status and family history status with respect to CVD. The first three can be determined from querying the appropriate table in the database. With respect to diabetic status the practice had undergone a rigorous process to identify all the patients that had diabetes so the non-diabetic status of the population was also known with confidence. Lipid results from all commonly used laboratories were mapped to a standard screening term within MedTech 32. Systolic blood pressure was routinely measured and, by linking blood pressure measurement to an enquiry regarding smoking status and family history of CVD, these were also recorded routinely.[7]

The strategy chosen by the practice in 2004 was to collect systematically and opportunistically the data necessary to measure CVD risk on all adults within the criteria defined by the NZGG and to develop software that would enable calculation of multiple sets of data at once, using the latest patient data available.

In this way, patient data was collected opportunistically at every point of contact with the patient by a nurse or doctor. The annual influenza vaccination programme was used to check Read-coding and patient data with regard to CVD risk. At various times queries were run in MedTech 32 to determine patients eligible for lipid and diabetes screening.

A further objective was to develop IT tools facilitating data acquisition and analysis of calculated risk thereby assisting with prioritisation of the at-risk population. It was hoped this strategy would eliminate the inefficiencies of screening patients individually, avoiding the inverse care law and highlighting hard to reach patients and those with high CVD risk.

Figure 1. The CVD risk dashboard



Screen shots of *CD Evolution*

The CVD risk dashboard (Figure 1)

The CVD risk dashboard provides summary information about the CVD risk register and tools for improving data integrity and assistance with patient and population management.

The CVD Risk Register (Figure 2a)

The CVD Risk Register includes all the patients in the CVD Risk cohort. The charts below provide an analysis of this data by age group on the left and with respect to data gap analysis on the right. The charts are dynamic to the table in that clicking

on the chart filters the data in the table and shows the corresponding data gap analysis for that age group.

Clicking on the calculated segment of the age band, shown in blue, displays the risk distribution within that age group, as shown in Figure 2b.

Results

Within three years of commencement, 90% of patients within the cohort (1803/1994 patients) have had their CVD risk calculated. Over 50% of the cohort is aged 60 or over (1044 patients). Of this group 97.9% have had a CVD risk calculated. The majority of those less than 60 years old who have not had a CVD risk calculated have not presented to the practice within the last three years.

CVD risk has been recorded on 85.9% of the Maori patients within the cohort (287/334 patients) and 81.9% of the Maori males (168/205 patients). This compares favourably with another recent New Zealand study and demonstrates that this process is successful in collecting risk factor information.[8]

Discussion

Assessing and managing the CVD risk of every patient in the cohort is hugely expensive and not supported by evidence.[9,10] Opportunistic assessment of risk is neither evidence-based nor consistent with equity of access, since the inverse care law (those who need care the most receive the least) applies to coronary risk factor screening and interventions.[11] Alternative strategies to opportunistic screening include the UK National Service Framework which recommends assessing diabetics on anti-hypertensives first, other diabetics second, those on anti-hypertensives third and finally all other patients. This approach may also reinforce the inverse care law as it focuses on those that are already receiving care.

Marshall[12] describes a strategy for estimating cardiovascular risk on a population basis by using limited risk factor information and default risk factors (average population values)

Figure 2a. The CVD Risk Register

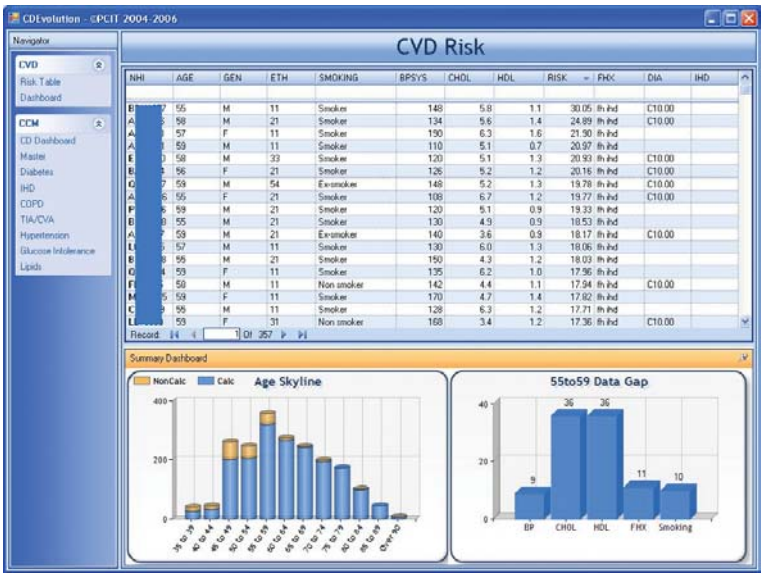
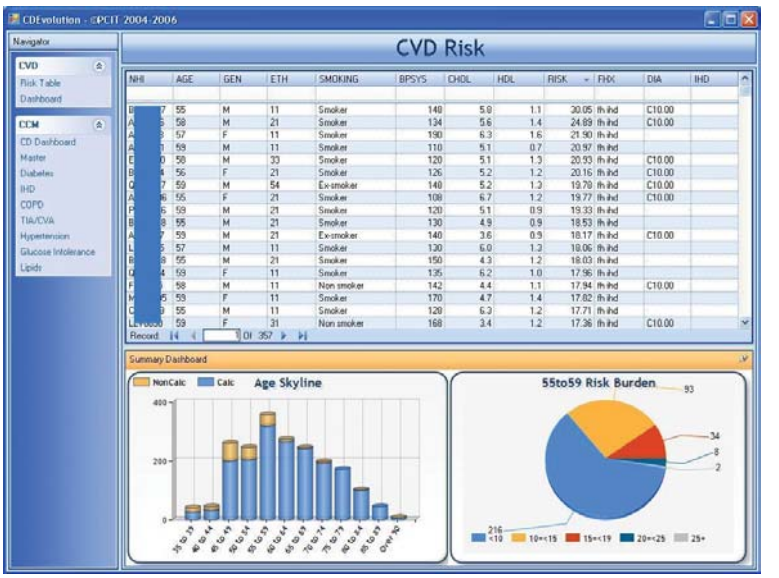


Figure 2b.



in order to prioritise patients for CVD risk assessment. Marshall concludes that appropriate information technology could calculate estimated cardiovascular risks on all patients in a practice database and identify those most likely to benefit from assessment.[12] Our experience would suggest that using default data for total cholesterol and HDL, and possibly blood pressure, could potentially speed up the process significantly. Our results also suggest that having accurate diabetic and smoking registers would be important. Additionally, a coefficient could also be used to adjust for known social gradients in disease.[13]

Our approach has been to structure systematically the practice coding and systems and to develop an information technology solution prioritising CVD risk management on high-risk individuals, thereby making efficient use of resources for the benefit of the whole practice population.

One of the most useful features of *CD Evolution* is that it is enabling this practice to target, strategically, primary health promotion interventions where they are most needed.[14,15]

Acknowledgements

We would like to thank our colleagues and team members who have contributed so much to the success of this work and who adapted their work processes so willingly.

We would also like to thank the Wairarapa DHB, the Wairarapa Community PHO and WIPA for their ongoing support of our programmes.

Competing Interests

Kevin Preston and David Nixon declare their financial interests and Directorships in Primary Care IT Solutions Ltd which has developed *CD Evolution*. Steve Chamberlain is the business manager at The Doctors Masterton but has no financial interest in the software.

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HPV vaccine – who should be vaccinated and when?

'To be most effective, the HPV vaccine should be given before a person becomes sexually active, and in three doses within one year. The Federal Advisory Committee on Immunization Practices (ACIP) has recommended that the vaccine be routinely given to females aged 11 to 12 and as early as age nine years at the discretion of doctors. The committee also recommended women ages 13 to 26 who have not yet been vaccinated receive "catch-up" vaccinations. The American Cancer Society also recommends that the vaccine be routinely given to females aged 11 to 12 and as early as age nine years at the discretion of doctors. The independent panel making the Society recommendations concluded there was insufficient evidence of benefit to recommend catch-up vaccination of all women age 19 to 26 years. As a result, the Society recommends "catch-up" vaccinations for females ages 13 to 18 only, and that women aged 19 to 26 talk to their health care provider about whether to get the vaccine, based on the risk of previous HPV exposure and potential benefit from vaccination.'

American Cancer Society. http://www.cancer.org/docroot/CRI/content/CRI_2_6x_FAQ_HPV_Vaccines.asp accessed 18/02/07.

Caesarean delivery

'In 1937, an article in the Journal describing 10 years of births at Boston City Hospital revealed an overall rate of cesarean delivery of about 3%. Recently released 2005 data on cesarean deliveries show that contemporary rates are 10 times as high, having climbed above 30%. Indeed, of the 20th century's many changes in obstetrical care – the wholesale move from home to hospital delivery, increasing use of anesthesia, the advent of in vitro fertilization – few have generated more attention and debate or had a greater effect on the process of delivery than this seemingly inexorable rise.'

Ecker JL, Frigoletto FD. Cesarian delivery and the risk-benefit calculus. N Eng J Med 2007;356(9):885-888.

New treatments for diabetes

'The failure of clinicians and their patients with diabetes to implement currently available interventions aggressively and effectively is, I suspect, the major barrier to good care. This problem will not be fixed by making more medications available. Ensuring the effective and cost-effective use of the medications that have already been established by high-quality clinical trials to control glycemia or prevent diabetes should be a higher priority than flooding the market with ever more medications.'

Nathan DM. Finding new treatments for diabetes - how many, how fast...how good? N Eng J Med 356;5:437-439