



Effective strategies for changing health behaviour at the population level: a rapid review

Bill Bellew

An **Evidence Check** Review
brokered by the Sax Institute for the
NSW Department of Health

This report was prepared and written by:

Bill Bellew, from Bill Bellew Consulting.

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Enquiries regarding this report may be directed to the:

Manager

Knowledge Transfer Program

The Sax Institute

www.saxinstitute.org.au

Phone: (02) 9514 5950

Fax: (02) 9514 5951

Email: director@.saxinstitute.org.au

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A

Summary Document.

Executive Summary

This paper was commissioned mid-2007 on behalf of the NSW Health Senior Executive Advisory Board (SEAB) and within the context of the NSW Health Reinvestment Strategy. The terms of reference required a review of strategies and support factors shown to be effective in changing behaviour at the population level.

In terms of common success factors across effective population health programs the 20 years of evidence since the publication of the Ottawa Charter have in general increasingly confirmed the basic tenets of that Charter - namely, that comprehensive approaches are required to deliver and sustain population health behaviour change. Analysis of the findings from the literature review of population health behaviour change and from case studies allows a cautious suggestion of the following possible principles for success:

1. Implementing comprehensive strategies (concurrent or sequential packaging of multiple component interventions or programs to work together in synergistic or mutually reinforcing ways) is more effective than implementing individual strategies in isolation. These strategies can include regulation, education (including mass media campaigns, Internet and telecommunication), personal goal-setting and behavioural monitoring, motivational techniques and social support, individual or group counselling, brief interventions by general practitioners and health professionals, partnerships, community capacity building, environmental change, use of signs/cues at points of health decision-making and population or community-based coordinated programs. A rapid review of evidence for this briefing paper provided support for the adoption of comprehensive approaches in injury prevention, tobacco control, physical activity promotion and HIV prevention.
2. Settings-based approaches represent one way in which a comprehensive approach to strategies may be integrated for delivery; evidence reviewed provided support for the effectiveness of settings-based approaches in Schools, at Home, through Primary Care, in Hospitals and in Pharmacies. Some doubts remain about the effectiveness and cost-effectiveness of the Workplace as a useful setting for intervention. More convincing evaluation data are needed before major investments could be recommended.
3. Interventions and programs are most likely to succeed if they are based on a clear understanding of target behaviours and the environmental context. There is an important role here for formative research (both qualitative and quantitative) noting that facilitators and barriers are likely to be multifaceted and to occur at a number of interrelated levels.

4. The issue(s) targeted for intervention must be clearly defined at the outset, so that antecedents, determinants and supporting mechanisms can be defined, suggesting points for intervention and strategies for initial and sustainable change; well established planning models exist which can incorporate these factors for the specific contexts such as the Area Health Services of NSW.
5. The target population's readiness to change is an important factor at both individual and organisational levels. There is accumulating evidence across behaviours such as smoking, nutrition, physical activity that tailoring (or matching) programs and interventions to better suit the characteristics of the target audience is a predictor of more positive outcomes.
6. Interventions delivered through means other than face-to-face media, such as print, telephone, or the Internet have been shown to be effective with short-term behaviour change, and increasing evidence indicates that these approaches may be effective in the longer term. Because these types of interventions rely on little or no face-to-face contact, they hold great future promise of achieving good reach and favourable cost-effectiveness benchmarks.
7. The timeframe required for population health behavioural change to become evident depends on the particular public health issue being addressed. A comprehensive community based coronary heart disease prevention program could require 5 years to show major progress in intermediate outcomes (risk factors). By contrast an intensive public education program to promote the uptake of a new childhood vaccine might achieve very rapid progress in raising awareness, prompting behaviour change as well as achieving health outcomes (reduced vaccine preventable disease) within a matter of months rather than years. Limitations in the evidence make a global assessment of the required intensity and duration of programs very tentative, however in general terms the greater the intensity and duration of interventions, the greater is the likelihood of success.
8. There is a dearth of research on effective strategies for special populations, and especially so for Aboriginal and Torres Strait Islander Peoples. Effective programs from overseas for rural and Indigenous populations have been reported with the caveat that their findings may not always necessarily translate for an Australian context. Telehealth-, pharmacy- and worksite-based interventions hold promise for rural and remote areas. Best practice principles for Aboriginal Health Promotion have been published and should inform practice; a few individual studies of programs implemented for Indigenous Australians are noted. Promising practices include the use of pre-existing community structures, the use of community educators and lay people to lead interventions and 'tailoring' interventions culturally as well as by behavioural stage to achieve better outcomes.

9. “Absence of evidence is not evidence of absence”; the fact that there is a dearth of evidence in some areas of population health should not be mistakenly interpreted as evidence that these programs do not work. Rather, there is a pressing need for well designed whole-of community and multi-strategic programs, delivered and evaluated in the ‘real-world’ conditions of local Area Health Services.

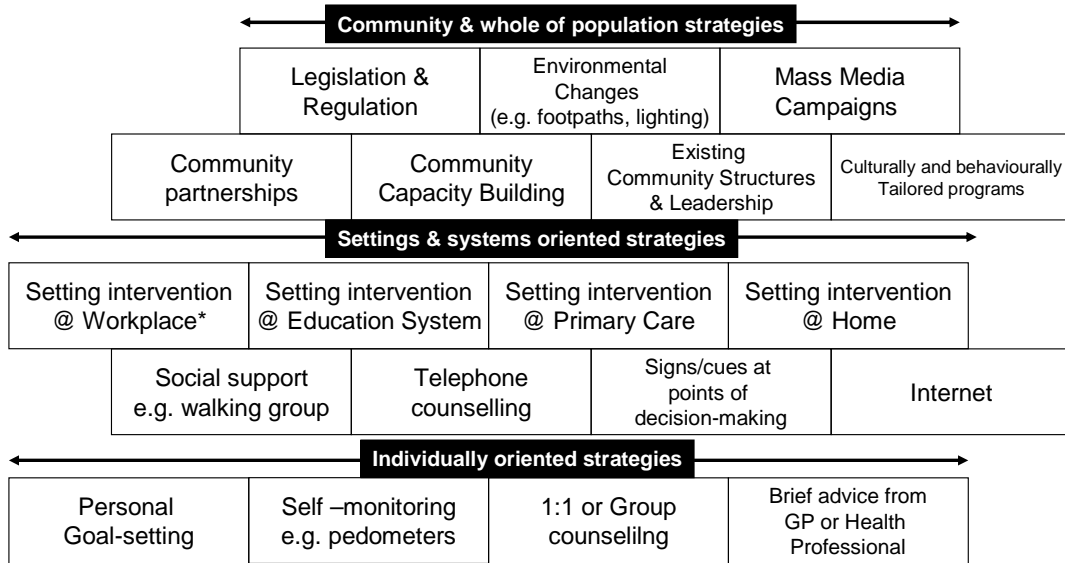
10. For Area Health Services in New South Wales (NSW) the fact that evidence indicates that comprehensive strategies appear to be required for the delivery of significant sustainable population health behaviour change does not necessarily imply that it should fall to an Area Health Service to fund all the components of those comprehensive strategies. Key questions are, which strategies are best funded and implemented at Area Health Service level? Which are best funded and implemented at State or Federal levels? Whilst it is possible to conceive of various models whereby an Area Health Service, properly resourced, might take on a Statewide strategic leadership role, in general terms it is helpful to distinguish typical roles for Federal, State and Area level within the implementation of a comprehensive strategic approach.

Introduction and Methods

This review paper was commissioned mid-year 2007 on behalf of the NSW Health Senior Executive Advisory Board (SEAB) and within the context of the NSW Health Reinvestment Strategy. The terms of reference required a review of strategies and support factors shown to be effective in changing behaviour at the population level. The review was to be based on published evidence using example/s of previous successful population health interventions. Length of investment, the time lag between knowledge and behaviour change and strategies required to reinforce the change were to be assessed and any common success factors across effective population health programs reported. Published studies were identified from searches of electronic databases including MEDLINE, PubMed, Cochrane Database of Systematic Reviews, The Evidence for Policy and Practice Information and Coordinating Centre (EPPI Centre) Evidence Library as well as the databases and publications of the Centre for Reviews and Dissemination (CRD) at the University of York (UK). Reference lists of previous reviews, retrieved articles and key evaluation /strategy documents were also examined. Keywords used in the searches were disease prevention and CVD, health promotion, preventive services, primary prevention, risk factors; behaviour change, tailoring and sexual behaviour, HIV infection, AIDS, health behaviour, health knowledge, attitudes, practice; strategy evaluation, effectiveness, cost benefit analysis, research, randomised controlled trials, clinical trials. Initial searches were undertaken from 1995 onwards, resulting in over 6000 references. After removal of duplicates and screening, this number was reduced to some 500. Given the availability of published Cochrane systematic reviews in many of the areas of interest these higher quality findings predominate in the final 95 studies chosen for inclusion as those most relevant in meeting the terms of reference. In addition thanks are due to Several Branch managers of NSW Health who suggested case study material and/or additional studies.

Note that Appendices and full scientific References have been confined to a companion volume entitled – *Part 2 Technical Document and Compendium of Supporting Evidence*.

Results: General findings across population health



Evidence-based building blocks for *Comprehensive Strategies* (concurrent or sequential packaging of multiple component interventions or programs to work together synergistically). Each strategy has supportive evidence for which strength is variable by specific health issues; [e.g. for workplace tobacco control policies and NRT are primarily recommended].

Figure 1: Evidence-based building blocks for Comprehensive Strategies

Figure 1 depicts the main findings from the background evidence review. The strategy building blocks have for the most part Cochrane Systematic Review evidence to support the view that they represent effective population health behaviour change strategies (the exception is for Rural and Special populations where less evidence is available). It should be noted that the evidence which supports these (generic) strategies applying across the breadth of population health is variable by health issue. For example, current evidence on workplace tobacco control does not support extensive strategies beyond basic smokefree workplace policy and access to smoking cessation services.

The evolution, nature and limitations of the current evidence are discussed in Appendix 1.

Results: Specific findings for selected areas of population health

Detailed findings from systematic reviews are presented in the Technical Document. Main findings on effective strategies are summarised in Figure 1. This section presents headline findings only and is illustrated with a series of brief case studies. For more detail please refer to the Technical companion document.

INJURY PREVENTION AND CONTROL

WHO Safe Communities: A systematic review found that the overall results of the model were positive.

Promoting bicycle helmet use to reduce head injury: legislative and non-legislative approaches

Bicycle helmet legislation appears to be effective in increasing helmet use and decreasing head injury rates in the populations for which it is implemented.

Pool fencing to prevent drowning: a legislative approach

Pool fencing significantly reduces the risk of drowning. Pool fences should have a dynamic and secure gate and should isolate the pool from the house (that is, four-sided fencing). Legislation should require isolation fencing with secure, self-latching gates for all pools, public, semi-public and private; it should require fencing of both newly constructed and existing pools and include enforcement provisions, in order to be effective.

Case Study: Preventing child traffic injuries in Norway and Sweden

The intervention (a)

Reports containing information about traffic injuries were distributed quarterly to all households (in Harstad, Norway). The information focussed on victim stories, statistics on medical data and the location of the accidents.

The behaviour change strategies used

Dissemination of relevant information, targeted specifically to a local community with impactful 'personalised' information about the effects of traffic injuries and specific locations.

The results

56.0% of respondents in Harstad reported having acquired information, or good advice, about traffic safety from the reports. From the first 2 years (mean rate 116.1/10,000 person years), to the last 2 years over a ten-year program there was a significant 59% [CI: 42% to 71%] reduction of traffic injury rates among Harstad children. Overall rates for all ages decreased 37% [CI:47% to 24%]

The intervention (b)

In Sweden introduction of an injury prevention program based on the WHO Safe Community model.

The behaviour change strategies used

The emphasis of the Safe Communities approach is on collaboration, partnership and community capacity building to reduce the incidence of injury and promote injury-reducing behaviours (e.g. promotion of cycle-helmet wearing).

The results

The Safe Communities model significantly reduced the relative risk for child injury. Total relative risk of child injury was reduced by a quarter [odds ratio 0.74; 95% CI 0.68 to 0.81]; relative risk of moderately severe injury was almost halved [odds ratio 0.49; 95% CI 0.41 to 0.57].

Table 1 Case Study: Preventing child traffic Injuries in Norway and Sweden

Preventing injurious falls among older people: population-based strategies

Interventions are available to prevent falls and include increased physical activity and hip protectors. Strategies include regulation, education, environmental change and population or community-based coordinated programs. Significant decreases or downward trends in fall-related injuries were reported in reviewed studies.

DRUGS AND ALCOHOL

Alcohol: brief interventions in primary care

The intervention includes feedback on alcohol use and harms, identification of high risk situations for drinking and coping strategies, increased motivation and the development of a personal plan to reduce drinking. It takes place within the time-frame of a standard consultation, 5 to 15 minutes for a general physician, longer for a nurse. A systematic review found that brief interventions consistently reduced alcohol consumption with an average drop of four standard drinks per week. The benefit is clear for males but unproven for females.

Alcohol: working with drink driving offenders

An ignition interlock device is part of a multi-dimensional program aimed at reducing recidivism in convicted drink drivers. To operate a vehicle equipped with an ignition interlock device, the driver must first provide a breath specimen. A systematic review of this type of intervention concludes that it is effective while the device is installed in the vehicle but no evidence is available for effectiveness of the program continuing once the device has been removed.

School-based drug prevention programs

School programs can be designed to provide knowledge about the effects of drugs on the body and psychological effects, as a way to build negative attitudes toward drugs; to build individual self-esteem and self-awareness, to work on psychological factors that may place people at risk of use; to teach refusal and social life skills; and to encourage alternative activities to drug use, which instill control abilities. Effects of the interventions on assertiveness, attitudes towards drugs, and intention to use drugs were modestly successful and broadly the same across studies.

HIV and AIDS

Two key strategies overall for NSW

For prevention of HIV and AIDS in NSW two main streams of prevention activity are particularly noteworthy for their effectiveness: (i) prevention programs promoting sexual behaviour change among gay in response to HIV; and (ii) Needle and Syringe Programs and associated education to promote and provide the means for utilisation of new injecting equipment by injecting drug users in response to HIV. NSW produced the first detailed HIV and AIDS care and treatment plan in Australia, and a specialist sexual health service was established in each Area Health Service. Legislative reforms in NSW were also a noteworthy contribution to the documented success of HIV and AIDS prevention in that State and included

- The requirement for informing sexual partners of infectious status;
- The protection of confidentiality in the event of a positive HIV test result;
- The management of infected people whose behaviour may place others at risk of infection;
- The decriminalisation of prostitution; and
- The establishment of the Needle and Syringe Program in November 1987.

Case Study: Tobacco control in Australia and in NSW

The behaviour change strategies used

Australia has what are perhaps the world's most advanced comprehensive tobacco control policies and programs. Because of these policies and programs, Australia has:

- the world's most expensive cigarettes, second only to Hong Kong;
- among the world's most prominent health warnings on cigarette packets;
- a total ban on all advertising and promotion of cigarettes;
- national campaigns for tobacco control that are emulated internationally;
- Quitline services that provide advice and support to smokers trying to quit smoking;
- extensive advocacy, via news media, for tobacco control;
- legislation that prohibits tobacco smoking in large buildings, public transport, and in restaurants;
- the widespread adoption of smoke-free homes
- litigation by smokers and passive smokers against tobacco companies, which has attracted widespread media attention.

In addition NSW has

- invested \$10 million in 2005/6 for anti-smoking advertising campaigns undertaken by the Cancer Institute NSW showing the consequences of smoking and promoting the Quitline number

The results

Between 1973 and 1984, the incidence rate of lung cancer in men rose by an average of 1.3 per cent per year, and since then has decreased by 1.9 per cent per year. In women, the incidence rate for lung cancer increased by 3.9 per cent per year between 1973 and 1993 but thereafter has remained stable, again reflecting the historical trend in smoking rates for women. Lung cancer remains the leading cause of cancer death in Australia. Death rates from coronary heart disease fell by 59 per cent in men and 55 per cent in women between 1980 and 2000, in large part because of changes in risk factors such as smoking.

In NSW calls to the NSW Quitline doubled in the period 2005-6 reaching 58,000 callers; The percentage of people aged 16 years and over smoking 'daily' or 'occasionally' dropped from 20.1% in 2005 to 17.7% in 2006; the 2.4% drop represented a relative decrease of 12% which is unprecedented in Australia

Table 2 Case study: Tobacco control in Australia & in NSW

Behavioural interventions can reduce risk of HIV infection in men who have sex with men (MSM) populations, but more research is needed to identify the best strategies. A summary measure of intervention effects corresponded to a 23% reduction in the proportion of men engaging in unprotected sex. Effects were homogeneous among studies, but

were slightly more favourable among:

- Community-level interventions;
- Interventions that served populations in their 20s rather than their 30s; and
- Programs that promoted interpersonal skills.

Mass media interventions for promotion of HIV testing show significant immediate and overall effect. No long-term effects were seen. There was no significant impact of detecting seropositive status after mass media intervention for promoting HIV testing, and this finding was limited to a small number of studies. Further research is required to identify possible effects on seropositivity status after mass media intervention for promotion of HIV testing among high-risk groups in epidemic countries.

TOBACCO CONTROL

Nicotine replacement therapy

All forms of nicotine replacement therapy (NRT) can help people quit smoking, almost doubling long term success rates. There is no evidence that one form of NRT is better than any other and NRT works with or without additional counselling.

Group-based programs for smoking cessation

A systematic review concludes that group programs are more effective for helping people to stop smoking than being given self-help materials without face-to-face instruction. The chances of quitting are more than doubled. It is unclear whether groups are better than individual counselling or other advice, but they are more effective than no treatment.

Cessation advice delivered by nurses

Advice and support from nursing staff can increase people's success in quitting smoking, especially in a hospital setting. Similar advice and encouragement given by nurses at health checks or prevention activities may be less effective, but may still have some impact.

Individual behavioural counselling for smoking cessation

Individual counselling is commonly used to help people who are trying to quit smoking. Individual counselling can help smokers quit, but there is not enough evidence about whether more intensive counselling is better.

Telephone counselling for smoking cessation

Proactive telephone counselling helps smokers interested in quitting. There is evidence of a dose response; one or two brief calls are less likely to provide a measurable benefit. Three or more calls increases the odds of quitting compared to a minimal intervention such as providing standard self-help materials, brief advice, or compared to pharmacotherapy alone. Telephone quitlines provide an important route of access to support for smokers, and call-back counselling enhances their usefulness.

Prevention of smoking in public places

Different methods are used to try and stop people smoking in public places such as hospitals and workplaces. Simply putting up signs of a "no smoking" policy does not seem to help prevent people smoking in public places. However, complete bans that have strong support from management do work. Carefully planned and resourced, multi-component strategies effectively reduced smoking within public places. Less comprehensive strategies are less effective.

Family-based programs to prevent uptake of smoking by young people

Some high quality studies show that family interventions may help to prevent adolescent smoking. How well the program staff are trained and how well they deliver the program may be related to effectiveness, but the number of sessions in the program does not seem to make a difference.

Preventing smoking amongst young people

Coordinated multi-component programs can reduce smoking among young people, and do so more effectively than single strategies alone. There is some support for the effectiveness of community interventions in helping prevent the uptake of smoking in young people – although it is limited. Mass media campaigns (television, radio, newspapers, billboards and booklets) may deter young people from starting to smoke but the evidence is not strong. Campaigns which had researched and developed their message to reach their target audience had a higher success rate than those which did not. Effective campaigns also lasted longer and were more intense than less successful ones.

The hospital as a setting for smoking cessation

Programs to stop smoking delivered during hospital stays that include a one month follow-up are the most effective. Intensive intervention (inpatient contact plus follow-up for at least one month) was associated with a significantly higher quit rate compared to controls. Interventions with less than a month of follow-up did not show evidence of significant benefit. Interventions increased quit rates irrespective of whether (NRT) was used, but the results for NRT were compatible with other data indicating that it further increases quit rates.

The pharmacy as a candidate setting for tobacco control

Personnel in community pharmacies can be a source of information and support for people trying to quit smoking. They may have a role because NRT, an effective cessation pharmacotherapy, is available without prescription in many countries. People

Case Study: A whole of community approach to healthy weight in Rural NSW

The intervention

The “WellingTONNE Challenge 2004” was a program coordinated by health professionals at the Wellington Community Health Centre in rural NSW. The initial focus was triggered by the perception of service duplication across client groups who had been referred for diabetes education, cardiac rehabilitation, overweight & obesity. To address this issue whilst also tackling preventable disease in the locality, a whole of community program was devised.

The behaviour change strategies used

Of 9,200 residents in Wellington, about 2,400 were considered overweight. A challenge was set for local residents to collectively lose a tonne in body weight.

Originally a 12-week program was planned which included:

- Weekly physical activity and information sessions;
- Supermarket tours (informed purchasing);
- Cooking demonstrations;
- Regular weigh-ins; and
- Dissemination of resource kits designed to help the community to work together to promote healthier lifestyles, prevent illness and manage chronic disease.

The results

Due to community engagement and demand, the program was extended to a period of 15 months. The community achieved many health improvements including weight loss, increased physical activity levels, reduction or even cessation of certain medications as well as reductions in blood glucose levels, blood pressures, and levels of pain. No formal evaluation was reported. Although impressive, the results require a cautionary note: a greater time lag than 15 months is required to determine whether observed changes and health gains have been sustained.

Table 3 Case study: A whole of community approach to healthy weight in Rural NSW

also come to pharmacies with prescriptions for medications to help them quit. There is some (albeit limited) evidence that training pharmacy personnel to offer counselling and record keeping services to their customers may help smokers to quit.

The workplace as a setting for tobacco control

The workplace can be an effective setting for people to stop smoking. Proven stop smoking methods, like group therapy, individual counselling and NRT, are equally effective when offered in the workplace. The evidence is less clear for self-help methods. Bans and restrictions can reduce smoking at work, although it is not clear whether they reduce overall smoking levels. Social and environmental support, competitions and incentives, and comprehensive programs do not show a clear benefit in helping smokers to quit at work. A recent cost effectiveness comparison concluded that smoke-free workplace policies are about 9 times more cost-effective per new nonsmoker than are free NRT programs; smoke-free workplace policies should therefore be a public health funding priority, even when the primary goal is to promote individual smoking cessation.

INTERVENTIONS IN HEALTHY NUTRITION and HEALTHY WEIGHT

Promoting healthy eating amongst school-aged children

A systematic review of barriers and

enablers for children's healthy eating was published in 2003. The types of interventions evaluated by the studies in the review were largely school-based, and often combined learning about the health benefits of fruit and vegetables with 'hands-on' experience in the form of food preparation and taste-testing. There was no evidence of the effectiveness of single component interventions, such as classroom lessons alone or providing fruit-only tuck shops. Six main issues emerged from the studies of children's views: (1) children do not see it as their role to be interested in health; (2) children do not see messages about future health as personally relevant or credible; (3) fruit, vegetables and confectionery have very different meanings for children; (4) children actively seek ways to exercise their own choices with regard to food; (5) children value eating as a social occasion; and (6) children see the contradiction between what is promoted in theory and what adults provide in practice. Interventions which were in line with these suggestions tended to be more effective than those that were not.

Prevention of childhood obesity

A 2005 Cochrane systematic review has addressed the question of obesity prevention in childhood. Studies that focused on combining dietary and physical activity approaches did not significantly improve body mass index (BMI), but some studies that focused on dietary or physical activity approaches showed a small but positive impact on BMI status. Nearly all studies included resulted in some improvement in diet or physical activity.

Case Study: Community-based programs to promote physical activity in Australia (NSW and Queensland)

The intervention (a)

"10,000 Steps Rockhampton" (Queensland)

The behaviour change strategies used

10,000 steps was a whole of community comprehensive (multi-strategic) approach using strategies to harness the influence of the environment as well as social marketing campaigns, advice from healthcare providers and personal goal-setting/monitoring using pedometers to address physical inactivity in a regional city in Queensland.

The results

This community-based comprehensive strategy increased physical activity participation levels by 5% among women (effects were not significant among men).

The intervention (b)

"Concord: A great place to be active" (Central Sydney, NSW)

The behaviour change strategies used

This was also a community based comprehensive (multi-strategic) approach. It focussed on women aged 20-50 years and was undertaken by an Area Health Service in partnership with local government (Concord). The key strategies were social marketing, community walking events, environmental changes in local parks and walking paths, and dissemination of maps of local walking routes.

The results

Over a two-year period this comprehensive strategy produced statistically significant reductions (6.4%) in the proportion of sedentary women in the target population.

Table 4 Case study: Community based programs to promote physical activity in Australia (NSW and Queensland)

There is not enough evidence from trials to prove that any one particular program can prevent obesity in children, although comprehensive strategies to address dietary and physical activity change, together with psycho-social support and environmental change, may help. Until more robust evidence for effective interventions becomes available it is unsurprising that systematic reviews examining the question of screening for childhood obesity find that screening to identify individual children can not be justified.

Physical activity and dietary change for weight loss

A 2006 systematic review assessed the use of exercise as a weight loss intervention. Results support the use of exercise as a weight loss intervention, particularly when combined with dietary change. Exercise is associated with improved cardiovascular disease risk factors even if no weight is lost. When compared with no treatment, exercise resulted in small weight losses across studies. Exercise combined with diet resulted in a greater weight reduction than diet alone. Exercise as a sole weight loss intervention resulted in significant reductions in diastolic blood pressure and fasting glucose. Higher intensity exercise resulted in greater reduction in fasting serum glucose than lower intensity exercise. It should be noted that the 'accumulate 30 minutes' message for physical activity applies to general health benefits whilst variations on this guideline are required according to a particular condition or outcome; for weight loss it is accepted that the quantum of daily physical activity is more in the order of 60-90 minutes. The more complex physical activity messages are probably best communicated on an individual basis and by a health professional.

Dietary advice

A 2005 systematic review examined the effects of providing dietary advice to achieve sustained dietary changes or improved cardiovascular risk profile among healthy adults. Dietary advice appears to be effective in bringing about modest beneficial changes in diet and cardiovascular disease (CVD) risk factors over approximately 9 months but longer term effects are not known.

Promoting healthy weight and preventing weight gain at the population level in NSW

A major review of interventions to promote healthy weight and prevent weight gain in NSW has been published. It found that the most promising approaches are likely to involve new combinations of strategies promoting physical activity and improving nutrition. These include: pricing; Point-of-Sale labelling and promotion; media campaigns; GP and health professional advice; worksite programs that provide physical activity facilities; cues for stair use; healthier food choices; social support; physical activity; and urban planning initiatives to provide mixed land use.

PHYSICAL ACTIVITY

A 2005 Cochrane review assessed the effects of interventions for promoting physical activity in adults aged 16 years and older, not living in an institution. It suggests that physical activity interventions have a moderate effect on self reported physical activity and cardio-respiratory fitness, but not on achieving a predetermined level of physical activity. To supplement the Hillsdon et al review, derived from Marcus and colleagues' important major review of interventions published in 2006 are included in the following sections on physical activity.

Physical activity promotion among older adults

In general, interventions among older adults, including face-to-face and telephone interventions and individual and group interventions, have been effective in increasing physical activity behaviour, at least in the short term. These interventions typically have multiple components and involve some combination of educational, behavioural, and cognitive-behavioural strategies. Although it is difficult to disentangle the most effective intervention components, the authors concluded that general health education alone does not appear to be an effective method of promoting physical activity in older men and women. Cognitive-behavioural interventions such as self-monitoring and goal setting have been effective in several studies. In terms of setting, in a recent review that compared home- versus centre-based physical activity programs among participants 50 years old, centre-based programs appeared to be superior in the short term for producing fitness outcomes among those with cardiovascular disease, although adherence to physical activity programs was superior in home-based programs.

Physical activity promotion among young people

In general, school-based programs that have included policy and environmental approaches have been more effective than curriculum-only approaches. French middle school students have demonstrated preliminary evidence that targeting a reduction in sedentary behaviours in youth may be an effective strategy for increasing physical activity. The most extensive youth physical activity intervention was the CDC-sponsored VERB campaign, which targeted nine to thirteen year-olds with paid media advertisements and community events. Physical activity increased in those exposed to the campaign, which indicates a positive nationwide effect. Although there are several effective physical education and multi-component school-based interventions, as well as promising programs for reducing sedentary behaviour, intervention approaches in home and community settings have not been promising.

Promoting physical activity in the primary care setting

Some research has shown that even brief (three to ten minutes) interventions can increase physical activity and, although physicians typically delivered the advice, effective interventions often involved other members of the healthcare team, such as

nurses and health educators. Written prescriptions provided in addition to verbal advice may enhance the effectiveness of interventions. Multiple-component interventions that include behavioural strategies such as goal setting, problem solving, self-monitoring, and feedback, as well as supervised exercise and provision of equipment, have generally been more effective than advice only, although these findings have not been entirely consistent across studies. Technological innovations such as using the Internet or making automated phone calls may reduce the effort and cost of interventions, although further research is needed to clarify this. Tailoring interventions to address specific barriers to change in a particular setting is probably important. Multifaceted interventions may be more effective than single interventions, because more barriers to change can be addressed.

Mediated interventions to promote physical activity

Interventions delivered through means other than face-to-face media, such as print, telephone, or the Internet, are referred to as mediated interventions. Reviews of mass media interventions have generally shown that they can produce consistent recall of campaign messages, but they have shown mixed results in terms of attitude change and have not impacted behaviour change in the targeted populations. Such interventions may be targeted toward a particular subgroup, such as older adults, or individually tailored on the basis of feedback from participants on, for example, their specific motivational readiness, expected outcomes, or self efficacy. Reviews of mediated interventions that use print-based programs indicate moderate efficacy in increasing physical activity behaviour, although further evidence is required to support longer-term maintenance of behaviour change. Evidence in support of telephone and Internet programs has been mixed. Studies of telephone counselling (only) interventions using three to five contacts over a one-year period show that this type of intervention can effectively impact on multiple lifestyle behaviours and that individuals with above-optimal blood pressure (BP) (including stage 1 hypertension), have made multiple lifestyle changes that lower BP and reduce their cardiovascular disease risk. There is evidence that the approach works specifically for Type 2 diabetes: a randomised study of a brief tailored intervention (including follow-up telephone calls) resulted in lifestyle changes among patients with Type 2 diabetes (reducing the total amount of fat consumed and increasing physical activity).

The promotion of walking

A recent systematic review assessed the effects of any type of intervention relating to how much people walk, the promotion of walking in individuals and populations, the distribution of effects on walking between social groups, and any associated effects on overall physical activity, fitness, risk factors for disease, health and wellbeing. The results found that the most successful interventions could increase walking among targeted participants by up to 30-60 minutes a week on average, at least in the short term. At the individual level, interventions were most effective when they were:

- Tailored to people's needs;
- Targeted at the most sedentary or at those most motivated to change by way of brief advice; and
- Supported by the use of pedometers or telecommunication.

Individualised marketing to households or through groups can also encourage people to walk more, although the clinical benefits and sustainability of many of these approaches are uncertain, as is the ability to generalise the findings to other groups.

Environmental interventions for PA

Research is rapidly evolving on the links between the built environment and physical activity. A review of the area was conducted in 2005. Importantly, environmental influences are not the only influences nor in themselves sufficient to exert a major influence on physical activity behaviour. Their impact is influenced by social and individual factors. An optimal approach is likely to require several strategies, including physical environment changes, in combination with social marketing and community education. Key environmental features that contribute to increased physical activity include:

- Mixed land use;
- Housing density;
- Footpaths and cycleways
- Facilities for physical activity;
- Street connectivity and design;
- Transport infrastructure; and
- Systems linking residential, commercial and business areas.

Case Study: Behaviour change strategies to prevent Type 2 Diabetes

The intervention

Type 2 Diabetes accounts for over 85% of diabetes in Australia. Systematic reviews of interventions among adults who are pre-diabetic show that very intensive interventions to achieve lifestyle change (physical activity, dietary change, weight loss) are effective. A review of individual RCTs confirms the effectiveness of intensive, individually tailored lifestyle programs to improve biomarkers for diabetes. In addition weight loss and physical activity interventions among overweight adults who have the metabolic syndrome are effective in delaying progression to Type 2 Diabetes.

The behaviour change strategies used

Weight loss and physical activity programs were found to be the most effective; greater intensity of intervention appears to improve effectiveness; spouse involvement in weight-loss may contribute to success. The range of specific strategies involved in the successful trials includes:

- Personal goal-setting - including 5-7% weight loss and increased physical activity;
- Tailored counselling and incentives for physical activity (e.g. subsidised/free membership of facilities) and supervised sessions;
- Motivational programs (e.g. walking groups, competitions, telephone-based peer support);
- Frequent contact with participants;
- Specific nutrition advice and assistance with decision-making for healthier food purchases;
- Low fat, low calorie diet; and
- Multiple lifestyle changes.

The results

Over intervention periods ranging from 3 years' duration (USA, Finland) to 6 years' duration (China) RCTs have shown reductions in the incidence of Type 2 Diabetes of 42-58%. Both USA and Finnish intervention trials achieved 58% and secondary analyses showed that among participants who complied fully with the programs the reduction was a remarkable 100% (i.e. diabetes was avoided altogether). Follow up has shown maintenance of effects for several years after

Table 5 Case Study: Behaviour change strategies to prevent Type 2 Diabetes

A comprehensive or 'integrated' approach is increasingly advocated for policy development in physical activity.

TAILORED INTERVENTIONS AND TECHNOLOGIES

Tailoring is a process of matching interventions and programs to characteristics of the target audience which it is thought will lead to better behavioural and ultimately better health outcomes. For tobacco control there is some evidence of a dose-response relationship for 'tailoring' with the greatest apparent tailoring producing the most positive outcomes. There are similar findings for fat intake and physical activity promotion.

The use of new technologies is growing in virtually all areas of health communication. There is the potential to make major contributions for an unhealthy and ageing population and this potential is notable in the case of the Internet because it represents a "hybrid" mass and interpersonal communication medium. Promising examples include web-based tailored smoking cessation programs made available when purchasing NRT, adding behavioural smoking cessation materials to brief telephone-based counselling (with print materials tailored to interim progress being effective for relapse prevention), promotion of dietary change and physical activity, and provision of specific information for parents to prevent injuries to young children. Tailored counselling by telephone has shown positive results in several recent RCTs and there is emerging evidence on the effectiveness of simultaneous/sequential risk factor intervention in middle age populations. Proactive telephone counselling helps smokers interested in quitting. There is evidence of a dose response; three or more calls (but not less) increasing the odds of quitting compared to a minimal intervention. Telephone quitlines provide an important route of access to support for smokers, and call-back counselling enhances their usefulness.

DISADVANTAGED OR HIGHER RISK POPULATIONS

The review found very few studies that could provide high quality evidence for interventions serving people from culturally and linguistically diverse (CALD) backgrounds, Aboriginal and Torres Strait Islander Peoples, disadvantaged or high risk populations.

A review undertaken in 2005 for the National Obesity Taskforce examined interventions among people living in rural and remote areas; these included native Indigenous

populations such as Maori, Inuit and native Hawaiians. Limited information was available on the effectiveness of interventions. However, the analysis found a range of innovative and potential systems for the delivery of lifestyle behavioural change programs and to some extent indicated the feasibility and acceptability of strategies in specific locations and circumstances. Interventions targeted people at risk of chronic disease, including overweight, diabetes and CVD. Access to service providers is often difficult because of the limited number of health practitioners in rural and remote areas. Some interventions such as teleconferencing may be worth further exploration to understand the efficacy of this technology to deliver interventions in Australian rural and remote areas. A Hunter Valley study showed that pharmacies could successfully provide screening, health promotion and referrals in small rural towns.

The need for interagency collaboration to successfully access people living remotely was highlighted in a number of studies. Interventions (including screening and health promotion programs) run through rural worksites hold the potential to identify, reach and educate people who have poor lifestyle behaviours in rural areas, and where primary health care is typically under resourced. The involvement of health agencies and other organisations in the larger community is recommended to ensure workplace programs are sustainable. Intervention programs among Indigenous populations which use pre-existing cultural structures have the potential for improving the uptake of preventative health services among these populations. Overall, the studies highlight the need to incorporate culturally specific programs to effectively target minority groups.

Key intervention features that may predict success with socially disadvantaged populations are:

- Cultural tailoring of the intervention;
- Community educators or lay people leading the intervention;
- One-on-one interventions with individualised assessment and reassessment;
- Incorporating treatment algorithms;
- Focusing on behaviour-related tasks;
- Providing feedback; and
- High-intensity interventions (>10 contact times) delivered over a long duration (>or=6 months).

A US trial conducted among lower-income African-American women from 10 urban public health centres involved development of a series of six women's health magazines with content tailored individually (by culture and by behavioural stage). The intervention focussed on mammography and fruit and vegetable consumption. Women receiving behaviourally and culturally tailored magazines were more likely than those in the Behaviour-only, Culture-only, and control groups to report getting a mammogram, and had greater increases in fruit and vegetable servings consumed daily.

Discussion and Conclusion

No single theory dominates population health behavioural change and health promotion. Many concepts in different models overlap, and some aspects of behavioural-change models have a stronger evidence base than others. The most useful approach is to combine concepts from more than one theory to address a problem, and to bring these together in a comprehensive way. A “slavish” devotion to testing models and theories can be counterproductive, as no model or theory will get it right all the time and, in practice, often a single theory explains only a small amount of the variance in targeted behaviours. Research literature on behavioural change and health promotion indicates that it is difficult to maintain health behavioural change over time; relapse rates as high as 80% have been reported in studies of lifestyle modification such as weight loss and increased physical activity. Some research is now beginning to address the question of ‘maintenance’ or ‘adherence’ but more is needed.

However the population health approach is predicated on the achievement of small changes across large numbers of people and/or environments and programs are available to achieve this. The review for this paper found substantial evidence from systematic reviews for effective programs in areas as broad as injury prevention, drug and alcohol, prevention of HIV and AIDS, tobacco control, public health nutrition and healthy weight interventions, physical activity promotion, tailored approaches and emerging technologies, as well as some limited evidence of programs for CALD, Indigenous, disadvantaged and high risk populations.

In terms of common success factors across effective population health programs the 20 years of evidence since the publication of the Ottawa Charter have in general increasingly confirmed the basic tenets of that Charter -namely, that comprehensive approaches are required to deliver and sustain population health behaviour change. Analysis of the findings from the literature review of population health behaviour change and from case studies allows a cautious suggestion of the following possible principles for success:

- Implementing comprehensive strategies (concurrent or sequential packaging of multiple component interventions or programs to work together in synergistic or mutually reinforcing ways) is more effective than implementing individual strategies in isolation. These strategies can include regulation, education (including mass media campaigns, Internet and telecommunication), personal goal-setting and behavioural monitoring, motivational techniques and social support, individual or group counselling, brief interventions by GPs and health professionals, partnerships, community capacity building, environmental change, use of signs/cues at points of health decision-making and population or community-based coordinated programs. A rapid review of evidence for this briefing paper provided support for the adoption of

comprehensive approaches in injury prevention, tobacco control, physical activity promotion and HIV prevention;

- Settings-based approaches represent one way in which a comprehensive approach to strategies may be integrated for delivery; evidence reviewed for this briefing paper provided support for settings-based approaches in Schools, at Home, through Primary Care, in Hospitals and in Pharmacies. Some doubts remain about the effectiveness and cost-effectiveness of the Workplace as a useful setting for intervention. More convincing evaluation data are needed before major investments could be recommended;
- Interventions and programs are most likely to succeed if they are based on a clear understanding of target behaviours and the environmental context. There is an important role here for formative research (both qualitative and quantitative) noting that facilitators and barriers are likely to be multifaceted and to occur at a number of interrelated levels;
- The issue(s) targeted for intervention must be clearly defined at the outset, so that antecedents, determinants and supporting mechanisms can be defined, suggesting points for intervention and strategies for initial and sustainable change; well established planning models exist which can incorporate these factors - applying them for the specific contexts such as the Area Health Services of NSW. Lawrence Green's PRECEDE-PROCEED model is a good example;
- The target population's readiness to change is an important factor at both individual and organisational levels. There is accumulating evidence across behaviours such as smoking, nutrition, and physical activity that tailoring (or matching) programs and interventions to better suit the characteristics of the target audience is a predictor of more positive outcomes;
- Interventions delivered through means other than face-to-face media, such as print, telephone, or the Internet have been shown to be effective with short-term behaviour change, and increasing evidence indicates that these approaches may be effective in the longer term. Although print has been studied most extensively, many studies have now demonstrated the efficacy of telephone-based interventions, and more studies into the use of the Internet are now underway. Because these types of interventions rely on little or no face-to-face contact, they hold great future promise of achieving good reach and favourable cost-effectiveness benchmarks;
- The timeframe required for population health behavioural change to become evident depends on the particular public health issue being addressed. A comprehensive community based coronary heart disease prevention program could require five years to show major progress in intermediate outcomes (risk factors). By contrast an

intensive public education program to promote the uptake of a new childhood vaccine might achieve very rapid progress in raising awareness, prompting behaviour change as well as achieving health outcomes (reduced vaccine preventable disease) within a matter of months rather than years. Limitations in the evidence make a global assessment of the required intensity and duration of programs tentative rather than definitive, however in general the greater the intensity and duration of interventions, the greater is the likelihood of success;

- There is a dearth of research on effective strategies for special populations, and especially so for Aboriginal and Torres Strait Islander Peoples. Effective programs from overseas for rural and Indigenous populations have been reported with the caveat that their findings may not always necessarily translate for an Australian context. Telehealth-, pharmacy- and worksite-based interventions hold promise for rural and remote areas. Best practice principles for Aboriginal Health Promotion have been published and should inform practice; a few individual studies of programs implemented for Indigenous Australians are noted. Promising practices include the use of pre-existing community structures, the use of community educators and lay people to lead interventions, and ‘tailoring’ interventions culturally as well as by behavioural stage to achieve better outcomes;
- “Absence of evidence is not evidence of absence”; the fact that there is a dearth of evidence in some areas of population health should not be mistakenly interpreted as evidence that these programs do not work. Rather, there is a pressing need for well designed whole-of community and multi-strategic programs, delivered and evaluated in the ‘real-world’ conditions of local Area Health Services; within these program evaluations greater attention needs to be paid to documenting intervention reach, adoption, implementation, and maintenance; and
- For Area Health Services in NSW the fact that evidence indicates that comprehensive strategies appear to be required for the delivery of significant sustainable population health behaviour change does not necessarily imply that it should fall to an Area Health Service to fund all the components of those comprehensive strategies. Key questions are, which strategies are best funded and implemented at Area Health Service level? Which are best funded and implemented at State or Federal levels? Whilst it is possible to conceive of various models whereby an Area Health Service, properly resourced, might take on a Statewide strategic leadership role, in general terms it is helpful to distinguish typical roles for Federal, State and Area level within the implementation of a comprehensive strategic approach. An NHMRC report published in 1997 contains templates which could represent a good starting point for such a role clarification process.

Appendix 1

The evolution, nature and limitation of current evidence on population health behavioural change strategies

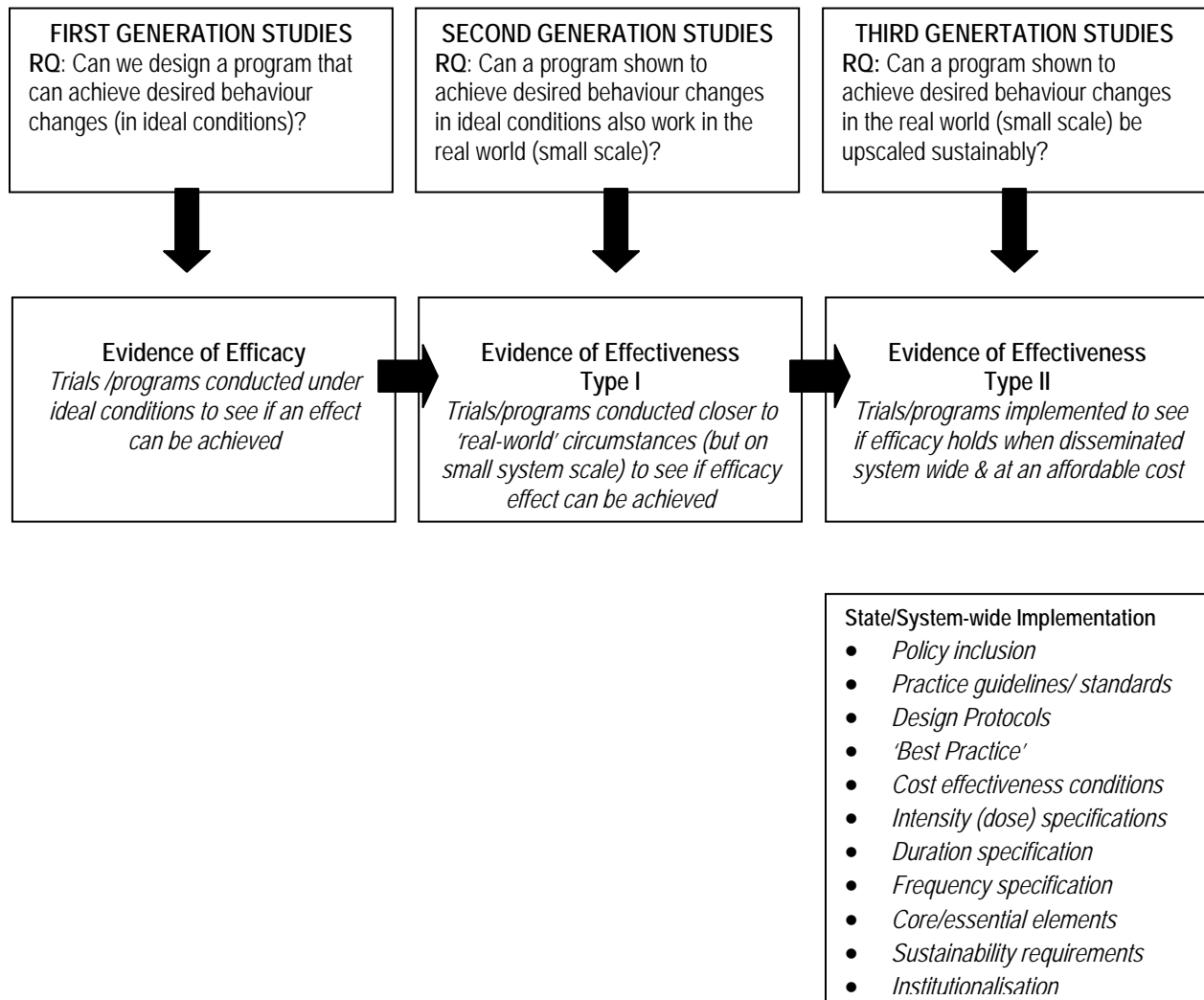


Figure 2: The evolution of evidence generation in population health behaviour change programs and interventions.

Limitations in the evidence make a global assessment of the required intensity and duration of programs very tentative, however in general the greater the intensity and duration of interventions, the greater is the likelihood of success. Figure 2 illustrates the evolution of evidence for population health behaviour change programs and interventions from 'first generation' (basic efficacy) through 'second generation' (effectiveness – small

scale) and on to 'third generation' (diffusion and sustainability). Most of the available evidence is limited to first or second generation categories. In healthy lifestyle/behavioural intervention studies, rarely are outcomes measured more than one year after baseline, and fewer assess outcomes after a period of no intervention. More typically, maintenance periods include continuation of the intervention or a tapered, less-intensive version of the initial program. Once interventionists, and the incentives they provide, are no longer salient, behaviours tend to decline. The implications of this are that conclusions about the necessary intensity and duration of interventions required to deliver meaningful change in population health behaviours are difficult to formulate and will remain so until more results of larger 'third generation' studies are confirmed. A further challenge is the well documented difficulty in configuring suitable evaluation designs for larger community trials when the interventions have been so well disseminated in the community (including the control or comparison groups) that it has been difficult to show overall impacts even when the discrete interventions have evaluated favourably.

Nonetheless in the twenty years since the publication of the Ottawa Charter for Health Promotion (1987), ten years since the Jakarta Declaration on Health Promotion (1997) and two years since the adoption of the Bangkok Charter for Health Promotion (2005) the evidence serves to underscore the importance of the original tenets put forward in Ottawa – namely that desired health behaviour changes need to be made possible to do in the first place and thereafter need to be facilitated to become even more so. This has become enshrined in the health promotion principle of “making healthy choices easier choices” (see Appendix 1 of Technical Document).

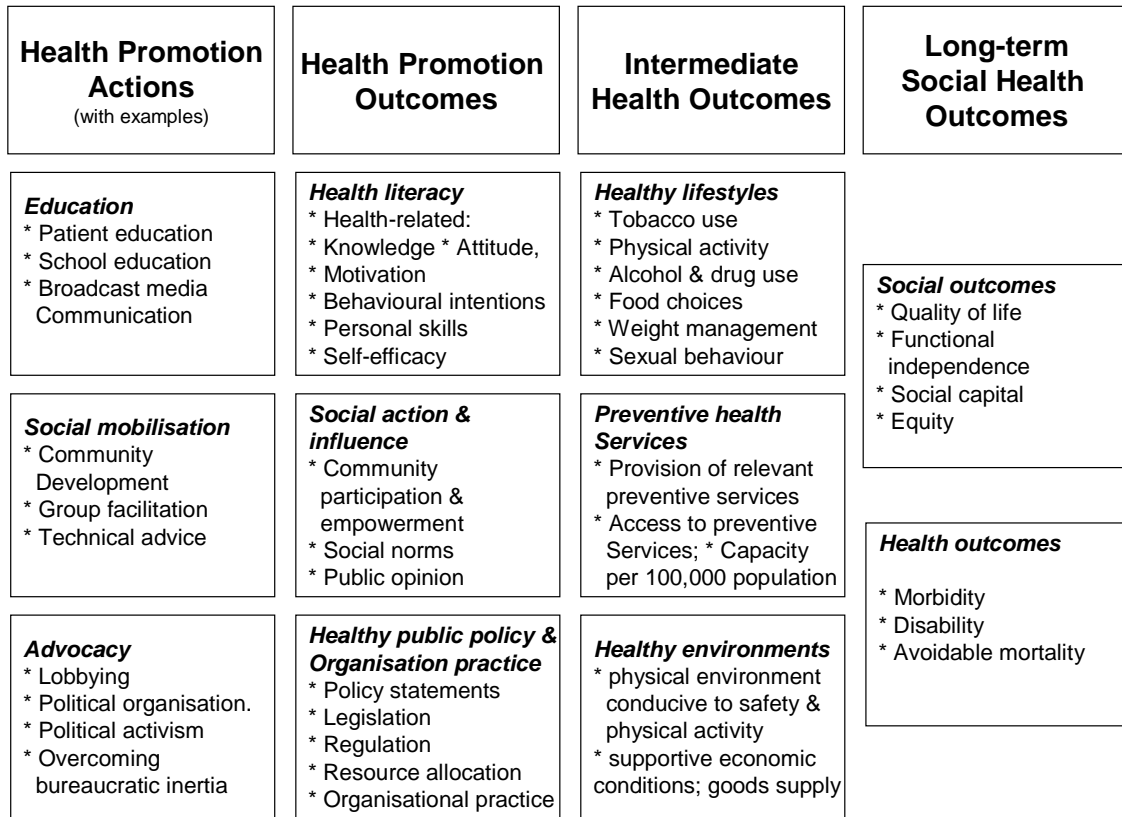


Figure 3: Health promotion actions and outcomes (adapted from Nutbeam and Bauman 2006)

A comprehensive population health program might consist of multiple interventions targeted at the achievement of different health promotion outcomes. Figure 3 provides an overview of the relationship between the process of health promotion (described in the model as *health promotion actions*) and the different types of impacts and outcomes that these interventions would be likely to produce. The Figure also illustrates the linkages of health promotion actions and outcomes over the medium to long term and across a range of strategies. Intermediate health outcomes represent the determinants of the health and social outcomes. These include personal behaviours that provide protection from disease or injury (such as physical activity) or increased risk of ill health (such as tobacco smoking) and are represented as *healthy lifestyles* in the model. The physical environment can limit access to facilities, or represent a direct hazard to the physical safety of people; economic and social conditions can limit people's participation in society. These determinants are represented in the model as *healthy environments*. Healthy environments are largely determined by *healthy public policy* and *organisational practices*. *Health promotion outcomes* refer to modifiable personal, social and environmental factors which are a means to changing the determinants of health (the intermediate health outcomes).

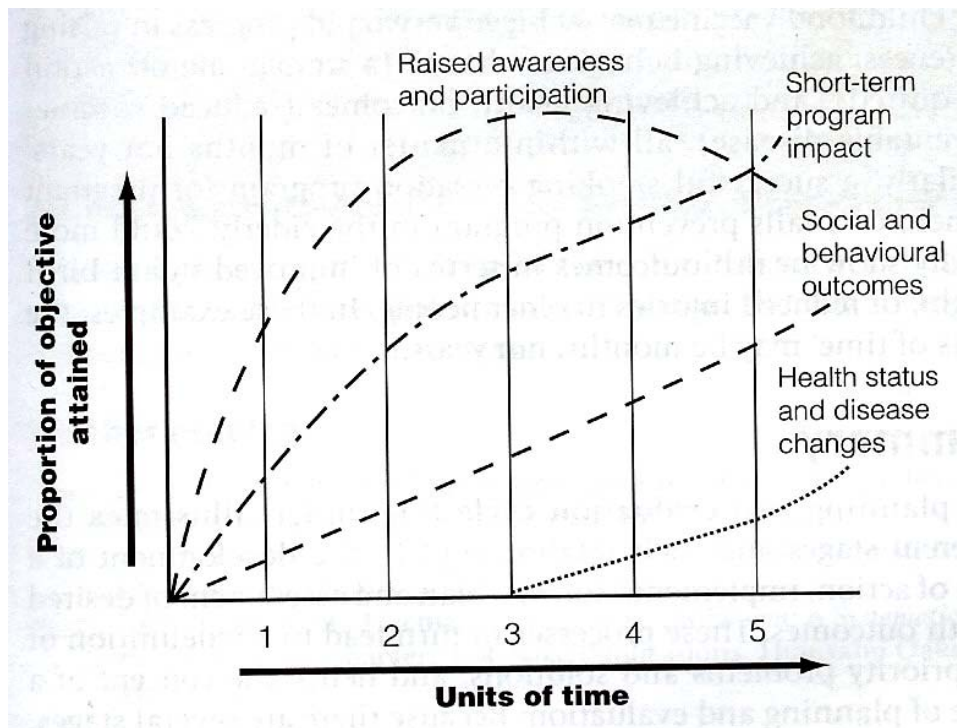


Figure 4: Time lag between population health programs and behavioural/health outcomes

The population health approach is predicated on the achievement of small changes across large numbers of people and/or environments and programs are available to achieve this. A good example is the recently published analysis of cardiovascular risk factor changes in England and Wales between 1981 and 2000 where quite modest reductions in major risk factors led to gains in life-years four times higher than did cardiological treatments. Figure 4 shows how a comprehensive set of health promotion strategies may produce different outcomes over a period of time. The model was originally developed to show a likely progress over a five-year period for community-based heart disease prevention programs. For coronary heart disease prevention progress might be expected to unfold as follows:

- **After one year**, program impact would be shown in terms of increased community awareness and participation in interventions;
- **After three years**, progress would be shown by achievements of short-term program impacts; and
- **After five years**, major progress in intermediate outcomes would be shown with early impacts on disease outcomes also observable.

The interpretation of the “units of time” in Figure 4 depends upon the particular public health issue being addressed. As the originators of the model point out, an intensive public education program to promote the uptake of a new childhood vaccine might achieve very rapid progress in raised awareness and behaviour change as well as achieving health outcomes (reduced vaccine preventable disease) within a matter of months rather than years. Similarly a smoking cessation program for pregnant women or falls prevention program for an elderly population, could show more rapid health outcomes in terms of improved infant birthweight and reduced injuries amongst older people respectively. In these examples the units of time would be more likely to be months rather than years.

B

Technical Document and Compendium of Supporting Evidence.

Executive Summary

This paper was commissioned mid-2007 on behalf of the NSW Health Senior Executive Advisory Board (SEAB) and within the context of the NSW Health Reinvestment Strategy. The terms of reference required a review of strategies and support factors shown to be effective in changing behaviour at the population level.

Research literature on behavioural change and health promotion indicates that it is difficult to maintain health behavioural change over time; relapse rates as high as 80% have been reported in studies of lifestyle modification such as weight loss and increased physical activity. Some research is now beginning to address the question of 'maintenance' or 'adherence' but more is needed. However the population health approach is predicated on the achievement of *small changes across large numbers* of people and/or environments. Programs are available to achieve this; the background review for this paper found substantial evidence from systematic reviews for effective programs in areas as broad as injury prevention, drug and alcohol, prevention of HIV and AIDS, tobacco control, public health nutrition and healthy weight interventions, physical activity promotion, tailored approaches and emerging technologies, as well as some limited evidence for the effectiveness of programs for culturally and linguistically diverse, Indigenous, disadvantaged and high risk populations.

A typical definition of primary prevention involves strategies targeting asymptomatic or healthy populations – and aiming to keep them that way; it is noted here, however, that a significant proportion of middle- and older-aged populations in Australia already have one or more risk factors for disease so that it is increasingly likely that lifestyle/behavioural change programs will need to focus on *populations with some existing risk factor(s)*. Pre-diabetes (or Impaired Glucose Tolerance) is a good example: almost one in four Australians aged 25 years and over has diabetes or a condition of impaired glucose metabolism (pre-diabetes). Preventive interventions for pre-diabetes are available and have been shown conclusively in trials to be capable of preventing approximately two-thirds of the otherwise inevitable progression to full type 2 diabetes.

In terms of common success factors across effective population health programs the 20 years of evidence since the publication of the Ottawa Charter have in general increasingly confirmed the basic tenets of that Charter - namely, that comprehensive approaches are required to deliver and sustain population health behaviour change. Analysis of the findings from the literature review of population health behaviour change and from case studies allows a cautious suggestion of the following possible principles for success:

1. Implementing comprehensive strategies (concurrent or sequential packaging of multiple component interventions or programs to work together in synergistic or mutually reinforcing ways) is more effective than implementing individual strategies in isolation. These strategies can include regulation, education (including mass media campaigns, Internet and telecommunication), personal goal-setting and behavioural monitoring, motivational techniques and social support, individual or group counselling, brief interventions by general practitioners and health professionals, partnerships, community capacity building, environmental change, use of signs/cues at points of health decision-making and population or community-based coordinated programs. A rapid review of evidence for this briefing paper provided support for the adoption of comprehensive approaches in injury prevention, tobacco control, physical activity promotion and HIV prevention.
2. Settings-based approaches represent one way in which a comprehensive approach to strategies may be integrated for delivery; evidence reviewed provided support for the effectiveness of settings-based approaches in Schools, at Home, through Primary Care, in Hospitals and in Pharmacies. Some doubts remain about the effectiveness and cost-effectiveness of the Workplace as a useful setting for intervention. More convincing evaluation data are needed before major investments could be recommended.
3. Interventions and programs are most likely to succeed if they are based on a clear understanding of target behaviours and the environmental context. There is an important role here for formative research (both qualitative and quantitative) noting that facilitators and barriers are likely to be multifaceted and to occur at a number of interrelated levels;
4. The issue(s) targeted for intervention must be clearly defined at the outset, so that antecedents, determinants and supporting mechanisms can be defined, suggesting points for intervention and strategies for initial and sustainable change; well established planning models exist which can incorporate these factors for the specific contexts such as the Area Health Services of NSW.
5. The target population's readiness to change is an important factor at both individual and organisational levels. There is accumulating evidence across behaviours such as smoking, nutrition, physical activity that tailoring (or matching) programs and interventions to better suit the characteristics of the target audience is a predictor of more positive outcomes.
6. Interventions delivered through means other than face-to-face media, such as print, telephone, or the Internet have been shown to be effective with short-term behaviour change, and increasing evidence indicates that these approaches may

be effective in the longer term. Because these types of interventions rely on little or no face-to-face contact, they hold great future promise of achieving good reach and favourable cost-effectiveness benchmarks.

7. The timeframe required for population health behavioural change to become evident depends on the particular public health issue being addressed. A comprehensive community based coronary heart disease prevention program could require 5 years to show major progress in intermediate outcomes (risk factors). By contrast an intensive public education program to promote the uptake of a new childhood vaccine might achieve very rapid progress in raising awareness, prompting behaviour change as well as achieving health outcomes (reduced vaccine preventable disease) within a matter of months rather than years. Limitations in the evidence make a global assessment of the required intensity and duration of programs very tentative, however in general terms the greater the intensity and duration of interventions, the greater is the likelihood of success.
8. There is a dearth of research on effective strategies for special populations, and especially so for Aboriginal and Torres Strait Islander Peoples. Effective programs from overseas for rural and Indigenous populations have been reported with the caveat that their findings may not always necessarily translate for an Australian context. Telehealth-, pharmacy- and worksite-based interventions hold promise for rural and remote areas. Best practice principles for Aboriginal Health Promotion have been published and should inform practice; a few individual studies of programs implemented for Indigenous Australians are noted. Promising practices include the use of pre-existing community structures, the use of community educators and lay people to lead interventions and 'tailoring' interventions culturally as well as by behavioural stage to achieve better outcomes.
9. "Absence of evidence is not evidence of absence"; the fact that there is a dearth of evidence in some areas of population health should not be mistakenly interpreted as evidence that these programs do not work. Rather, there is a pressing need for well designed whole-of-community and multi-strategic programs, delivered and evaluated in the 'real-world' conditions of local Area Health Services.
10. For Area Health Services in New South Wales (NSW) the fact that evidence indicates that comprehensive strategies appear to be required for the delivery of significant sustainable population health behaviour change does not necessarily imply that it should fall to an Area Health Service to fund *all* the components of those comprehensive strategies. Key questions are, which strategies are best funded and implemented at Area Health Service level? Which are best funded and implemented at State or Federal levels? Whilst it is possible to conceive of various models whereby an Area Health Service, properly resourced, might take on a Statewide strategic leadership role, in general terms it is helpful to distinguish

typical roles for Federal, State and Area level within the implementation of a comprehensive strategic approach.

Introduction and Methods

This review paper was commissioned mid-year 2007 on behalf of the NSW Health Senior Executive Advisory Board (SEAB) and within the context of the NSW Health Reinvestment Strategy. The terms of reference required a review of strategies and support factors shown to be effective in changing behaviour at the population level. The review was to be based on published evidence using example/s of previous successful population health interventions. Length of investment, the time lag between knowledge and behaviour change and strategies required to reinforce the change were to be assessed and any common success factors across effective population health programs reported. Published studies were identified from searches of electronic databases including MEDLINE, PubMed, Cochrane Database of Systematic Reviews, The Evidence for Policy and Practice Information and Coordinating Centre (EPPI Centre) Evidence Library as well as the databases and publications of the Centre for Reviews and Dissemination (CRD) at the University of York (UK). Reference lists of previous reviews, retrieved articles and key evaluation /strategy documents were also examined. Keywords used in the searches were disease prevention and CVD, health promotion, preventive services, primary prevention, risk factors; behaviour change, tailoring and sexual behaviour, HIV infection, AIDS, health behaviour, health knowledge, attitudes, practice; strategy evaluation, effectiveness, cost benefit analysis, research, randomised controlled trials, clinical trials. Initial searches were undertaken from 1995 onwards, resulting in over 6000 references. After removal of duplicates and screening, this number was reduced to some 500. Given the availability of published Cochrane systematic reviews in many of the areas of interest these higher quality findings predominate in the final 95 studies chosen for inclusion as those most relevant in meeting the terms of reference. In addition thanks are due to Several Branch managers of NSW Health who suggested case study material and/or additional studies.

Results – General findings across population health

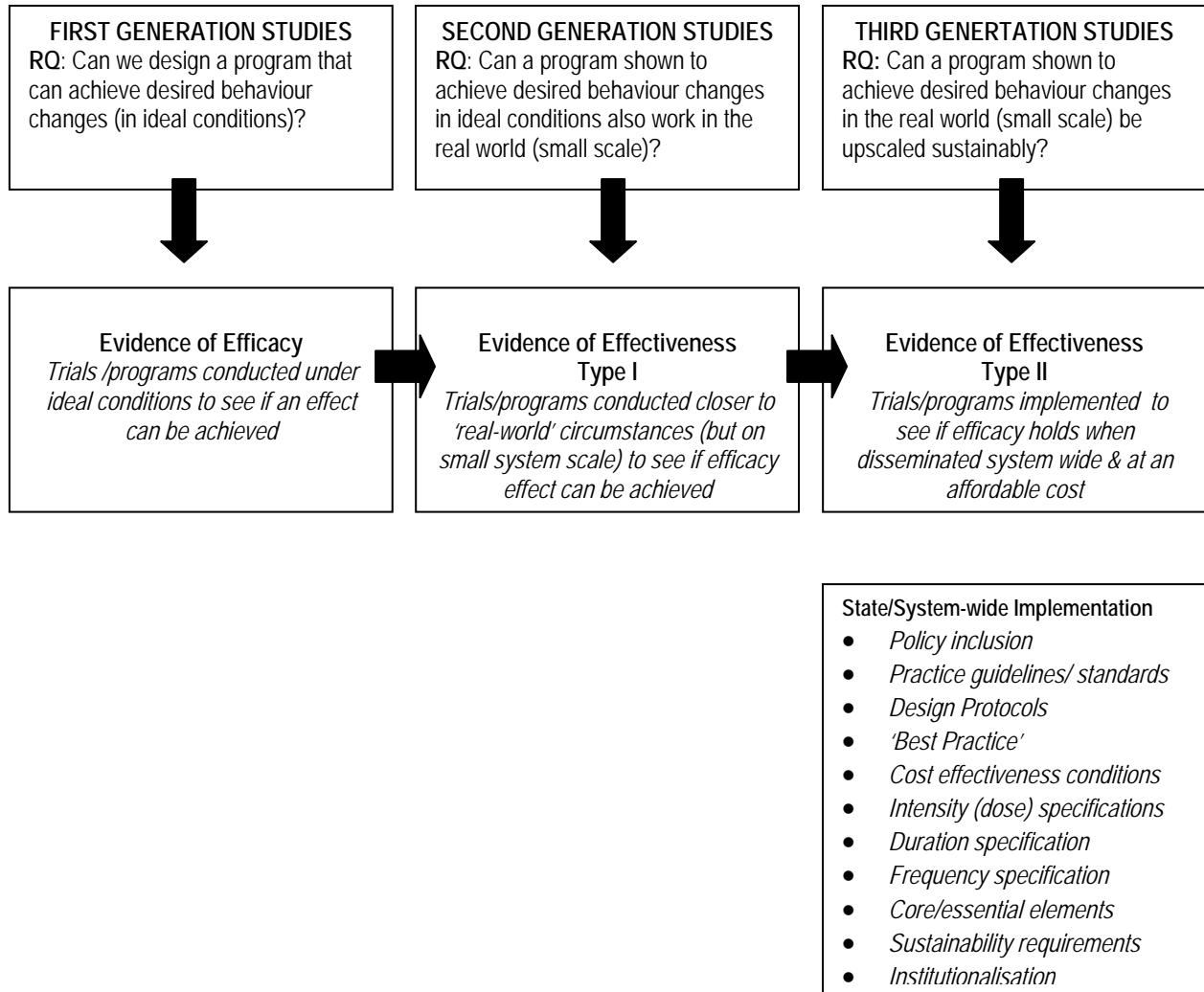


Figure 1: The evolution of evidence generation in population health behaviour change programs and interventions.

Limitations in the evidence make a global assessment of the required intensity and duration of programs very tentative, however in general the greater the intensity and duration of interventions, the greater is the likelihood of success. Figure 1 illustrates the evolution of evidence for population health behaviour change programs and interventions from ‘first generation’ (basic efficacy) through ‘second generation’ (effectiveness – small scale) and on to ‘third generation’ (diffusion and sustainability). Most of the available evidence is limited to first or second generation categories. In

healthy lifestyle/behavioural intervention studies, rarely are outcomes measured more than one year after baseline, and fewer assess outcomes after a period of no intervention. More typically, maintenance periods include continuation of the intervention or a tapered, less-intensive version of the initial program. Once interventionists, and the incentives they provide, are no longer salient, behaviours tend to decline. The implications of this are that conclusions about the necessary intensity and duration of interventions required to deliver meaningful change in population health behaviours are difficult to formulate and will remain so until more results of larger 'third generation' studies are confirmed. A further challenge is the well documented difficulty in configuring suitable evaluation designs for larger community trials when the interventions have been so well disseminated in the community (including the control or comparison groups) that it has been difficult to show overall impacts even when the discrete interventions have evaluated favourably.^{1, 2, 3, 4, 5, 6}

Nonetheless in the twenty years since the publication of the Ottawa Charter for Health Promotion (1987), ten years since the Jakarta Declaration on Health Promotion (1997) and two years since the adoption of the Bangkok Charter for Health Promotion (2005) the evidence serves to underscore the importance of the original tenets put forward in Ottawa – namely that desired health behaviour changes need to be made possible to do in the first place and thereafter need to be facilitated to become even more so. This has become enshrined in the health promotion principle of “making healthy choices easier choices”. (see Appendix 1)

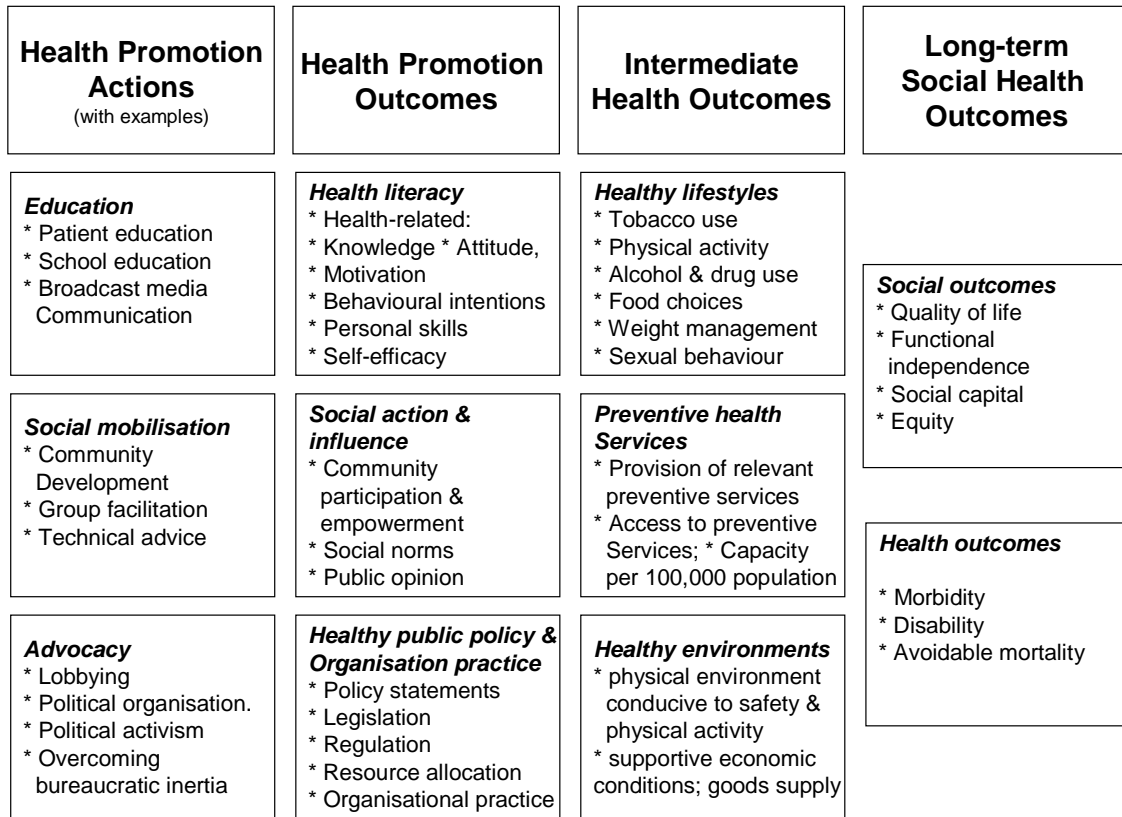


Figure 2 Health promotion actions and outcomes (adapted from Nutbeam and Bauman 2006)¹

A comprehensive population health program might consist of multiple interventions targeted at the achievement of different health promotion outcomes. Figure 2 provides an overview of the relationship between the process of health promotion (described in the model as *health promotion actions*) and the different types of impacts and outcomes that these interventions would be likely to produce.⁷

The Figure also illustrates the linkages of health promotion actions and outcomes over the medium to long term and across a range of strategies. Intermediate health outcomes represent the determinants of the health and social outcomes. These include personal behaviours that provide protection from disease or injury (such as physical activity) or increased risk of ill health (such as tobacco smoking) and are represented as *healthy lifestyles* in the model. The physical environment can limit access to facilities, or represent a direct hazard to the physical safety of people;

¹ Nutbeam, D., Bauman, A. (2006) Evaluation in a Nutshell: A practical guide to the evaluation of health promotion programs.

economic and social conditions can limit people's participation in society. These determinants are represented in the model as *healthy environments*. Healthy environments are largely determined by *healthy public policy* and *organisational practices*. *Health promotion outcomes* refer to modifiable personal, social and environmental factors which are a means to changing the determinants of health (the intermediate health outcomes).

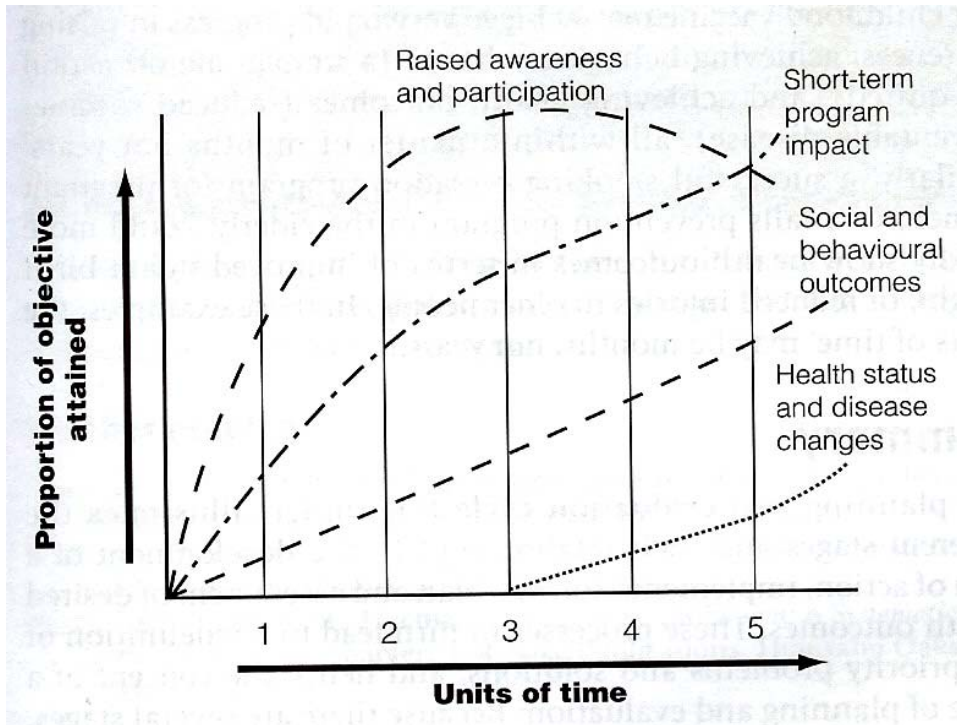


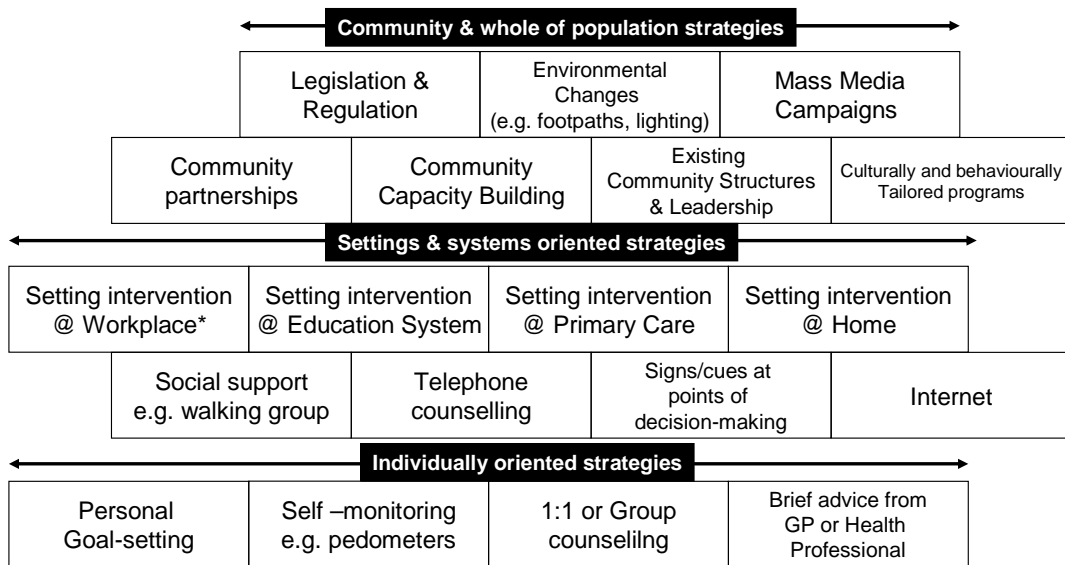
Figure 3 Time lag between population health programs and behavioural/health outcomes

The population health approach is predicated on the achievement of small changes across large numbers of people and/or environments and programs are available to achieve this. A good example is the recently published analysis of cardiovascular risk factor changes in England and Wales between 1981 and 2000 where quite modest reductions in major risk factors led to gains in life-years four times higher than did cardiological treatments.⁸ Figure 3 shows how a comprehensive set of health promotion strategies may produce different outcomes over a period of time. The model was originally developed to show a likely progress over a five-year period for community-based heart disease prevention programs. For coronary heart disease prevention progress might be expected to unfold as follows:

- **After one year**, program impact would be shown in terms of increased community awareness and participation in interventions;

- **after three years**, progress would be shown by achievements of short-term program impacts; and
- **after five years**, major progress in intermediate outcomes would be shown with early impacts on disease outcomes also observable.

The interpretation of the “units of time” in Figure 3 depends upon the particular public health issue being addressed. As the originators of the model point out, an intensive public education program to promote the uptake of a new childhood vaccine might achieve very rapid progress in raised awareness, and, behaviour change as well as achieving health outcomes (reduced vaccine preventable disease) within a matter of months rather than years. Similarly a smoking cessation program for pregnant women or falls prevention program for an elderly population, could show more rapid health outcomes in terms of improved infant birthweight and reduced injuries amongst older people respectively. In these examples the units of time would be more likely to be months rather than years.



Evidence-based building blocks for *Comprehensive Strategies* (concurrent or sequential packaging of multiple component interventions or programs to work together synergistically). Each strategy has supportive evidence for which strength is variable by specific health issues; [e.g. for workplace tobacco control policies and NRT are primarily recommended].

Figure 4 Evidence-based building blocks for Comprehensive Strategies

Figure 4 depicts the main findings from the background evidence review. The strategy building blocks have for the most part Cochrane Systematic Review evidence to support the view that they represent effective population health behaviour change strategies (the exception is for Rural and Special populations where less evidence is available). It should be noted that the evidence which supports these (generic) strategies applying across the breadth of population health is variable by health issue. For example, current evidence on workplace tobacco control does not support extensive strategies beyond basic smokefree workplace policy and access to smoking cessation services.⁹

Results: Specific findings for selected areas of population health

INJURY PREVENTION AND CONTROL

WHO 'Safe Communities' model for the prevention of injury in whole populations

The emphasis of the approach is on collaboration, partnership and community capacity building to reduce the incidence of injury and promote injury-reducing behaviours. More than 80 communities throughout the world have been designated as 'Safe Communities', in countries as diverse as Sweden, Australia, China, South Africa and the Czech Republic. Programs target high-risk groups or environments and promote safety for vulnerable groups. They range from bicycle helmet promotion in Sweden to anti-violence programs in South Africa, traffic safety initiatives in South Korea and Indigenous community injury prevention programs in New Zealand. A systematic review found that the overall results of the model were positive.¹⁰

Injury and young people

A systematic review has focussed on prevention of injury among young people aged 12-24. A broad-ranging review (with a UK policy orientation), covering topics as diverse as drugs, alcohol, transport and sport, it concluded that, while there is a large literature on a 'culture of risk-taking' among young people, the evidence to

Case Study: Preventing child traffic injuries in Norway and Sweden

The intervention (a)

Reports containing information about traffic injuries were distributed quarterly to all households (in Harstad, Norway). The information focussed on victim stories, statistics on medical data and the location of the accidents.

The behaviour change strategies used

Dissemination of relevant information, targeted specifically to a local community with impactful 'personalised' information about the effects of traffic injuries and specific locations.

The results

56.0% of respondents in Harstad reported having acquired information, or good advice, about traffic safety from the reports. From the first 2 years (mean rate 116.1/10,000 person years), to the last 2 years over a ten-year program there was a significant 59% [CI: 42% to 71%] reduction of traffic injury rates among Harstad children. Overall rates for all ages decreased 37% [CI:47% to 24%]

The intervention (b)

In Sweden introduction of an injury prevention program based on the WHO Safe Community model.

The behaviour change strategies used

The emphasis of the Safe Communities approach is on collaboration, partnership and community capacity building to reduce the incidence of injury and promote injury-reducing behaviours (e.g. promotion of cycle-helmet wearing).

The results

The Safe Communities model significantly reduced the relative risk for child injury. Total relative risk of child injury was reduced by a quarter [odds ratio 0.74; 95% CI 0.68 to 0.81]; relative risk of moderately severe injury was almost halved [odds ratio 0.49; 95% CI 0.41 to

Table 1 Case Study: Preventing child traffic injuries in Norway¹² and Sweden¹³

support the view that this translates into significant numbers of injuries is limited. It challenges the idea that 'risk-taking' is a helpful umbrella term to describe the motivations underlying a range of activities and suggests that a move away from individual behavioural explanations towards a focus on structures and material resources is likely to be a much more productive approach.¹¹

Promoting bicycle helmet use to reduce head injury: legislative and non-legislative approaches

A recent systematic review concludes that bicycle helmet legislation appears to be effective in increasing helmet use and decreasing head injury rates in the populations for which it is implemented,¹⁴ whilst a systematic review of non-legislative behavioural interventions to promote helmet wearing by children found that community-based programs that provide free helmets alongside an educational component increased helmet wearing [OR 2.30, 95% CI 1.37 to 3.85].¹⁵ Impact data are more impressive for community-based studies [OR 4.30, 95% CI 2.24 to 8.25] and those providing free helmets [OR 4.35, 95% CI 2.13 to 8.89] than for those providing subsidised helmets [OR 2.02, 95% CI 0.98 to 4.17] and for those set in schools [OR 1.82, 95% CI 0.94 to 3.52].

Pool fencing to prevent drowning: a legislative approach

A systematic review indicates that pool fencing significantly reduces the risk of drowning.¹⁶ The OR for the risk of drowning or near drowning in a fenced pool compared to an unfenced pool is 0.27 [95% CI 0.16 to 0.47]. Isolation fencing (enclosing pool only) is superior to perimeter fencing (enclosing property and pool); the OR for the risk of drowning in a pool with isolation fencing compared to a pool with three-sided fencing is 0.17 [95% CI 0.07 to 0.44]. The review concluded that pool fences should have a dynamic and secure gate and should isolate the pool from the house (that is, four-sided fencing). Legislation should require isolation fencing with secure, self-latching gates for all pools, public, semi-public and private. Legislation should require fencing of both newly constructed and existing pools and include enforcement provisions, in order to be effective.

Preventing injurious falls among older people: population-based strategies

A systematic review has noted that effective interventions are available to prevent falls and include increased physical activity and hip protectors.¹⁷ Strategies targeted at fall prevention include regulation, education, environmental change and population or community-based coordinated programs. A population-based intervention program shares ownership of the injury problem with the whole community, experts and community members. Joint responsibility is taken for determining priorities and appropriate interventions are widely promoted. Significant decreases or downward trends in fall-related injuries were reported in reviewed studies (Australia, Denmark, Norway, and Sweden, duration up to eight years) with the relative reduction in fall-

related injuries ranging from 6 to 33%. Three of the studies were based on the World Health Organisation Safe Communities model of safety and injury prevention

School-based violence prevention programs

School-based secondary prevention programs to reduce aggressive behaviour appear to improve young peoples' behaviour.¹⁸ Benefits can be achieved in both primary and secondary school age groups and in both mixed sex groups and boys-only groups. Further research is required to establish whether such programs reduce the incidence of violent injuries or if the benefits identified can be maintained beyond 12 months. Aggressive behaviour was significantly reduced in intervention groups compared to no intervention groups immediately post intervention in 34 trials with data [Standardised Mean Difference -0.41; 95% CI -0.56 to -0.26]. The positive effect was maintained in the seven studies reporting 12 month follow-up [SMD = -0.40, 95% CI -0.73 to -0.06].

DRUGS AND ALCOHOL

Alcohol: brief interventions in primary care

One approach to reduce alcohol consumption levels in a community is to provide a brief intervention in primary care over one to four sessions. This is provided by healthcare workers such as general physicians, nurses or psychologists. In general practice, patients are routinely asked about alcohol consumption during registration, general health checks and as part of health screening (using a questionnaire). They tend not to be seeking help for alcohol problems when presenting. The intervention they are offered includes feedback on alcohol use and harms, identification of high risk situations for drinking and coping strategies, increased motivation and the development of a personal plan to reduce drinking. It takes place within the time-frame of a standard consultation, 5 to 15 minutes for a general physician, longer for a nurse. A systematic review found that brief interventions consistently reduced alcohol consumption with an average drop of four standard drinks per week.¹⁹ At one year's follow up (17 trials), people who had received the brief intervention drank less alcohol (a difference of 6 to 25 grams per week, mean 41 grams). For men (some 70% of participants), the benefit of brief intervention was a reduction of 57 grams/week, range 25 to 89 grams (six trials). The benefit was unproven for women.

Alcohol: working with drink driving offenders

An ignition interlock device is part of a multi-dimensional program aimed at reducing recidivism in convicted drink drivers. To operate a vehicle equipped with an ignition interlock device, the driver must first provide a breath specimen. A systematic review of this type of intervention concludes that it is effective while the device is installed in the vehicle [RR 0.36, 95% CI 0.21 to 0.63].²⁰ There is currently no evidence available for effectiveness of the program continuing once the device has been removed however.

School-based drug prevention programs

School programs can be designed to provide knowledge about the effects of drugs on the body and psychological effects, as a way to build negative attitudes toward drugs; to build individual self-esteem and self-awareness, to work on psychological factors that may place people at risk of use; to teach refusal and social life skills; and to encourage alternative activities to drug use, which instill control abilities. The systematic review process found that skills-based programs appear to be effective in deterring early-stage drug use.²¹ Programs focusing on knowledge improved drug knowledge to some degree; social skills programs were more widely used and effectively increased drug knowledge, decision-making skills, self-esteem, resistance to peer pressure, and drug use including marijuana (RR 0.8) and hard drugs (heroin) (RR 0.5). The programs were mainly interactive and involved external educators. Effects of the interventions on assertiveness, attitudes towards drugs, and intention to use drugs were broadly the same across studies (most of which are North American).

HIV AND AIDS

For prevention of HIV and AIDS in NSW two main streams of prevention activity are particularly noteworthy for their effectiveness: (i) prevention programs promoting sexual behaviour change among gay men in response to HIV; and (ii) Needle and Syringe Programs and associated education to promote and provide the means for utilisation of new injecting equipment by injecting drug users in response to HIV.²² NSW produced the first detailed HIV and AIDS care and treatment plan in Australia, and a specialist sexual health service was established in each Area Health Service. This recognised the important role of such services in the prevention of HIV. Legislative reforms in NSW are a noteworthy contribution to the documented success of HIV and AIDS prevention in that State²³:

- The decriminalisation of homosexuality in June 1984;
- HIV and AIDS becoming notifiable conditions in August 1984;
- The requirement for informing sexual partners of infectious status;
- The protection of confidentiality in the event of a positive HIV test result;
- The management of infected people whose behaviour may place others at risk of infection;
- The prohibition of vilification, and expansion of the NSW Anti-Discrimination Act to protect against discrimination on the grounds of HIV infection or sexuality;
- The decriminalisation of prostitution; and
- The establishment of the Needle and Syringe Program in November 1987.

A systematic review of population-based interventions for reducing sexually transmitted infections, including HIV infection, found limited evidence from randomised controlled trials for sexually transmitted infection (STI) control as an

effective HIV prevention strategy.²⁴ Improved STI treatment services have been shown to reduce HIV incidence in an environment characterised by an emerging HIV epidemic (low and slowly rising prevalence), where STI treatment services are poor and where STIs are highly prevalent. There is no evidence for substantial benefit from treatment of all community members.

An earlier review of interventions to prevent transmission of STIs and HIV in heterosexual men found (in eligible studies) that most interventions targeted specific groups of men (e.g., those attending STI clinics) rather than general populations. Few were conducted with men alone, and most focused on behavioural and social psychological rather than morbidity outcomes. The successful programs included:

- On-site individual counselling and HIV testing;
- Mass communications regarding risk reduction; and
- Multiple-component motivation and skills education in STI clinics.²⁵

A 2004 meta-analysis examined the issue of HIV and health promotion²⁶ found that counselling or workshops based on cognitive-behavioural techniques for men who have sex with men (MSM) who are at high risk are effective compared with standard counselling in reducing the number of men reporting sero-discordant or unknown status unprotected anal intercourse (sdUAI). However, there was some risk of increased incidence of sexually transmitted infections. No evidence of effect was found for any of the evaluated interventions on: casual UAI; knowledge or awareness; attitudes or beliefs; HIV testing; or practical skills. The review concluded that policy-makers should consider implementing counselling based on cognitive-behavioural techniques, or workshops using these techniques, in place of standard counselling for MSM at high risk of engaging in UAI with partners of unknown or sero-discordant HIV status. These interventions should be combined with addressing the reduction of STIs and there should be sound evaluation of impact on sdUAI and STI incidence

A 2002 Cochrane systematic review found that behavioural interventions can reduce risk of HIV infection in MSM populations, but that more research is needed to identify the best strategies. A summary measure of intervention effects on reducing unprotected sex was favourable (OR = 0.73) and statistically significant (CI, 0.60 to 0.88), corresponding to a 23% reduction in the proportion of men engaging in unprotected sex. Effects were homogeneous among studies, but were slightly more favourable among:

- Community-level interventions;
- Interventions that served populations in their 20s rather than their 30s; and
- Programs that promoted interpersonal skills.²⁷

A systematic review was conducted to assess the effect of mass media interventions and the most effective form of mass media intervention, in relation to changes in HIV testing, compared with a control group or with pre-intervention levels.²⁸ Mass media

interventions for promotion of HIV testing showed significant immediate and overall effect. No long-term effects were seen. There was no significant impact of detecting seropositive status after mass media intervention for promoting HIV testing, and this finding was limited to a small number of studies. Further research is required to identify possible effects on seropositivity status after mass media intervention for promotion of HIV testing among high-risk groups in epidemic countries.

An analysis has recently been undertaken to inform the design of HIV screening programs by identifying combinations of screening frequency and HIV prevalence and incidence at which screening is cost-effective.²⁹ The authors concluded (for a USA context) that routine, rapid HIV testing is recommended for all adults except in settings where there is evidence that the prevalence of undiagnosed HIV infection is below 0.2%. Analytic work included a cost-effectiveness analysis linking simulation models of HIV screening to published reports of HIV transmission risk, with and without antiretroviral therapy. Under moderately favourable assumptions regarding the effect of HIV patient care on secondary transmission, routine HIV screening in a population with HIV prevalence of 1.0% and annual incidence of 0.12% had incremental cost-effectiveness ratios of 30,800 dollars/quality adjusted life year (QALY) (one-time screening), 32,300 dollars/QALY (screening every five years), and 55,500 dollars/QALY (screening every three years). In settings with HIV prevalence of 0.10% and annual incidence of 0.014%, one-time screening produced cost-effectiveness ratios of 60,700 dollars/QALY. Sensitivity analysis showed that cost-effectiveness of screening policies varied within a narrow range as assumptions about the effect of screening on secondary transmission varied from favourable to unfavourable. Assuming moderately favourable effects of antiretroviral therapy on transmission, cost-effectiveness ratios remained below 50,000 dollars/QALY in settings with HIV prevalence as low as 0.20% for routine HIV screening on a one-time basis and at prevalence as low as 0.45% and annual incidence as low as 0.0075% for screening every five years.

A 2005 study assessed the costs and health effects of a range of interventions for preventing the spread of HIV and for treating people with HIV/AIDS in the context of the millennium development goal for combating HIV/AIDS.³⁰ For a developing country context, reducing HIV transmission could be done most efficiently through mass media campaigns, interventions for sex workers and treatment of sexually transmitted infections where resources are most scarce. However, prevention of mother to child transmission, voluntary counselling and testing, and school based education would yield further health gains at higher budget levels and would be regarded as cost effective or highly cost effective based on standard international benchmarks.

TOBACCO CONTROL

Nicotine Replacement Therapy

All forms of nicotine replacement therapy (NRT) can help people quit smoking, almost doubling long term success rates.³¹ NRT aims to reduce withdrawal symptoms associated with stopping smoking by replacing nicotine in the blood. NRT is available as chewing gum, patches for the skin, nose spray, inhalers, and tablets. A systematic review of trials found that all these forms of NRT made it more likely that a person's attempt to quit smoking would succeed. There is no evidence that one form of NRT is better than any other and NRT works with or without additional counselling. The odds ratio (OR) for abstinence with NRT compared to control was 1.77 (95% CI: 1.66 to 1.88). The ORs for the different forms of NRT were 1.66 (95% CI: 1.52 to 1.81) for gum, 1.81 (95% CI: 1.63 to 2.02) for patches, 2.35 (95% CI: 1.63 to 3.38) for nasal spray, 2.14 (95% CI: 1.44 to 3.18) for inhaled nicotine and 2.05 (95% CI: 1.62 to 2.59) for nicotine sublingual tablet/lozenge. These odds were largely independent of the duration of therapy, the intensity of additional support provided or the setting in which the NRT was offered.

Group-based programs for smoking cessation

A systematic review concludes that group programs are more effective for helping people to stop smoking than being given self-help materials without face-to-face instruction.³² The chances of quitting are more than doubled. It is unclear whether groups are better than individual counselling or other advice, but they are more effective than no treatment. Not all smokers making a quit attempt want to attend group meetings, but for those who do they are likely to be helpful.

Cessation advice delivered by nurses

A systematic review of trials found that advice and support from nursing staff could increase people's success in quitting smoking, especially in a hospital setting.³³ Similar advice and encouragement given by nurses at health checks or prevention activities may be less effective, but may still have some impact. Twenty studies comparing a nursing intervention to a control or to usual care found the intervention to significantly increase the odds of quitting [1.47, 95% CI 1.29 to 1.68]. The results indicate the potential benefits of smoking cessation advice and/or counselling given by nurses to patients, with reasonable evidence that interventions can be effective. The challenge will be to incorporate smoking behaviour monitoring and smoking cessation interventions as part of standard practice, so that all patients are given an opportunity to be asked about their tobacco use and to be given advice and/or counselling to quit along with reinforcement and follow-up. A review of interventions to change the (professional) behaviour of health professionals was published in 2004.³⁴ The author concluded that: (i) few studies have marked change in professional practice over time, to determine the sustainability of change; (ii) research from other behavioural change literature shows that initial change is difficult to maintain with

reported relapse rates as high as 80%; (iii) interventions most likely to succeed are based on a clear understanding of target behaviours and the environmental context. Facilitators and barriers are usually multifaceted and occur at a number of interrelated levels; (iv) the issue targeted for intervention must be clearly defined at the outset, so that antecedents, determinants and supporting mechanisms can be defined, suggesting points for intervention and strategies for initial and sustainable change; (v) the target population's readiness to change is an important factor at both an individual and organisational level; and (vi) in most cases, a combination of different interventions will be needed to achieve lasting change.

Individual behavioural counselling for smoking cessation

Individual counselling is commonly used to help people who are trying to quit smoking. A systematic review looked at trials of counselling by a trained therapist providing one or more face-to-face sessions, separate from medical care. All the trials involved sessions of more than 10 minutes, with most also including further telephone contact for support. The review found that individual counselling could help smokers quit, but there was not enough evidence about whether more intensive counselling was better. Individual counselling was more effective than control; the odds ratio for successful smoking cessation was 1.56 [95% CI 1.32 to 1.84)].³⁵

Telephone counselling for smoking cessation

Proactive telephone counselling helps smokers interested in quitting.³⁶ There is evidence of a dose response; one or two brief calls are less likely to provide a measurable benefit. Three or more calls increases the odds of quitting compared to a minimal intervention such as providing standard self-help materials, brief advice, or compared to pharmacotherapy alone. Telephone quitlines provide an important route of access to support for smokers, and call-back counselling enhances their usefulness.

Prevention of smoking in public places

Different methods are used to try and stop people smoking in public places such as hospitals and workplaces. A (quite US focused) systematic review looked at trials of different strategies, and found that simply putting up signs of a "no smoking" policy does not seem to help prevent people smoking in public places. However, complete bans that have strong support from management do work. Carefully planned and resourced, multi-component strategies effectively reduced smoking within public places. Less comprehensive strategies were less effective.³⁷

Family-based programs to prevent uptake of smoking by young people

Children and adolescents' likelihood of starting to smoke may be influenced by the behaviour of their families, and it may be possible to help family members strengthen non-smoking attitudes and promote non-smoking in children and other family members. Some high quality studies show that family interventions may help to

prevent adolescent smoking. How well the program staff are trained and how well they deliver the program may be related to effectiveness, but the number of sessions in the program does not seem to make a difference.³⁸

Community-based interventions for reducing smoking among adults

Surprisingly, there is little convincing evidence from published systematic reviews that community interventions reduce smoking among adults.³⁹ Although intervention communities often showed substantial awareness of their program, this rarely led to higher quit rates. Similarly, increased knowledge of health risks, changes in attitudes to smoking, more quit attempts, and better environmental and social support for quitting were not accompanied by reductions in community smoking levels. In the best designed trials, light to moderate smokers did slightly better than heavy smokers (the US COMMIT study), and men did a little better than women (the Australian CART study), but overall smoking rates remained similar between intervention and control communities. However, experience of very successful outcomes in Australia (and in NSW in particular) with comprehensive strategic approaches including community-based support (perhaps less well articulated in other countries) should be noted (see case study).

Preventing smoking amongst young people

A systematic review found some evidence that coordinated multi-component programs can reduce smoking among young people, and do so more effectively than single strategies alone.⁴⁰

There is some support for the effectiveness of community interventions in helping prevent the uptake of smoking in young people – although it is limited. The decision to start (or continue) smoking is made within a broad social context, affected by many factors. Community interventions use coordinated, widespread, multi-component programs to try and influence people's behaviour. Community members are often involved in determining and/or implementing programs. These include age restrictions on tobacco purchase, programs for prevention of disease (like heart disease), mass media and school programs.

Mass media campaigns (television, radio, newspapers, billboards and booklets) may deter young people from starting to smoke⁴¹ but the evidence is not strong. Campaigns which had researched and developed their message to reach their target audience had a higher success rate than those which did not. Effective campaigns also lasted longer and were more intense than less successful ones. The timing and type of broadcast made a

Case Study: Tobacco control in Australia and in NSW

The behaviour change strategies used

Australia has what are perhaps the world's most advanced comprehensive tobacco control policies and programs. Because of these policies and programs, Australia has:

- The world's most expensive cigarettes, second only to Hong Kong;
- Among the world's most prominent health warnings on cigarette packets;
- A total ban on all advertising and promotion of cigarettes;
- National campaigns for tobacco control that are emulated internationally;
- Quitline services that provide advice and support to smokers trying to quit smoking;
- extensive advocacy, via news media, for tobacco control;
- Legislation that prohibits tobacco smoking in large buildings, public transport, and in restaurants;
- The widespread adoption of smoke-free homes; and
- Litigation by smokers and passive smokers against tobacco companies, which has attracted widespread media attention.

In addition NSW has

- Invested \$10 million in 2005/6 for anti-smoking advertising campaigns undertaken by the Cancer Institute NSW showing the consequences of smoking and promoting the Quitline number

The results

Between 1973 and 1984, the incidence rate of lung cancer in men rose by an average of 1.3 per cent per year, and since then has decreased by 1.9 per cent per year. In women, the incidence rate for lung cancer increased by 3.9 per cent per year between 1973 and 1993 but thereafter has remained stable, again reflecting the historical trend in smoking rates for women. Lung cancer remains the leading cause of cancer death in Australia. Death rates from coronary heart disease fell by 59 per cent in men and 55 per cent in women between 1980 and 2000, in large part because of changes in risk factors such as smoking. In NSW calls to the NSW Quitline doubled in the period 2005-6 reaching 58,000 callers; The percentage of people aged 16 years and over smoking 'daily' or 'occasionally' dropped from 20.1% in 2005 to 17.7% in 2006; the 2.4% drop represented a relative decrease of 12% which is unprecedented in Australia.

Table 2 Case Study: Tobacco control in Australia and in NSW

difference to their success, with older youths in one study preferring radio to television. Changes in attitudes, knowledge or intention to smoke did not generally seem to affect the long-term success of the campaigns.

The hospital as a setting for smoking cessation

A systematic review of trials found that programs to stop smoking delivered during hospital stays that include a one month follow-up are the most effective.⁴² Intensive intervention (inpatient contact plus follow-up for at least one month) was associated with a significantly higher quit rate compared to control [OR 1.82, 95% CI 1.49-2.22, six trials]. Interventions with less than a month of follow-up did not show evidence of significant benefit. There was no evidence to judge the effect of very brief (<20 minutes) interventions delivered only during the hospital stay. Longer interventions delivered only during the hospital stay were not significantly associated with a higher quit rate. Interventions increased quit rates irrespective of whether NRT was used, but the results for NRT were compatible with other data indicating that it further increases quit rates.

The pharmacy as a candidate setting for tobacco control

Personnel in community pharmacies can be a source of information and support for people trying to quit smoking. They may have a role because NRT, an effective cessation pharmacotherapy, is available without prescription in many countries. People also come to pharmacies with prescriptions for medications to help them quit. A systematic review of trials found some (albeit limited) evidence that training pharmacy personnel to offer counselling and record keeping services to their customers may help smokers to quit.⁴³

The workplace as a setting for tobacco control

The workplace can be an effective setting for people to stop smoking.⁹ Proven stop smoking methods, like group therapy, individual counselling and NRT, are equally effective when offered in the workplace. The evidence is less clear for self-help methods. Bans and restrictions can reduce smoking at work, although it is not clear whether they reduce overall smoking levels. Social and environmental support, competitions and incentives, and comprehensive programs do not show a clear benefit in helping smokers to quit at work. The systematic review found:

- Strong evidence that interventions directed towards individual smokers increase the likelihood of quitting smoking. These include advice from a health professional, individual and group counselling and pharmacological treatment to overcome nicotine addiction. Self-help interventions are less effective. All these interventions are effective whether offered in the workplace or elsewhere. Although people taking up these interventions are more likely to stop, the absolute numbers who quit are low;
- Limited evidence that participation in programs can be increased by competitions and incentives organised by the employer;

- Consistent evidence that workplace tobacco policies and bans can decrease cigarette consumption during the working day by smokers and exposure of non-smoking employees to environmental tobacco smoke at work, but conflicting evidence about whether they decrease prevalence of smoking or overall consumption of tobacco by smokers;
- A lack of evidence that comprehensive approaches reduce the prevalence of smoking, despite the strong theoretical rationale for their use; and
- A lack of evidence about the cost-effectiveness of workplace programs.

A recent cost effectiveness comparison concluded that smoke-free workplace policies are about 9 times more cost-effective per new nonsmoker than are free NRT programs; smoke-free workplace policies should therefore be a public health funding priority, even when the primary goal is to promote individual smoking cessation.⁴⁴

INTERVENTIONS IN HEALTHY NUTRITION AND HEALTHY WEIGHT

Promoting healthy eating amongst school-aged children

A systematic review of barriers and enablers for children's healthy eating was published in 2003.⁴⁵ The types of interventions evaluated by the studies in the review were largely school-based, and often combined learning about the health benefits of fruit and vegetables with 'hands-on' experience in the form of food preparation and taste-testing. The majority involved parents in intervention delivery, alongside teachers and health promotion practitioners. Some included environmental modification, involving for example changes to the foods provided at school. Some interventions targeted more than one outcome and aimed to increase, for example, physical activity as well. Analysis revealed that these kinds of interventions have a small but statistically significant, positive effect. Bigger effects are associated with targeted interventions for parents with risk factors for cardiovascular disease and possibly also with those interventions which do not 'dilute' their focus on fruit and vegetables by trying to promote physical activity or other forms of healthy eating (for example, reduced intake of sodium and fat) in the same intervention. There was no evidence of the effectiveness of single component interventions, such as classroom lessons alone or providing fruit-only tuck shops. Six main issues emerged from the studies of children's views: (1) children do not see it as their role to be interested in health; (2) children do not see messages about future health as personally relevant or credible; (3) fruit, vegetables and confectionery have very different meanings for children; (4) children actively seek ways to exercise their own choices with regard to food; (5) children value eating as a social occasion; and (6) children see the contradiction between what is promoted in theory and what adults provide in practice. The studies of children's views suggested that interventions should treat fruit and vegetables in different ways, and should not focus on health warnings. Interventions

which were in line with these suggestions tended to be more effective than those that were not.

Prevention of childhood obesity

A 2005 Cochrane systematic review addressed the question of obesity prevention in childhood.⁴⁶ Studies that focused on combining dietary and physical activity approaches did not significantly improve body mass index (BMI), but some studies that focused on dietary or physical activity approaches showed a small but positive impact on BMI status. Nearly all studies included resulted in some improvement in diet or physical activity. There is not enough evidence from trials to prove that any one particular program can prevent obesity in children, although comprehensive strategies to address dietary and physical activity change, together with psycho-social support and environmental change, may help. Until more robust evidence for effective interventions becomes available it is unsurprising that systematic reviews examining the question of screening for childhood obesity find that screening to identify individual children can not be justified.⁴⁷

Physical activity and dietary change for weight loss

A 2006 systematic review assessed the use of exercise as a weight loss intervention.⁴⁸ Results support the use of exercise as a weight loss intervention, particularly when combined with dietary change. Exercise is associated with improved cardiovascular disease risk factors even if no weight is lost. When compared with no treatment, exercise resulted in small weight losses across studies. Exercise combined with diet resulted in a greater weight reduction than diet alone (WMD -1.1 kg; 95% CI -1.5 to -0.6). Increasing exercise intensity increased the magnitude of weight loss (WMD -1.5 kg; 95% CI -2.3 to -0.7). There were significant differences in other outcome measures such as serum lipids, blood pressure and fasting plasma glucose. Exercise as a sole weight loss intervention resulted in significant reductions in diastolic blood pressure (WMD -2 mmHg; 95% CI -4 to -1), triglycerides (WMD -0.2 mmol/L; 95% CI -0.3 to -0.1) and fasting glucose (WMD -0.2 mmol/L; 95% CI -0.3 to -0.1). Higher intensity exercise resulted in greater reduction in fasting serum glucose than lower intensity exercise (WMD -0.3 mmol/L; 95% CI -0.5 to -0.2). It should be noted that the 'accumulate 30 minutes' message for physical activity applies to general health benefits whilst variations on this guideline are required according to a particular condition or outcome; for weight loss it is accepted that the quantum of daily physical activity is more in the order of 60-90 minutes.⁴⁹ The more complex physical activity messages are probably best communicated on an individual basis and by a health professional.

Case Study: A whole of community approach to healthy weight in Rural NSW

The intervention

The “Wellington Challenge 2004” was a program coordinated by health professionals at the Wellington Community Health Centre in rural NSW. The initial focus was triggered by the perception of service duplication across client groups who had been referred for diabetes education, cardiac rehabilitation, overweight & obesity. To address this issue whilst also tackling preventable disease in the locality, a whole of community program was devised.

The behaviour change strategies used

Of 9,200 residents in Wellington, about 2,400 were considered overweight. A challenge was set for local residents to collectively lose a tonne in body weight.

Originally a 12-week program was planned which included:

- Weekly physical activity and information sessions;
- Supermarket tours (informed purchasing);
- Cooking demonstrations;
- Regular weigh-ins; and
- Dissemination of resource kits designed to help the community to work together to promote healthier lifestyles, prevent illness and manage chronic disease.

The results

Due to community engagement and demand, the program was extended to a period of 15 months. The community achieved many health improvements including weight loss, increased physical activity levels, reduction or even cessation of certain medications as well as reductions in blood glucose levels, blood pressures, and levels of pain. No formal evaluation was reported. Although impressive, the results require a cautionary note: a greater time lag than 15 months is required to determine whether observed changes and health gains have been sustained.

Dietary advice

A 2005 systematic review examined the effects of providing dietary advice to achieve sustained dietary changes or improved cardiovascular risk profile among healthy adults.⁵⁰ Dietary advice appears to be effective in bringing about modest beneficial changes in diet and cardiovascular disease (CVD) risk factors over approximately 9 months but longer term effects are not known. Dietary advice reduced total serum cholesterol by 0.13 mmol/l [95% CI 0.03 to 0.23] and LDL cholesterol by 0.13 mmol/l [95% CI 0.01 to 0.25] after 3-12 months. Mean HDL cholesterol levels were unchanged. Dietary advice reduced blood pressure by 2.10 mmHg systolic [95% CI 1.37 to 2.83] and 1.63 mmHg diastolic [95% CI 0.56 to 2.71] and 24-hour urinary sodium excretion by 44.2 mmol [95% CI 33.6 to 54.7] after 3-36 months. Dietary fibre intake increased with advice by 7.22 g/day [95% CI 2.84 to 11.60], while total dietary fat as a percentage of total energy intake fell by 6.18% [95% CI 4.00 to 8.36] with dietary advice and saturated fat intake fell by 3.28 % [95% CI 1.92 to 4.64].

Table 3 Case Study: A whole of community approach to healthy weight in Rural NSW

Promoting healthy weight and preventing weight gain at the population level in NSW

A major review of interventions to promote healthy weight and prevent weight gain in NSW has been published.⁵¹ It found that the most promising approaches are likely to involve new combinations of strategies promoting physical activity and improving nutrition. These include: pricing; Point-of-Sale labelling and promotion; media campaigns; GP and health professional Advice; worksite programs that provide physical activity facilities; cues for stair use; healthier food choices; social support physical activity; and urban planning initiatives to provide mixed land use.

PHYSICAL ACTIVITY

A 2005 Cochrane review assessed the effects of interventions for promoting physical activity in adults aged 16 years and older, not living in an institution.⁵² It suggests that physical activity interventions have a moderate effect on self reported physical activity and cardio-respiratory fitness, but not on achieving a predetermined level of physical activity. Due to the clinical and statistical heterogeneity of the studies, only limited conclusions could be drawn about the effectiveness of individual components of the interventions. To supplement the Hillsdon et al review, analyses derived from Marcus and colleagues' important major review of interventions published in 2006 are included in the following sections on physical activity.⁵³

Case Study: Community-based programs to promote physical activity in Australia (NSW and Queensland)

The intervention (a)

“10,000 Steps Rockhampton” (Queensland)

The behaviour change strategies used

10,000 steps was a whole of community comprehensive (multi-strategic) approach using strategies to harness the influence of the environment as well as social marketing campaigns, advice from healthcare providers and personal goal-setting/monitoring using pedometers to address physical inactivity in a regional city in Queensland.

The results

This community-based comprehensive strategy increased physical activity participation levels by 5% among women (effects were not significant among men).

The intervention (b)

“Concord: A great place to be active” (Central Sydney, NSW)

The behaviour change strategies used

This was also a community based comprehensive (multi-strategic) approach. It focussed on women aged 20-50 years and was undertaken by an Area Health Service in partnership with local government (Concord). The key strategies were social marketing, community walking events, environmental changes in local parks and walking paths, and dissemination of maps of local walking routes.

The results

Over a two-year period this comprehensive strategy produced statistically significant reductions (6.4%) in the proportion of sedentary women in the target population.

Table 4 Case study: Community-based programs to promote physical activity in Australia (NSW⁵⁵ and Queensland⁵⁶)

Physical activity promotion among older adults

In general, interventions among older adults, including face-to-face and telephone interventions and individual and group interventions, have been effective in increasing physical activity behaviour, at least in the short term. These interventions typically have multiple components and involve some combination of educational, behavioural, and cognitive-behavioural strategies. Although it is difficult to disentangle the most effective intervention components, the authors concluded that general health education alone does not appear to be an effective method of promoting physical activity in older men and women. Cognitive-behavioural interventions such as self-monitoring and goal setting have been effective in several studies. In terms of setting, in a recent review that compared home- versus centre-based physical activity programs among participants 50 years old, centre-based programs appeared to be superior in the short term for producing fitness outcomes among those with cardiovascular disease, although adherence to physical activity programs was superior in home-based programs.⁵⁴

Physical activity promotion among young people

In general, school-based programs that have included policy and environmental approaches have been more effective than curriculum-only approaches. French middle school students have demonstrated preliminary evidence that targeting a reduction in sedentary behaviours in youth may be an effective strategy for increasing physical activity. The most extensive youth physical activity intervention was the CDC-sponsored VERB campaign, which targeted nine to thirteen-year-olds with paid media advertisements and community events. Physical activity increased in those exposed to the campaign, which indicates a positive nationwide effect.⁵⁷ Although there are several effective physical education and multi-component school-based interventions, as well as promising programs for reducing sedentary behaviour, intervention approaches in home and community settings have not been promising.

Promoting physical activity in the primary care setting

Some research has shown that even brief (three to ten minutes) interventions can increase physical activity and, although physicians typically delivered the advice, effective interventions often involved other members of the healthcare team, such as nurses and health educators. Written prescriptions provided in addition to verbal advice may enhance the effectiveness of interventions. Multiple-component interventions that include behavioural strategies such as goal setting, problem solving, self-monitoring, and feedback, as well as supervised exercise and provision of equipment, have generally been more effective than advice only, although these findings have not been entirely consistent across studies. Technological innovations such as using the Internet or making automated phone calls may reduce the effort and cost of interventions, although further research is needed to clarify this. A general review of the PHC setting found that effective interventions to increase preventive activities in primary care exist, but there is considerable variation in the level of

change achieved, with effect sizes usually small or moderate. Tailoring interventions to address specific barriers to change in a particular setting is probably important. Multifaceted interventions may be more effective than single interventions, because more barriers to change can be addressed.⁵⁸

Mediated interventions to promote physical activity

Interventions delivered through means other than face-to-face media, such as print, telephone, or the Internet, are referred to as mediated interventions. Reviews of mass media interventions have generally shown that they can produce consistent recall of campaign messages, but they have shown mixed results in terms of attitude change and have not impacted behaviour change in the targeted populations (with the exception of the national VERB campaign for youth, which showed very high “brand” awareness and message recall with evidence of physical activity change, especially in those exposed to the messages). The particularly positive effects were thought to be due (possibly) to the large budget for purchasing ads, combined with coordinated community events. Smaller mediated intervention trials typically deliver more comprehensive messages and target a more specific subpopulation, such as employees of a company or research volunteers. Such interventions may be targeted toward a particular subgroup, such as older adults, or individually tailored on the basis of feedback from participants on, for example, their specific motivational readiness, expected outcomes, or self efficacy. Reviews of mediated interventions that use print-based programs indicate moderate efficacy in increasing physical activity behaviour, although further evidence is required to support longer-term maintenance of behaviour change. Evidence in support of telephone and Internet programs has been mixed.

Studies of telephone counselling (only) interventions using three to five contacts over a one-year period show that this type of intervention can effectively impact on multiple lifestyle behaviours⁵⁹ and that individuals with above-optimal blood pressure (BP) (including stage 1 hypertension), have made multiple lifestyle changes that lower BP and reduce their cardiovascular disease risk.⁶⁰ There is evidence that the approach works specifically for Type 2 diabetes: a randomised study of a brief tailored intervention (including follow-up telephone calls) resulted in lifestyle changes among patients with Type 2 diabetes (reducing the total amount of fat consumed and increasing physical activity).⁶¹

The promotion of walking

A recent systematic review assessed the effects of any type of intervention relating to how much people walk, the promotion of walking in individuals and populations, the distribution of effects on walking between social groups, and any associated effects on overall physical activity, fitness, risk factors for disease, health and wellbeing.⁶²

The results found that the most successful interventions could increase walking among targeted participants by up to 30-60 minutes a week on average, at least in the short term. At the individual level, interventions were most effective when they were

- Tailored to people's needs;
- Targeted at the most sedentary or at those most motivated to change by way of brief advice;
- Supported by the use of pedometers or telecommunication.

Individualised marketing to households or through groups can also encourage people to walk more, although the clinical benefits and sustainability of many of these approaches are uncertain, as is the ability to generalise the findings to other groups.

Environmental interventions for PA

A Western Australian program compared the relative influence of individual, social and physical environment determinants of physical activity. The physical environment's direct influence on exercising as recommended was found to be secondary to individual and social environmental determinants. Nevertheless, accessible facilities determined whether or not they were used and in this way, support and enhance the achievement of recommended levels of physical activity behaviour by providing opportunities. The results suggest that access to a supportive physical environment is necessary, but may be insufficient to increase recommended levels of physical activity in the community. Complementary strategies are required that aim to influence individual and social environmental factors. Given the popularity of walking in the community, it is recommended that greater emphasis be placed on creating streetscapes that enhance walking for recreation and transport. The authors concluded that few people do enough walking to benefit their health; those who walk as well as engage in other physical activities appear more likely to achieve recommended levels of activity. Promoting walking may require a comprehensive strategy (inclusive of social marketing as well as environmental change strategies).⁶³

Research is rapidly evolving on the links between the built environment and physical activity. A review of the area was conducted in 2005.⁶⁴ Importantly, environmental influences are not the only influences nor in themselves sufficient to exert a major influence on physical activity behaviour. Their impact is influenced by social and individual factors. An optimal approach is likely to require several strategies, including physical environment changes, in combination with social marketing and community education.

Key environmental features that contribute to increased physical activity include:

- Mixed land use;
- Housing density;
- Footpaths and cycleways
- Facilities for physical activity;
- Street connectivity and design;
- Transport infrastructure; and
Systems linking residential, commercial and business areas.

A comprehensive or 'integrated' approach is increasingly advocated for policy development in physical activity.

TAILORED INTERVENTIONS AND TECHNOLOGIES

Tailoring is a process of matching interventions and programs to characteristics of the target audience which it is thought will lead to better behavioural and ultimately better health outcomes. For tobacco control there is some evidence of a dose-response relationship for 'tailoring' with the greatest apparent tailoring producing the most positive outcomes. This was found for evaluation of information booklets, with trends for readiness to change and self-efficacy increases and despite the fact that the tobacco information 'content' was the same in the tailored and non-tailored program.⁶⁵ There are similar findings for fat intake and physical activity promotion.⁶⁶

Case Study: Behaviour change strategies to prevent Type 2 Diabetes

The intervention

Type 2 Diabetes accounts for over 85% of diabetes in Australia. Systematic reviews of interventions among adults who are pre-diabetic show that very intensive interventions to achieve lifestyle change (physical activity, dietary change, weight loss) are effective. A review of individual RCTs confirms the effectiveness of intensive, individually tailored lifestyle programs to improve biomarkers for diabetes. In addition weight loss and physical activity interventions among overweight adults who have the metabolic syndrome are effective in delaying progression to Type 2 Diabetes.

The behaviour change strategies used

Weight loss and physical activity programs were found to be the most effective; greater intensity of intervention appears to improve effectiveness; spouse involvement in weight-loss may contribute to success. The range of specific strategies involved in the successful trials include:

- Personal goal-setting - including 5-7% weight loss and increased physical activity
- Tailored counselling and incentives for physical activity (e.g. subsidised/free membership of facilities) and supervised sessions;
- Motivational programs (e.g. walking groups, competitions, telephone-based peer support);
- Frequent contact with participants;
- Specific nutrition advice and assistance with decision-making for healthier food purchases;
- Low fat, low calorie diet; and
- Multiple lifestyle changes.

The results

Over intervention periods ranging from 3 years' duration (USA, Finland) to 6 years' duration (China) RCTs have shown reductions in the incidence of Type 2 Diabetes of 42-58%. Both USA and Finnish intervention trials achieved 58% and secondary analyses showed that among participants who complied fully with the programs the reduction was a remarkable 100% (i.e. diabetes was avoided altogether). Follow up has shown maintenance of effects for several years after the interventions had ceased.

Table 5 Case study: Prevention of Type 2 Diabetes; Finland⁷⁸, USA⁷⁹ China⁸⁰

The use of new technologies is growing in virtually all areas of health communication, including consumer, patient, and provider education; decision and social support; health promotion; knowledge transfer; and the delivery of services. Many applications have the potential to make major contributions in meeting the needs of an unhealthy and ageing population and this potential is notable in the case of the Internet because it represents a "hybrid" mass and interpersonal communication medium^{67 68} Promising examples include web-based tailored smoking cessation programs made available when purchasing NRT,⁶⁹ adding behavioural smoking cessation materials to brief telephone-based counselling (with print materials tailored to interim progress being effective for relapse prevention),⁷⁰ promotion of dietary change and physical activity,⁷¹ provision of specific information for parents to prevent injuries to young children.⁷² Tailored counselling (non-computer based) by telephone has shown positive results in several recent RCTs^{73,74,75,76,77} and there is emerging evidence on the effectiveness of simultaneous/sequential risk factor intervention in middle age populations. A 2006 Cochrane systematic review concludes that proactive telephone counselling helps smokers interested in quitting: There is evidence of a dose response; with three or more calls (but not less) increasing the odds of quitting compared to a minimal intervention. Telephone quitlines provide an important route of access to support for smokers, and call-back counselling enhances their usefulness.³⁶

DISADVANTAGED OR HIGHER RISK POPULATIONS

The review found very few studies that could provide high quality evidence for interventions serving people from culturally and linguistically diverse (CALD) backgrounds, Aboriginal and Torres Strait Islander Peoples, disadvantaged or high risk populations.

A review undertaken in 2005 for the National Obesity Taskforce examined interventions among people living in rural and remote areas; these included native Indigenous populations such as Maori, Inuit and native Hawaiians. Limited information was available on the effectiveness of interventions. However, the analysis found a range of innovative and potential systems for the delivery of lifestyle behavioural change programs and to some extent indicated the feasibility and acceptability of strategies in specific locations and circumstances. Interventions targeted people at risk of chronic disease, including overweight, diabetes and CVD. The difficulties accessing healthcare in rural and remote areas pose different difficulties compared with urban populations; time spent traveling to appointments is considered a significant impediment among rural populations.^{81, 82} Access to service providers is often difficult because of the limited number of health practitioners in rural and remote areas. Some interventions such as teleconferencing may be worth further exploration to understand the efficacy of this technology to deliver interventions in Australian rural and remote areas; the medium addresses one of the primary issues for these

populations - distance. A Hunter Valley study showed that pharmacies could successfully provide screening, health promotion and referrals in small rural towns.⁸³ The need for interagency collaboration to successfully access people living remotely was highlighted in a number of studies.^{83,84,85} Interventions (including screening and health promotion programs) run through rural worksites hold the potential to identify, reach and educate people who have poor lifestyle behaviours in rural areas, and when primary health care is typically under resourced.⁸⁶ The involvement of health agencies and other organisations in the larger community is recommended to ensure workplace programs sustainable.⁸⁵ Intervention programs among Indigenous populations which use pre-existing cultural structures have the potential for improving the uptake of preventative health services among these populations.⁸⁷ Overall, the studies highlight the need to incorporate culturally specific programs to effectively target minority groups.

A systematic review was conducted of interventions to improve diabetes care in socially disadvantaged populations.⁸⁸ It provides evidence for the identification of key intervention features that may predict success; these were: cultural tailoring of the intervention; community educators or lay people leading the intervention; one-on-one interventions with individualised assessment and reassessment; incorporating treatment algorithms; focusing on behaviour-related tasks, providing feedback, and high-intensity interventions (>10 contact times) delivered over a long duration (>or=6 months). Interventions that were consistently associated with the largest negative outcomes included those that used mainly didactic teaching or that focused only on diabetes knowledge.

Systematically integrating culture into tailored prevention programs and interventions may enhance their effectiveness with culturally and linguistically diverse (CALD) populations.⁸⁹ A US randomised trial conducted among lower-income African-American women from 10 urban public health centres involved development of a series of six women's health magazines with content tailored individually (by culture and by behavioural stage). The intervention focussed on mammography and fruit and vegetable consumption. Women receiving behaviourally and culturally tailored magazines were more likely than those in the Behaviour-only, Culture-only, and control groups to report getting a mammogram (76% vs 65% vs 64% vs 55%, respectively), and had greater increases in fruit and vegetable servings consumed daily (+0.96 serves vs + 0.43 serves vs + 0.25 serves vs + 0.59 serves daily).

Discussion and Conclusion

No single theory dominates population health behavioural change and health promotion. Many concepts in different models overlap, and some aspects of behavioural-change models have a stronger evidence base than others. The most useful approach is to combine concepts from more than one theory to address a problem, and to bring these together in a comprehensive way. A “slavish” devotion to testing models and theories can be counterproductive, as no model or theory will get it right all the time and, in practice, often a single theory explains only a small amount of the variance in targeted behaviours.³⁴ Research literature on behavioural change and health promotion indicates that it is difficult to maintain health behavioural change over time; relapse rates as high as 80% have been reported in studies of lifestyle modification such as weight loss and increased physical activity. Some research is now beginning to address the question of ‘maintenance’ or ‘adherence’ but more is needed.

However the population health approach is predicated on the achievement of small changes across large numbers of people and/or environments and programs are available to achieve this. The review for this paper found substantial evidence from systematic reviews for effective programs in areas as broad as injury prevention, drug and alcohol, prevention of HIV and AIDS, tobacco control, public health nutrition and healthy weight interventions, physical activity promotion, tailored approaches and emerging technologies, as well as some limited evidence of programs for CALD, Indigenous, disadvantaged and high risk populations.

In terms of common success factors across effective population health programs the 20 years of evidence since the publication of the Ottawa Charter have in general increasingly confirmed the basic tenets of that Charter - namely, that comprehensive approaches are required to deliver and sustain population health behaviour change. Analysis of the findings from the literature review of population health behaviour change and from case studies allows a cautious suggestion of the following possible principles for success:

- Implementing comprehensive strategies (concurrent or sequential packaging of multiple component interventions or programs to work together in synergistic or mutually reinforcing ways) is more effective than implementing individual strategies in isolation. These strategies can include regulation, education (including mass media campaigns, Internet and telecommunication), personal goal-setting and behavioural monitoring, motivational techniques and social support, individual or group counselling, brief interventions by GPs and health professionals, partnerships, community capacity building, environmental change, use of signs/cues at points of health decision-making and population or

community-based coordinated programs. A rapid review of evidence for this briefing paper provided support for the adoption of comprehensive approaches in injury prevention, tobacco control, physical activity promotion and HIV prevention;

- Settings-based approaches represent one way in which a comprehensive approach to strategies may be integrated for delivery; evidence reviewed for this briefing paper provided support for settings-based approaches in Schools, at Home, through Primary Care, in Hospitals and in Pharmacies. Some doubts remain about the effectiveness and cost-effectiveness of the Workplace as a useful setting for intervention. More convincing evaluation data are needed before major investments could be recommended;
- Interventions and programs are most likely to succeed if they are based on a clear understanding of target behaviours and the environmental context. There is an important role here for formative research (both qualitative and quantitative) noting that facilitators and barriers are likely to be multifaceted and to occur at a number of interrelated levels;
- The issue(s) targeted for intervention must be clearly defined at the outset, so that antecedents, determinants and supporting mechanisms can be defined, suggesting points for intervention and strategies for initial and sustainable change; well established planning models exist which can incorporate these factors, applying them for the specific contexts such as the Area Health Services of NSW. Lawrence Green's PRECEDE-PROCEED model is a good example;⁹⁰
- The target population's readiness to change is an important factor at both individual and organisational levels. There is accumulating evidence across behaviours such as smoking, nutrition, and physical activity that tailoring (or matching) programs and interventions to better suit the characteristics of the target audience is a predictor of more positive outcomes;
- Interventions delivered through means other than face-to-face media, such as print, telephone, or the Internet have been shown to be effective with short-term behaviour change, and increasing evidence indicates that these approaches may be effective in the longer term. Although print has been studied most extensively, many studies have now demonstrated the efficacy of telephone based interventions, and more studies into the use of the Internet are now underway. Because these types of interventions rely on little or no face-to-face contact, they hold great future promise of achieving good reach and favourable cost-effectiveness benchmarks;
- The timeframe required for population health behavioural change to become evident depends on the particular public health issue being addressed. A

comprehensive community based coronary heart disease prevention program could require five years to show major progress in intermediate outcomes (risk factors). By contrast an intensive public education program to promote the uptake of a new childhood vaccine might achieve very rapid progress in raising awareness, prompting behaviour change as well as achieving health outcomes (reduced vaccine preventable disease) within a matter of months rather than years. Limitations in the evidence make a global assessment of the required intensity and duration of programs tentative rather than definitive, however in general the greater the intensity and duration of interventions, the greater is the likelihood of success;

- There is a dearth of research on effective strategies for special populations, and especially so for Aboriginal and Torres Strait Islander Peoples. Effective programs from overseas for rural and Indigenous populations have been reported with the caveat that their findings may not always necessarily translate for an Australian context. Telehealth-, pharmacy- and worksite-based interventions hold promise for rural and remote areas. Best practice principles for Aboriginal Health Promotion have been published and should inform practice; a few individual studies of programs implemented for Indigenous Australians are noted. Promising practices include the use of pre-existing community structures, the use of community educators and lay people to lead interventions, and ‘tailoring’ interventions culturally as well as by behavioural stage to achieve better outcomes;
- “Absence of evidence is not evidence of absence”; the fact that there is a dearth of evidence in some areas of population health should not be mistakenly interpreted as evidence that these programs do not work. Rather, there is a pressing need for well designed whole-of-community and multi-strategic programs, delivered and evaluated in the ‘real-world’ conditions of local Area Health Services; within these program evaluations greater attention needs to be paid to documenting intervention reach, adoption, implementation, and maintenance;⁹¹ and
- For Area Health Services in NSW the fact that evidence indicates that comprehensive strategies appear to be required for the delivery of significant sustainable population health behaviour change does not necessarily imply that it should fall to an Area Health Service to fund all the components of those comprehensive strategies. Key questions are, which strategies are best funded and implemented at Area Health Service level? Which are best funded and implemented at State or Federal levels? Whilst it is possible to conceive of various models whereby an Area Health Service, properly resourced, might take on a Statewide strategic leadership role, in general terms it is helpful to distinguish typical roles for Federal, State and Area level within the implementation of a comprehensive strategic approach. An NHMRC report published in 1997 contains

templates which could represent a good starting point for such a role clarification process.⁹²

Appendices

Appendix 1

Ottawa Charter for Health Promotion (1987)

The Ottawa charter focused on five key actions:

- Building healthy public policy;
- Creating supportive environments;
- Strengthening community action;
- Developing personal skills; and
- Reorienting health services.

The Charter established the core principles of Health Promotion which seek to identify and positively affect the root causes, or determinants, of health. These are social and economic factors that determine health status such as income, education, profession, working conditions, mental status, which in turn can affect risk factors such as smoking, alcohol consumption, eating habits and physical inactivity.

Jakarta Declaration (1997)

In 1997, the Jakarta declaration on health promotion, "New Players for a New Era: Leading Health Promotion into the 21st Century," identified five priorities:

- Promote social responsibility for health;
- Increase investments for health development in all sectors;
- Consolidate and expand partnerships for health;
- Increase community capacity and empower the individual; and
- Secure an infrastructure for health promotion.

Bangkok Charter for Health Promotion (2005)

In August 2005 the Bangkok Charter was adopted. The Charter identified actions, commitments and pledges required to address the determinants of health in a globalised world through health promotion; it stated that progress towards a healthier world requires strong political action, broad participation and sustained advocacy. It was noted that health promotion now had an established repertoire of proven effective strategies which needed to be fully utilised. The Charter held that further advances in implementing these strategies required all sectors and settings to:

- (i) Advocate for health based on human rights and solidarity;
- (ii) Invest in sustainable policies, actions and infrastructure to address the determinants of health;
- (iii) Build capacity for policy development, leadership, health promotion practice, knowledge transfer and research, and health literacy;

- (iv) Regulate and legislate to ensure a high level of protection from harm and enable equal opportunity for health and well-being for all people; and
- (v) Partner and build alliances with public, private, nongovernmental and international organisations and civil society to create sustainable actions.

The four key commitments were to make the promotion of health:

- Central to the global development agenda;
- A core responsibility for all of government;
- A key focus of communities and civil society; and
- A requirement for good corporate practice.

These were elucidated as follows:

Make the promotion of health central to the global development agenda

Strong intergovernmental agreements that increase health and collective health security are needed. Government and international bodies must act to close the health gap between rich and poor. Effective mechanisms for global governance for health are required to address all the harmful effects of:

- Trade;
- Products;
- Services; and
- Marketing strategies.

Health promotion must become an integral part of domestic and foreign policy and international relations, including in situations of war and conflict.

This requires actions to promote dialogue and cooperation among nation states, civil society, and the private sector. These efforts can build on the example of existing treaties such as the World Health Organisation Framework Convention for Tobacco Control.

Make the promotion of health a core responsibility for all of government

All governments at all levels must tackle poor health and inequalities as a matter of urgency because health is a major determinant of socioeconomic and political development. Local, regional and national governments must:

- Give priority to investments in health, within and outside the health sector; and
- Provide sustainable financing for health promotion.

To ensure this, all levels of government should make the health consequences of policies and legislation explicit, using tools such as equity-focused health impact assessment.

Make the promotion of health a key focus of communities and civil society

Communities and civil society often lead in initiating, shaping and undertaking health promotion. They need to have the rights, resources and opportunities to enable their contributions to be amplified and sustained. In less developed communities, support for capacity building is particularly important. Well organised and empowered communities are highly effective in determining their own health, and are capable of making governments and the private sector accountable for the health consequences of their policies and practices. Civil society needs to exercise its power in the marketplace by giving preference to the goods, services and shares of companies that exemplify corporate social responsibility. Grass-roots community projects, civil society groups and women's organisations have demonstrated their effectiveness in health promotion, and provide models of practice for others to follow. Health professional associations have a special contribution to make.

Make the promotion of health a requirement for good corporate practice

The corporate sector has a direct impact on the health of people and on the determinants of health through its influence on:

- Local settings;
- National cultures;
- Environments; and
- Wealth distribution.

The private sector, like other employers and the informal sector, has a responsibility to ensure health and safety in the workplace, and to promote the health and well-being of their employees, their families and communities.

The private sector can also contribute to lessening wider global health impacts, such as those associated with global environmental change, by complying with local national and international regulations and agreements that promote and protect health. Ethical and responsible business practices and fair trade exemplify the type of business practice that should be supported by consumers and civil society, and by government incentives and regulations.

Appendix 2

LANDMARK ACHIEVEMENTS IN BEHAVIOUR CHANGE THROUGH HEALTH PROMOTION

Tremendous gains in behaviour change for population health have been achieved in the period. Both globally and in Australia, areas of progress include tobacco control, injury control, and prevention of HIV/AIDS (notwithstanding the enormous challenges that remain in Africa and elsewhere). Advances have been made in the use of mass media and information technologies such as the Internet, merged technologies, and the use of smart systems such as telephone and computer-based counselling. Selected case studies are presented in this section to highlight some of this progress.⁹³

TOBACCO CONTROL

Over the last 30 years in countries such as Sweden, Australia, New Zealand, Canada, England, and the USA, health promotion programs to reduce smoking have been very effective. In 2001, less than 20% of Australians smoked, whereas in the early 1950s 75% of Australian men smoked. Over the last 30 years or so consumption of tobacco has fallen by over 60% in New Zealand, by 43% in the UK, and by 42% in the USA.⁹⁴ In Australia, in 1998, an estimated 17,400 premature deaths were averted because of tobacco control efforts over the previous 30 years. The total benefit of health improvement due to reduced cigarette smoking from 1970 onwards was estimated at 12.3 billion Australian dollars, made up of longevity gains worth \$9.6 billion, gains in health status valued at \$2.2 billion, and lower healthcare costs of \$0.5 billion.

In NSW, as elsewhere, the use of social marketing to reinforce the health risks of smoking to adults supported by accessible cessation services is considered best practice in effective tobacco control interventions. It is important to focus on making messages personally relevant to smokers. The NSW Cancer Institute's program aims to limit self-exempting behaviour by focusing on delivering a strong memory and message to quit. The primary focus of the program is to use mass media campaigns to increase the number of smokers in the NSW adult population making an attempt to quit smoking. Support for the Quitline will continue so that smokers making a quit attempt will have the best opportunity for a successful attempt. A report prepared for NSW Health by Collins and Lapsley, *Counting the cost of tobacco and the benefits of reducing smoking prevalence in NSW*, was a major impetus for increased funding for tobacco control. The study indicated that the social cost of tobacco use in NSW for the year 1998-1999 was approximately \$6.56 billion. The report estimated that for a five percent reduction in smoking rates, NSW would benefit (conservatively) by \$2.36 billion over a twenty year period. This represents \$9,046 for each person prevented from smoking by the anti-smoking interventions. The NSW Government (Cancer

Institute) has invested significant funds in social marketing campaigns during the past 2 years (\$10 million in 06/07). This investment in social marketing campaigns (as part of a comprehensive tobacco control program) has resulted in a 2.4% reduction in smoking prevalence (daily and occasional) from 2005 (20.1%) to 2006 (17.7%).

HIV/AIDS

Uganda's experience of HIV/AIDS demonstrates that health promotion is effective not only for non-communicable diseases in developed countries, but also for communicable diseases, and in developing countries. At the peak of the HIV/AIDS epidemic in Uganda in 1992, nearly 30% of antenatal women in Kampala were HIV positive. By 2000, the number was just above 10%. The Ugandan President attributes success to delaying girls' first sexual encounter: in 1986 it was at 14 years, in 2000 it had increased to 16 years. Sex with non-regular partners has also decreased. Use of a condom has risen from 57% in 1995 to 76% in 1998. Since 1990 when HIV testing and counselling facilities were introduced, 450,000 Ugandans have volunteered for testing⁹⁵.

CARDIOVASCULAR DISEASE.

Over the last 30 years, in many countries, mortality rates from coronary heart disease have fallen dramatically. In Finland, 25 years of health promotion, beginning in North Karelia and extending over the whole country, has resulted in significant increases in life expectancy and declines in mortality.

INJURY - ROAD TRAUMA

in 1971, more than 1000 people died on the roads of the Australian state of Victoria. Because of community-wide road trauma prevention programs there are now, per year, 600 fewer deaths and 6000 fewer serious injuries. The estimated benefits in terms of reduced payments by the Transport Accident Commission (GAC) were respectively 3.9 and 7.9 times the cost of advertising supporting the speed and alcohol enforcement program.⁹⁶ Through the induction of seat belt legislation, speed limits, and compulsory helmets for motorcycle and moped riders, road fatalities in Sweden have fallen from 1319 in 1970 to just below 600, in 2000.⁹⁷

SKIN CANCER

The sun smart program and its flagship Slip! Slop! Slap! Campaign, established in the 1980s by the Cancer Council of Victoria, has resulted in a 60% reduction in sunburn levels in Victoria in a 10-year period.⁹⁸

Appendix 3

LANDMARK STRATEGIES AND INITIATIVES

Global/Overseas

- Cochrane Database and Public Health Field
- Global Program on Health Promotion Effectiveness
- The WHO Framework Convention on Tobacco Control
- The Bloomberg Global Initiative to Reduce Tobacco Use
- The WHO Global Strategy on Diet and Physical Activity
- The Wanless Reports 2002, 2004 (UK)
- WHO Commission on the Social Determinants of Health

National/Regional level in Australia

- Tobacco control: a bluechip investment in public health
- Healthy Weight 2008: National action agenda for children and young people
- Evaluation of Australia's second HIV and AIDS Strategy
- Returns on investment in Public Health

COCHRANE HEALTH PROMOTION AND PUBLIC HEALTH FIELD

The Cochrane Field of Health Promotion was created in 1996, and was expanded to include public health in 1999. The field aims to promote the conduct, dissemination, and utilisation of systematic reviews of all health promotion and public health interventions. Practitioners and researchers in health promotion and public health face many challenges in producing systematic reviews and compiling best available evidence to guide practice in policy in the motivation, challenge and nexus of the field's work. See: [HTTP://www.Cochrane.org](http://www.Cochrane.org)

GLOBAL PROGRAM ON HEALTH PROMOTION EFFECTIVENESS

The Global Program on Health Promotion Effectiveness (GPHPE) is a multi-partner project coordinated by the International Union for Health Promotion and Education (IUHPE) in collaboration with the World Health Organisation (WHO). GPHPE aims to raise the standards of health promoting policy-making and practice worldwide by:

- Reviewing and building evidence of effectiveness in terms of health, social economic and political impact;
- Translating evidence to policy makers, teachers, practitioners, researchers; and
- Stimulating debate on the nature of evidence of effectiveness.

WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL

The WHO Framework Convention on Tobacco Control (WHO FCTC) is the first global health treaty negotiated under the auspices of the World Health Organisation. The WHO FCTC was developed in response to the globalisation of the tobacco epidemic.

The spread of the tobacco epidemic is exacerbated by a variety of complex factors with cross-border effects, including trade liberalisation, direct foreign investment, global marketing, transnational tobacco advertising, promotion and sponsorship, and the international movement of contraband and counterfeit cigarettes.

BLOOMBERG GLOBAL INITIATIVE TO REDUCE TOBACCO USE

The Bloomberg Global Initiative to Reduce Tobacco Use (BGI) is a two-year initiative funded by a \$125-million gift from US financier Michael R Bloomberg to five partner organisations. The Union is managing several components of the BGI with a grant from the World Lung Foundation, one of the BGI partners. Because of the commitment to evidence-based approaches inherent in the WHO approach it is unsurprising that BGI is closely linked with the implementation of the WHO Framework Convention on Tobacco Control.

WHO GLOBAL STRATEGY ON DIET, PHYSICAL ACTIVITY AND HEALTH (DPAS).⁹⁹

This strategy, released in 2004, puts physical activity on the international public health agenda. WHO's role is to support its Member States in the development of national physical activity policies and guidelines (e.g. by providing technical support for health professionals in physical activity and surveillance, disseminating information on evidence-based practice).

WANLESS REPORTS

In 2003 the English Prime Minister, the Chancellor and the Secretary of State for Health asked Derek Wanless, ex-Group Chief Executive of NatWest (National Westminster Bank) to provide an update of the challenges in implementing the fully engaged scenario set out in his report on long-term health trends. This 2004 report was the final report produced by Derek Wanless and it provided an update of the challenges in implementing the 'fully engaged scenario' set out in the 2002 Wanless report on long-term health trends.

See: [http://www.hm-](http://www.hm-treasury.gov.uk/consultations_and_legislation/wanless/consult_wanless04_final.cfm)

[treasury.gov.uk/consultations_and_legislation/wanless/consult_wanless04_final.cfm](http://www.hm-treasury.gov.uk/consultations_and_legislation/wanless/consult_wanless04_final.cfm)

WHO COMMISSION ON SOCIAL DETERMINANTS OF HEALTH

The Commission on Social Determinants of Health (CSDH) supports countries and global health partners to address the social factors leading to ill health and inequities. It draws the attention of society to the social determinants of health that are known to be among the worst causes of poor health and inequalities between and within countries. The determinants include unemployment, unsafe workplaces, urban slums, globalisation and lack of access to health systems.

See: http://www.who.int/social_determinants/en/

TOBACCO CONTROL: A BLUECHIP INVESTMENT IN PUBLIC HEALTH

This document outlines a practical agenda for action that would markedly reduce the social costs of tobacco use in Australia. All of the proposals are based on sound thinking and the best available evidence. This document is underpinned by economic analyses and background papers which justify the approaches proposed, cost out the program, and estimate the benefits to the community. Options for financing the proposed package are also provided.

See: <http://www.vctc.org.au/>

HEALTHY WEIGHT 2008: NATIONAL ACTION AGENDA FOR CHILDREN AND YOUNG PEOPLE¹⁰⁰

The National Obesity Taskforce put its report and a national action agenda for children, young people and their families to Australian Health Ministers in November 2003. Healthy Weight 2008 - Australia's Future - The National Action Agenda for Children and Young People and their Families recommends actions across a range of settings such as child care, schools, primary care, maternal and infant health care, neighbourhoods, workplaces, food supply, family and community services, media and marketing. The focus is on children and young people. The National Obesity Taskforce has also developed a national action agenda for adults and older Australians.

See: <http://www.health.gov.au/Internet/healthyactive/publishing.nsf/Content/publications>

VALUING THE PAST, INVESTING IN THE FUTURE: EVALUATION OF THE NATIONAL HIV/AIDS STRATEGY 1993–94 TO 1995–96 (THE FEACHEM REPORT)

This evaluation report was published in 1995 as the period of the second National HIV/AIDS Strategy drew to a close and Australia was 10 years into a HIV/AIDS epidemic. It took a hard look at whether the existing programs had achieved the outcomes desired in a cost-effective manner. It also reviewed whether both the programs and the then current levels of resourcing were appropriate for the future. It provided sound analysis of the available economic, social and epidemiological data.

See: <http://www.hivpolicy.org/Library/HPP000170.pdf>

RETURNS ON INVESTMENT IN PUBLIC HEALTH: AN EPIDEMIOLOGICAL AND ECONOMIC ANALYSIS

The report describes an epidemiological and economic analysis of five public health programs, namely: programs to reduce tobacco consumption, coronary heart disease, HIV/AIDS, measles and Hib-related diseases and road trauma. The report details the financial and economic return on investment of past public health programs associated with these areas.

See: http://www.health.gov.au/Internet/wcms/publishing.nsf/Content/health-publth-publicat-document-roi_eea-cnt.htm

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