

Evidence for Prevention of Chronic Diseases

A Productivity Report in 2004 found that “over the next 40 years, total expenditure on health care is projected to increase from just under 10% of GDP to between 16 and 20%”ⁱ. Most of this growth in demand will come from the burgeoning chronic disease burden, which is increasing in both absolute as well as relative terms and is estimated to grow from the current 70% of the total national burden of disease to 80% by 2020.ⁱⁱ The ageing population demographic and increasing prevalence of some risk factors are the key drivers behind this increase.

There is significant international and national evidence that prevention strategies aimed at reducing chronic diseases and improving health and wellbeing are effective, yet the investment in prevention lags behind the necessity for the health system and governments to be more proactive.

Prevention and evidence

Prevention is often associated with mass media health promotion campaigns, brochures or posters about health issues, or information provided to individuals by health professionals. In fact, the evidence indicates that by themselves these are ineffective strategies in altering health behaviours. Yet over the past few decades there have been a number of costly efforts relying on such tactics.

Current approaches (correctly) use the language of “*evidence-informed*” prevention, and in respect of the stages of chronic diseases, see prevention as occurring at three levelsⁱⁱⁱ:

Primary Prevention – aims to limit the incidence of disease and disability in the population by measures that eliminate or reduce causes or determinants of departures from good health, control exposure to risk, and promote factors that are protective of health.^{iv} Primary prevention strategies could include legislative reform, policy development, and fiscal strategies aimed at improving whole-of-population health, as well as multiple specific strategies aimed at improving nutrition, physical activity and psychosocial wellbeing.

Secondary Prevention – aims to reduce progression of the disease through early detection, usually by screening at an asymptomatic stage, and early intervention.^v Secondary prevention strategies may include screening programs such as cervical, breast or colorectal cancer screening, or interventions targeted at those already identified as being at risk due to genetic or other factors such as impaired glucose tolerance or high cholesterol.

Tertiary Prevention – aims to improve function and includes minimalisation of the impact of established disease, and prevention of complications and the establishment of chronic conditions through effective management and rehabilitation.^{vi} Tertiary prevention programs include cardiac rehabilitation, effective blood glucose control in diabetics (to avoid complications) and can also include lifestyle coaching programs by a health professional, Stanford or Flinders model self management programs for those living with chronic conditions, or training and support to help manage existing conditions such as “Living with Diabetes” or “Get the Most Out Of Life”.

In addition, prevention programs can be applied at either a **universal** (whole of population), **selective** (targeted to at risk groups), or **indicated** level (where individuals have significantly increased risk).

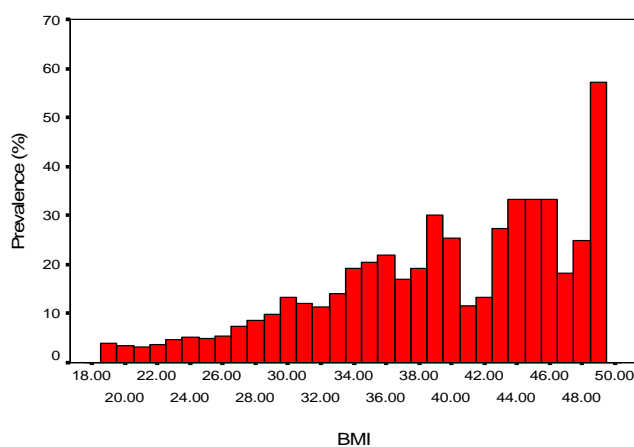
Increasingly, evidence points to primary prevention, or population level approaches, as the most effective means of preventing or delaying chronic conditions.

Population approaches aim to make healthy choices easy for everyone in the community (or conversely, sometimes aim to make unhealthy choices more difficult eg cigarette pricing policies), and are generally more effective, less costly and more sustainable than interventions aimed at individuals.

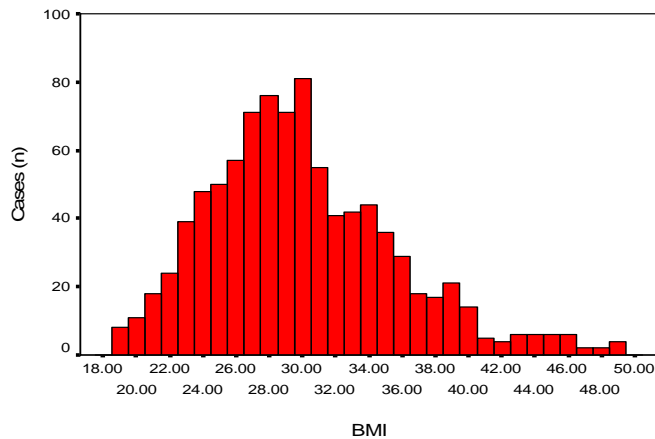
Achieving relatively small health benefits across the whole of the population – even if not explicitly at high risk - produces far larger overall gains than only targeting highest risk groups (for example, reducing the amount of fat in all meat or milk products results in a reduction of fat consumption across the whole population).

This can be illustrated by looking at the example of Type 2 diabetes. The evidence shows Type 2 diabetes is escalating rapidly across our population, in association with burgeoning obesity and overweight. Whilst the risks for an individual increase with Body Mass Index (BMI) as shown in Figure 1 below, across a population the sheer weight of numbers of people in the medium to high BMI range nowadays means that the bulk of cases is arising in people who would not be targeted by a high-risk group strategy.

Prevalence of diabetes according to BMI (AUSDIAB survey, unpublished data)



Number of diabetes cases according to BMI (AUSDIAB survey, unpublished data)



Population health approaches can be more cost effective than other approaches as risk factors for chronic diseases are widespread across the population and cumulative over an individual's lifespan^{vii}.

However the nature of the evidence for population level approaches is often very different from the randomised controlled clinical trial paradigm utilised in clinical medicine and drug trials, which suggests that there need to be different ways of thinking about how we evaluate effectiveness. It is not possible to apply the same methods used to evaluate individual approaches for a number of reasons, including that randomised control trials are not applicable (as there are multiple factors at play over longer timeframes in real life community situations, as well as ethical constraints). Instead, the nature of population level evidence includes observational information; experimental data; data obtained by extrapolation, deduction or logic; theoretical understandings and accumulated knowledge^{viii}.

But there certainly are robust data and evidence for effectiveness of primary prevention interventions.

For example, a recent meta-analysis comparing the contributions from primary and secondary prevention in reducing coronary heart disease found that between 1981 and 2000 mortality rates in England and Wales fell by 54%, and that primary prevention strategies were far more effective at reducing mortality than secondary prevention^{ix}. The study found that primary prevention of three major risk factors (smoking, cholesterol and diastolic blood pressure) in the healthy community achieved a fourfold bigger impact on mortality reduction than did secondary prevention for those already identified as being at risk of coronary heart disease (CHD). They reported that the fourfold advantage of primary prevention becomes 12-fold greater when life years gained rather than deaths postponed are considered. Patients with established CHD tertiary prevention gain on average 7.5 years of life whereas each death prevented or postponed by primary prevention gain an average additional 21 years of life.

Other evidence for interventions that address risk factors such as physical activity and nutrition includes:

- a range of evidence on interventions that can encourage active transport including policy and legislation, local, state and national programs and infrastructure

- good evidence on health benefits of active commuting eg. walking/cycling to work or using public transport combined with walking
- good evidence for point of decision prompts, eg. signage encouraging the use of stairs instead of lifts
- enhancing access to community facilities including walking tracks, swimming pools, fitness centres
- building social networks that support behaviour change eg. walking groups
- individually adapted health behaviour change programs which are tailored to a person's specific needs and focus on skill development are effective
- mass media campaigns promoting physical activity have limited impact on behaviour unless supplemented by strategies such as walking groups, community events, print material and promotion by health professionals, together with environmental measures that enable physical activity.^x
- Evaluation of the WA "Go for 2 and 5" campaign promoting increased consumption of fruit and vegetables showed an increase in average consumption of 0.7 serves per day for children and 0.5 serves for adults.^{xi}

Potential savings based on evidence

There is significant evidence that demonstrates the effectiveness, in terms of both economic cost and improvements in health status, of prevention programs. For example:

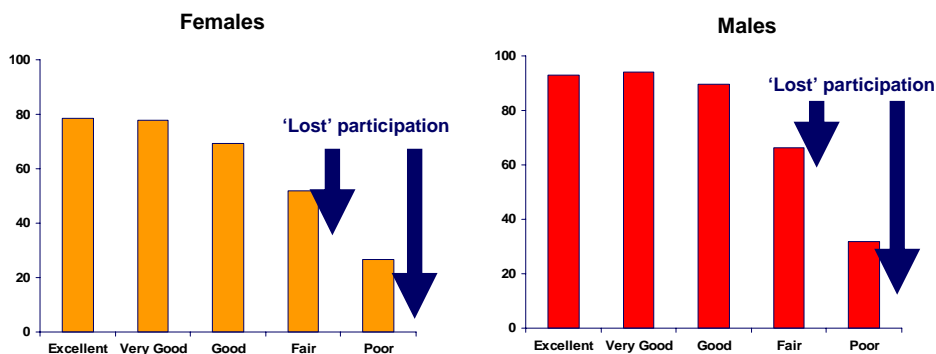
- Programs to reduce tobacco consumption in Australia over the last 30 years have cost \$176 million but have created benefits of \$8,602 million, and have contributed to a 10% decline in tobacco consumption. These programs have combined legislation, including health warnings and regulations that restrict promotion of tobacco products, fiscal strategies such as increased taxing of tobacco, as well as mass media campaigns.^{xii} Investment in prevention is between 500 and 1000 times more cost effective than treating end-stage lung cancer.^{xiii}
- Programs to reduce coronary heart disease over the last 30 years in Australia have cost \$810 million but created benefits of \$9.3 billion, predominantly through reduction in risk factors of smoking, cholesterol and blood pressure. Changes in these risk factors account for around 70 per cent of the decline in mortality from coronary heart disease.
- Interventions that result in weight loss of 5 kg in all Australians who are overweight or obese could reduce the health care costs associated with type 2 diabetes and its complications alone by up to \$43.7 million per year.^{xiv}
- Appropriate diet and maintenance of healthy body weight could prevent 30-40 % of all cancers^{xv} and thus save \$571.2-\$761.6 million per year in direct health system costs^{xvi}.
- The US Center for Disease Control and Prevention found that physically active people compared with physically inactive people had lower annual direct medical cost, fewer hospital stays and used less medication. It also concluded that workplace physical activity programs can reduce short-term sick leave by 6 to 32% and increase productivity by 2 to 52%^{xvii}.
- Existing estimates from a report published by the Australian Government suggest that savings of up to \$8 million per year could be achieved for every 1%

increase in the proportion of the population that is sufficiently physically active (ie doing 30 minutes or more per day of moderate level exercise). This would also avoid an estimated 122 premature deaths.^{xviii}

- The Australian Food and Nutrition Monitoring Unit estimates that increasing levels of fruit and vegetable consumption by just one serve per day would save between \$8.6 million and \$24.4 million per year of health costs associated with breast, colorectal, prostate and lunch cancer.^{xix}
- The North Karelia project in Finland demonstrated significant improvements in dietary patterns with a concurrent reduction in cardiovascular disease at a population level over a 25-year period. The investigators on this study claim that whole-of-population dietary change is possible, but requires a persistent and comprehensive intervention^{xx}.
- Reports have demonstrated sound evidence that nutrition interventions can reduce the prevalence of hypertension^{xxi} and cardiovascular morbidity and mortality (de Lorgeril et al 1999)^{xxii}.
- In Australia, a community-wide nutrition intervention program in a remote indigenous community clearly demonstrated that significant improvements can be made in physical and biological risk factors for chronic disease over a 12-month period when compared to a control community^{xxiii}.

In addition to, and more importantly than the economic gains from reducing health care costs, there are social benefits from enhancing participation in the community and in the workforce that arise from a healthier population.

Poor health has a significant impact on labour force participation...



Self-reported health status

Source: Cai and Kalb, 2004 – cited in Dept Premier and Cabinet Victoria "The Reform Challenge" Sept 5 2005

To illustrate this, Access Economics has estimated that the employment rate for people with arthritis is 5.1% lower than the age-standardised rate for all Australians. If people with arthritis were employed at the same rate as average Australians the same age, an additional 170,900 people would be employed. Access Economics estimated that the annual cost of lost earnings would be of the order of \$6.69 billion^{xxiv}.

Preliminary work by the scientific advisory group to the National Obesity Taskforce suggests^{xxv} that, informed by available evidence, effective interventions aimed at promoting physical activity and nutrition include:

- Pricing, point of sale labelling and promotion of healthier food choices in food services, retail and vending machines
- Media campaigns to promote awareness of healthier lifestyle options and to address particular behaviours eg. low fat milk
- Worksite programs that provide physical activity facilities, cues for stair use, support and incentives for participation, healthier food choices at competitive prices
- Providing physical activity facilities – access to places for physical activity
- Infrastructure and promotion of active transport options, such as walking paths and cycleways
- Social support for physical activity such as Walk with Friends programs
- Urban planning initiatives to promote mixed land use.

The National Public Health Partnership points out that even small improvements in addressing key risk factors for chronic conditions will have significant benefits:

- **the same strategies have benefits for multiple conditions:** four key risk factors (smoking, nutrition, alcohol and physical activity) are important in the prevention and management of many chronic conditions
- **healthier eating and greater levels of physical activity will tackle all of Australia's national priorities:** asthma, cancer, cardiovascular health, diabetes, injury prevention, mental health, arthritis and musculoskeletal conditions
- **the same strategies have benefits across the continuum of care:** key population based primary prevention strategies are relevant not only to keeping people well but also important to those who already have disease, or disease markers and risk factors.^{xxvi}

ⁱ Productivity Commission (2004) *Review of national competition policy reforms*, Canberra.

ⁱⁱ National Public Health Partnership (2001) *Preventing Chronic Disease: a strategic framework, background paper* Melbourne: NPHP

ⁱⁱⁱ National Public Health Partnership (2005) *Primary Prevention of Chronic Disease: a framework for action discussion paper* (draft) Melbourne: NPHP

^{iv} *ibid.*

^v *ibid*

^{vi} *ibid*

^{vii} Murphy, Janine (2005) Health promotion. Australian Treasury Department www.treasury.gov.au/contentitem.asp?navid=035&contentid=1009

^{viii} National Obesity Taskforce Scientific Reference Group (2005) Presentation to National Obesity Taskforce.

^{ix} B. Unal, J.A. Critchley and S. Capewell "Modelling the decline in coronary heart disease deaths in England and Wales, 1981-2000: comparing contributions from primary prevention and secondary prevention" *BMJ* doi:10.1136/bmj.38561.633345.8F 17 August 2005

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- ^x National Public Health Partnership (2005) *Be Active Australia: a framework for health sector action for physical activity*, NPHP Melbourne.
- ^{xi} ACDPA
- ^{xii} Applied Economics (2003) *Returns on Investments in Public Health: an epidemiological and economic analysis*. Canberra: Commonwealth Department of Health and Ageing.
- ^{xiii} VicHealth (2003) *Strategic Directions 2003-2006*. Victorian Health Promotion Foundation.
- ^{xiv} Marks GC, Coune T, Pang G (2001) *Type 2 Diabetes Costs in Australia – the potential impact of changes in diet, physical activity and levels of obesity* Canberra: Commonwealth Department of Health and Aged Care.
- ^{xv} WCRF (1997) *Food, Nutrition and the Prevention of Cancer: a global perspective*. Washington: World Cancer Research Fund/American Institute for Cancer Research
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- ^{xvii} US Dept of Health and Human Services (2002) Physical Activity Fundamental to Preventing Disease, 20 June 2002.
- ^{xviii} Stephenson, J, Bauman, A, Armstrong T, et al (2000). *The costs of illness attributable to physical inactivity*. Canberra: Commonwealth Department of Health and Aged Care.
- ^{xix} Marks GC, Pang G, Coyne T, Picton P (2001) *Cancer costs in Australia – the potential impact of dietary change*. Australian Food and Nutrition Monitoring Unit, Commonwealth Department of Health and Aged Care.
- ^{xx} Pietinen, P., Lahti-Koski, M., Vartiainen, E., and Puska, P. (2001) 'Nutrition and cardiovascular disease in Finland since the early 1970s: a success story'. *Journal of Nutrition Health and Ageing*, 5:150-154.
- ^{xxi} Harsha, D., Lin, PH., Obarzanek, E., Karaja, NM., Moore, TJ., and Caballero, B. (1999) 'Dietary Approaches to Stop Hypertension: a summary of study results. DASH Collaborative Research Group'. *J Am Diet Assoc.* 99 (8 Suppl): 535 - 9.
- ^{xxii} de Lorgeril, M., Salen, P., Martil, J-L., Monjaud, I., Delaye, J., and Mamelle, N. (1999) 'Mediterranean diet, traditional risk factors, and the rate of cardiovascular complications after myocardial infarction. Final report of the Lyon Diet Heart Study'. *Circulation*, 99:779-785.
- ^{xxiii} Lee, A., Bailey, A., Yarmarr, D., O'Dea, K. and Matthews, J.D. (1994) Survival tucker: improved diet and health indicators in an Aboriginal community" *Aust. J. Public Health* 18:277-285
- ^{xxiv} Access Economics (2005) Arthritis – the bottom line: the economic impact of arthritis in Australia. Report to Arthritis Australia January 2005.
- ^{xxv} National Obesity Taskforce (2005) Presentation to National Obesity Taskforce August 2005.
- ^{xxvi} National Public Health Partnership (2005) *Primary Prevention of Chronic Disease: a framework for action discussion paper* (draft) Melbourne: NPHP