

Child and Youth Health Promotion

Update of the evidence since 2006



Canterbury
District Health Board
Te Poari Hauora o Waitaha

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Introduction

This report is provided as an update of the evidence contained in the Child and Youth Health Promotion Interventions and Effectiveness reference document for South Canterbury by Dr Annabel Begg that was written in 2006. It has been requested by Dr Daniel Williams, Medical Officer of Health for the Timaru Team of Community and Public Health.

The original report was set out into sections dealing with issues, settings, and populations. This update document covers detailed evidence on seven issues or topic areas: tobacco control, nutrition and physical activity, injury prevention, mental health, alcohol, sexual health, oral health, and alcohol and other drugs. As each of these topic areas has such a vast volume of literature associated with it, the approach to providing the update of evidence has been the following:

- Systematic reviews that have been published or updated since 2006 have been considered as the highest level of evidence. Other reviews and trials included in recent reviews have not been further examined.
- Where there has been no update of evidence in a systematic review since 2006, the information from the document by Begg (2006) has been provided and more recent randomised trials have been included where appropriate.
- In areas of emerging interest, particularly to do with the use of newer electronic media for health promotion interventions, reference has been made to available trials and other studies.

Identification of the relevant literature used the following approach:

- Specific searches of Medline were made for systematic reviews and meta-analyses in each topic area. In some cases multiple searches were made for individual aspects of a topic.
- All relevant Cochrane systematic reviews for each topic area were examined.
- Two recent reviews by Community and Public Health analysts related to nutrition and physical activity and mental health promotion were examined in detail and their findings used where appropriate.
- Where the only systematic reviews had been published prior to 2011, a search for recent randomised trials was conducted.
- References cited by retrieved papers were examined in some cases where it seemed useful but this was not done routinely.
- New Zealand studies were included where possible but a wide-ranging search for New Zealand material was not undertaken.

At the end of the sections covering the seven large issues, a final section draws together some of the themes that appear to cross them all as successful methods of approaching health promotion with children and young people. An accompanying document gives the evidence in brief for each topic.

A note on the meaning of “limited” or “insufficient evidence”

Systematic reviews often use cautious language such as “limited evidence” or “insufficient evidence” when stating their conclusions about an intervention’s effectiveness. These statements usually refer to one or more of the following situations relating to the original studies that have been reviewed:

- There have not been enough studies published in this area even though some of those that have been published may have shown effectiveness.
- The effect of the studies, while positive, may have been too small to be thought worthwhile for the resources needed for the intervention.
- The available studies may not have been well designed, or may not have reported their designs in enough detail to be able to tell whether they have been well designed.
- The number of participants included in the studies may have been too small to show a conclusive effect.
- The study may have been in a limited target group with unusual circumstances and may lack generalizability outside this population.
- The range of interventions carried out and/or the range of outcomes reported may have been so diverse that it has not been possible to consider the overall effectiveness.

In general, “insufficient” evidence does not necessarily mean that the intervention in question is not effective, but only that the effectiveness is as yet unsure, and is likely to be clarified only by further, well-designed studies being carried out. “Limited evidence” is a more positive statement than “insufficient evidence” but it too suggests that while some evidence is available, it is likely to need to confirmation by further studies. To understand why the reviewers came to their conclusions about the strength of the evidence in each case, it is necessary to read the relevant reviews that are referenced in this document.

Tobacco control

Evidence summary

In pregnancy

- There is good evidence that psychosocial smoking cessation interventions reduce the proportion of women who smoke during pregnancy and the early postpartum period and that they reduce preterm births and low birthweight.
- Incentives (usually in the form of food vouchers) have proved successful in some economically disadvantaged populations in the United States but it is uncertain whether the same approach would be generalisable to New Zealand.
- Nicotine replacement products for smoking cessation are effective in general populations but there is insufficient data to establish safety or effectiveness in pregnancy.
- Text messaging and online support are emerging areas but as yet there is insufficient evidence available to assess their effectiveness.

Interventions to prevent children from passive smoking in the home

- Randomised trials of smoking cessation interventions with parents and carers of children show that the intervention groups have higher quit rates than the control groups. There is insufficient evidence to show that any one type of intervention is more effective than another.
- There is some evidence that cessation counselling for parents and carers in clinical settings (for example parents of children who are hospitalised) is effective.
- Smoking cessation interventions should be preferred over interventions to reduce exposure through making homes and cars smoke free.

Preventing the initiation of smoking

- School-based social competence interventions to teach young people self-management skills and how to resist media and interpersonal pressures have proved to be the most effective means over the long term in reducing the number of young people who start smoking.
- School-based interventions led by adults show more effectiveness than peer led interventions.
- There is no evidence to support providing incentives to whole school classes as a way of preventing smoking uptake.
- There is insufficient evidence relating to family-based interventions for preventing smoking uptake.
- There are few interventions targeted at indigenous youth. New Zealand research is in progress.
- Mass media and community based interventions show some evidence of effectiveness when they use widespread, multi-component programmes of sufficient duration targeted at whole communities/populations rather than children and young people alone.

- The US Preventive Services Task Force found that behaviour-based interventions in primary care were effective in preventing uptake of smoking in young people

Smoking cessation interventions for adolescents

- Randomised trials of smoking cessation interventions with adolescents have shown only limited effectiveness, regardless of the type of intervention.
- Web-based and text messaging interventions are an area of increasing interest but are not yet well researched.

Programmes for whole populations

- Legislation that covers, taxes, advertising bans, and Smokefree environments is effective in preventing smoking uptake as long as it is well enforced.
- Community interventions are effective in preventing smoking uptake in young people if they use coordinated, widespread, multi-component programmes and involve the target community in determining and/or implementing the programme.
- Mass media interventions can be effective if the message is developed to fit the target audience, and the campaign is of sufficient duration and intensity. Specific targeting of youth may not be necessary if strong general mass media campaigns are in place that target the whole country.



Interventions in pregnancy

A Cochrane systematic review (Chamberlain et al 2013) found good evidence that psychosocial interventions to support women to stop smoking in pregnancy can increase the proportion of women who stop smoking in late pregnancy, and can reduce low birthweight and preterm births. This review included data from 86 trials with over 29,000 women participants. The review is complex and, although it updates several previous reviews, the conclusions are more detailed and different from the previous versions. The full review should be read for details such as the exact effect size of individual interventions. The main findings are outlined in brief.

Pooled results showed that:

- Women who received psychosocial interventions had an 18% reduction in preterm births and infants born with low birthweight.
- There did not appear to be any adverse effects from psychosocial interventions and several studies measured an improvement in women's psychological wellbeing.
- There were similar effect sizes in trials with biochemically validated smoking abstinence and in those with self-reported abstinence.
- There was no significant difference between trials implemented by researchers and those implemented by routine pregnancy staff.
- Effects were similar for trials where participants were of low socio-economic status and those of other women. However, the effect was unclear for

interventions among women from ethnic minority groups and aboriginal women.

Conclusions by type of therapy showed that:

- Interventions with incentives (usually food vouchers) were consistently the most effective, however the results were based on only four trials (all in the US) with a small number of women, and they only seemed to help when provided intensively.
- Counselling interventions had a significant effect when compared to usual care, and were particularly effective when counselling was used in conjunction with other strategies. It was unclear whether any one type of counselling was more effective than others. In these studies there was a clear effect in smoking abstinence up to 17 months from the intervention but not in the longer term.
- Feedback interventions, for example, cotinine testing demonstrated a significant effect only when compared to usual care and combined with other strategies such as counselling.
- The effect of health education was unclear when compared to usual care.
- Social support interventions appeared effective when provided by peers, but the effect when provided by partners was unclear.
- There were mixed effects of interventions provided as part of a broader package to improve maternal health (rather than targeted specifically at smoking cessation).

Also worth noting, is a recent review (Higgins et al 2012) that summarised data from four trials conducted by two research groups in the United States (Oregon and Vermont). The trials were all with economically disadvantaged women in the Women Infants and Children's (WIC) programmes:

- Evidence of the effectiveness of incentives on abstinence during pregnancy and the early post-partum period was further strengthened.
- Women in the intervention group were also more likely to maintain breastfeeding at 12 weeks postpartum (35% compared to 17% of controls), but at 24 weeks (12 weeks after the intervention finished) the effect was no longer significant.

Another trial by Tuten et al (2012) showed outcomes consistent with the trials summarised by Higgins et al (2012) but was with a small specialised sample of women on a methadone programme.

A Cochrane Review of pharmacotherapy for smoking cessation in pregnancy (Coleman et al 2012) analysed data from six trials of NRT for smoking cessation in pregnancy. Although a total of 1745 pregnant smokers were included in the six trials, there was insufficient evidence to support the effectiveness or safety of NRT in pregnancy. A further meta-analysis of nicotine replacement patches and gum for smoking cessation in pregnant smokers (Myung et al 2012) found that the pooled data from seven studies with 1386 women showed an abstinence rate 1.8 times higher for the intervention group compared to controls. A range of minor and serious pregnancy outcomes were reported in both arms of all studies but there was no evidence directly linking the adverse events to the NRT. Both meta-analyses found that larger RCTs would be necessary to establish the safety and effectiveness of pharmacotherapy for smoking cessation in pregnancy. The authors noted that because there are difficulties

recruiting pregnant smokers into such trials and obtaining ethical approval, there has not been an RCT with a large enough number of participants to fully establish the safety of NRT in pregnancy.

A meta-analysis of counselling for smoking cessation (Filion et al 2011) concluded that there was little evidence to suggest counselling alone was successful in pregnant smokers. Trials that had used any type of counselling (including brief intervention) were included, but were restricted to those studies that had verified abstinence using biochemical methods and had at least a 6 month follow up. According to these criteria the effect of counselling in the 3290 participants proved to be modest (4-24% for those receiving counselling compared to 2-21% for controls). The authors called for a large trial of NRT in pregnant smokers and noted that even if NRT might have some adverse effects, available data suggested that they were less harmful than smoking (p, 1426).

Text messaging and phone applications for smoking cessation in pregnant women are emerging as an area of interest. While they appear to be promising, studies so far have been small, and either uncontrolled (Fujioka et al 2012), or insufficiently powered (Naughton et al 2012) to detect a statistical difference in smoking outcomes. Moreover in the latter study almost half the participants found the text messages annoying or too numerous and 9% chose to discontinue them.

Interventions to protect children from passive smoking in the home

A Cochrane systematic review (Priest et al 2008) of the evidence on family and carer programmes for reducing children's exposure to tobacco smoke did not find any new evidence to update their earlier conclusions that:

- There is some evidence that intensive counselling in clinical settings is effective.
- There is insufficient evidence to determine whether any one intervention reduces parental smoking and child exposure more effectively than another.

A more recent systematic review and meta-analysis (Rosen et al 2012) found somewhat more positive outcomes. Data from 18 randomised controlled trials up to April 2011 found that there was a 4% absolute difference in the quit rates between the intervention and control groups. However, more than three quarters of the parents in both intervention and control groups continued to smoke. Note that the outcome of interest in the meta-analysis was parental smoking cessation to protect children, rather than reducing absolute exposure to environmental tobacco smoke for children by having smoke free homes and cars. The interventions were diverse in settings, intensity, follow-up, methods, who the intervention was delivered by and whether the children were ill or well. Sub-group analysis identified the three most promising approaches: interventions for parents with children over the age of four years; interventions with the primary purpose of getting parents to quit (rather than promoting smoke free homes and cars); and interventions that used nicotine replacement therapy. It is worth noting that though the NRT studies included in this review were only two small trials, the WHO supports NRT as having more than double the success rate as a means of quitting compared to placebo or non-NRT therapy (WHO 2013; WHO 2011).

Recent randomised trials to protect children from passive smoking include two new approaches:

- Pre-teen children (8-13 years) who lived in households where one or more adults smoked were given coaching in methods to reduce their exposure to second hand smoke, for example, how to approach the adult about not smoking in the house (Hovell et al 2011). Wider context health education around the importance of not smoking and problem solving methods was also provided. One parent of each child was interviewed for the study but did not receive the intervention. Urine samples were collected from children to measure cotinine levels. Financial incentives were provided to all participants (both children and parents) to complete interviews and gift cards were awarded to children whose cotinine results showed a reduction, or who found novel methods of smoke avoidance. There were 200 children in this study evenly divided between intervention and control groups.
- The installation of HEPA air cleaners in households where there were adults who smoked and children with asthma (Butz et al 2011; Lanphear et al; 2011).

Both trials showed a significant reduction in particle levels in households and an increase in symptom free days in children in the intervention group compared to controls but were not sufficient to prevent exposure to second hand smoke. The study by Butz et al also used a health coach for one of the three intervention groups (air cleaner plus coach vs air cleaner alone vs control) but there was no additional effect of the coach on particle reduction.

Also relevant to passive smoking across whole populations is a Cochrane review of legislative smoking bans which found that they are effective in leading to a reduction in passive smoking, especially among hospitality workers (Callinan et al 2010). There is limited evidence on the impact of legislation on active smoking but the trend is generally downwards.

The World Health Organisation (2011, p. 42) in their latest report on effective measures for tobacco control provide recommendations relevant to passive smoking:

- Governments must maintain strong support for laws once they are enacted through proactive enforcement that achieves high compliance levels.
- Public opinion shows strong support for smoke free laws wherever they have been enacted.
- Smokefree environments encourage people to make their homes smoke free to protect children and other non-smokers.
- Bans on advertising are effective but need to be complete and well enforced.
- Increasing tobacco prices through higher taxes is the most effective method of reducing tobacco use as long as taxes keep pace with inflation and incomes.

Preventing the initiation of smoking

A number of Cochrane systematic reviews have examined the effectiveness of different types of approaches and settings for preventing the initiation of smoking among young people.

School based interventions (Thomas et al 2013): This review updated a previous one done in 2002. The primary outcome of interest was the effect of the intervention on the smoking status of individuals or cohorts who reported no use of tobacco at baseline. Studies were analysed in three groups according to the method used for measuring prevention: pure prevention (never smokers continuing to be never smokers at follow up); change in smoking behaviour over time; and point prevalence of smoking at baseline and follow up. Results of this large review showed that:

- There was an effect for pure prevention cohorts which showed a significant effect at longest follow up (but not at shorter time frames) with an average 12% reduction in starting smoking in intervention groups compared to controls.
- Combined social competence and social influence interventions¹ at all time points and social competence alone at longest follow up prevented smoking uptake compared with controls.
- Interventions delivered by adult presenters were more effective in the longer term than peer-led programmes.
- Information only, and social influences alone did not show any overall effect at any time point.

Family-based programmes: Another Cochrane Review (Thomas et al 2007) reviewed the results of 16 randomised trials of family based programmes for preventing smoking by children and adolescents. Some well-executed RCTs showed family interventions may prevent adolescent smoking, but RCTs which were less well executed had mostly neutral or negative results. Additionally, a variety of control group mechanisms made it difficult to draw definite conclusions. The authors noted that there was a need for well-designed and executed RCTs in this area.

Incentives: The effectiveness of incentives for preventing smoking initiation (Johnston et al 2012) has also been the subject of a Cochrane systematic review. The review examined five trials, all of which were part of the Smokefree Class Competition initiative in Europe. School classes with students aged 11-14 years committed to being Smokefree for 6 months and went into a competition to win class prizes. There was no evidence of effectiveness of incentives such as these preventing smoking uptake. However, the authors note that there are relatively few published studies on this type of intervention and they are of variable quality. They also noted that individual incentives may be different from whole class incentives.

Mass media interventions (Brinn et al 2010): This was an update of a 1998 review included in Begg (2006) and though one extra study was included, the overall conclusions remained unchanged:

- There is some, but limited, evidence that mass media campaigns can prevent the uptake of smoking among young people.

¹ These terms are defined in the review by Begg (2006, p. 22.)

- Campaigns that showed positive results were those that researched and developed the message to fit the target audience, lasted for at least three years and were intensive (repetitive media messages over a variety of communication channels) throughout the duration of the campaign.

The World Health Organisation (2011) has found that because general mass media campaigns are effective at reaching youth, specific targeting of youth may not be necessary if strong campaigns that reach the whole country are in place. However, large national smoking prevention campaigns may make it difficult to detect a difference in youth smoking prevalence (Flynn et al 2010).

Community interventions (Carson et al 2011): This review updated a previous one done in 2003 and included in Begg (2006). An extra eight studies were included in the updated review but conclusions remained unchanged:

- There is some, but limited, evidence that multi-component community interventions are effective in preventing smoking uptake in young people.
- Successful interventions use coordinated, widespread, multi-component programmes and involve the target community in determining and/or implementing the programme. Components of the studies reviewed included education of tobacco retailers about age restrictions, programmes for prevention of smoking related diseases, mass media, school and family-based programmes.

Interventions with indigenous youth (Carson et al 2012): Only two studies of sufficient quality were located for this Cochrane review, both with Native American settings. Because of the lack of research in this area, the review was unable to provide any conclusions. Reference was made, however, to the ongoing Auckland University study *Keeping Kids Smokefree* (Glover et al 2010; Charlier et al 2009). This study is part of a larger body of work by the group and to date has published only on the rationale and design of the study and lessons learned about university engagement with communities. No outcomes are yet available.

Primary care interventions: A recent systematic review and meta-analysis (Patnode et al 2013) for the US Preventive Services Task Force examined primary care interventions for tobacco use prevention in children and adolescents. The review concluded that behaviour-based interventions were effective in reducing smoking initiation among non-smoking young persons. Pooled analysis showed a 19% relative risk reduction for smoking initiation among participants in intervention groups compared to controls. Interventions were highly variable and included brief advice, counselling sessions of various intensity and follow up telephone calls after counselling sessions. Some targeted young people only; others included parents. There was no evidence that any one approach was more effective than another.

Smoking cessation interventions for young people

In spite of the numerous Cochrane reviews on smoking cessation there do not appear to be any that focus specifically on adolescents. Since the review by Begg (2006), there have been a number of randomised trials of various cessation interventions with

young people but to date there has been little evidence of effectiveness. A meta-analysis of pharmacologic therapy for smoking cessation in adolescent smokers (Kim et al 2011) found that there was little effect at short or mid-term follow up (up to 26 weeks). There were few adverse events reported but studies were limited by small numbers. Other recent trials of motivational interviewing (Colby et al 2012; Audrain-McGovern et al 2011), bupropion (Gray et al 2011), and various types of counselling (Pbert et al 2011; Dalum et al 2012) also showed little evidence of effectiveness. The use of online and text messaging interventions is a developing area for adolescent smoking cessation (Haug et al 2012; Patten et al 2012) though there has been little evidence of effectiveness to date (Hutton et al 2011).

Nutrition and physical activity

Evidence summary

The World Health Organisation advice for the prevention of childhood obesity and encouragement of healthy nutrition and physical activity is that there needs to be intervention at three levels:

- supportive structures within government
- population wide policies and initiatives (including regulations), social marketing, and the creation of supportive environments, and
- carefully planned community interventions across multiple settings, tailored to the local context and well integrated with other initiatives in the local community.

Evidence reviewed for this document focuses primarily on the second and third of these areas where public health concentrates most of its health promotion work.

Taxes, regulations, and subsidies for promoting health eating and reducing obesity

- Most published studies of the impact of taxes and subsidies are specific to United States pricing and regulation arrangements and are not necessarily generalizable to other countries.
- Modelling studies in the US have demonstrated that :
 - There is some evidence that a 20% rise in the price of fast food would be likely to reduce consumption by about 10%, and that a 20% subsidy on fruit and vegetables would similarly be likely to increase consumption by 10%.
 - There is fairly consistent evidence that increases in the price of fast food would reduce body weight among adolescents.
 - There is an association between lower fruit and vegetable prices and lower body weight when subsidies are targeted at low income populations.
 - Increases in the price of soft drinks may not be effective in reducing body weight if diet drinks are included in the same category as sugar sweetened beverages.

Food vouchers for specific items provided to pregnant and breastfeeding low-income women through the Women Infants and Children supplemental programme in the United States were able to improve intake of targeted nutrients by 10-20% and improve mean birth weight of infants of women who smoked.

Media and informational campaigns

- Labelling and other nutritional information on food packaging is frequently used as a component of policies to improve food and physical activity environments but as yet there is no strong evidence that labelling has any impact on food choices.
- Point of decision prompts are effective in increasing physical activity (for example, using the stairs instead of the lift), particularly when the prompt is tailored to a specific group.
- Standalone mass media campaigns have not been proven to increase physical activity at population level. However, media campaigns are a useful within a broader multi-component intervention.

It is likely that social networking and newer electronic media will be important in mass media and multi-component campaigns in the future.

Breastfeeding

- Breastfeeding has short and long-term benefits for both mother and child and helps protect infants from a variety of acute and chronic disorders.
- Antenatal peer support by women who have themselves breastfed and received training is effective in increasing breastfeeding initiation, particularly in low-income women.
- Peer counselling, lactation consultation and formal breastfeeding education during pregnancy appear to increase breastfeeding initiation and duration compared to no intervention.
- Face-to-face, predictable, scheduled, on-going support either by professionals or trained lay-people for breastfeeding mothers is effective in increasing the duration of breastfeeding and as well as exclusive breastfeeding. Support should be offered proactively (rather than wait for it to be requested) and should be tailored to the individual's context.
- There is insufficient evidence to support any particular approach in training health professionals who support breastfeeding women.
- An association has been shown in a number of studies between breastfeeding and a preventive effect on overweight and some other health conditions but there is no strong or consistent evidence of a causal effect.
- Web-based interventions to promote the initiation of breastfeeding may be useful as a component of other interventions but are unlikely to replace the need for face-to-face interventions by health providers.

Nutritional and physical activity programmes to prevent childhood obesity

- There is strong evidence that multi-component programmes that combine both diet and exercise, are delivered across multiple settings (school, families and communities), and are of longer duration are effective in preventing obesity and overweight among children and young people.
- Examples of particular strategies include school food changes, enhanced opportunities for physical activity in schools and communities, parent support and home activities to encourage more nutritious food, city policies, community awareness campaigns and social marketing.

- For school-based programmes, a dedicated coordinator to ensure consistent implementation and conduct professional development and capacity building with teachers is important. Initially an external coordinator may be needed, but ultimately the programme needs to be run independently by school staff to ensure long term viability.
- There is some evidence that school-based physical activity programmes (without a nutrition intervention) increase the proportion of children who engage in moderate activity during school hours and watch less television. However, these programmes do not appear to improve BMI, cholesterol, blood pressure or pulse rate in children or increase physical activity among adolescents.
- There is as yet insufficient evidence to establish which particular components of nutrition and physical activity promotion interventions contribute to successful outcomes.
- It is still uncertain whether the impact of successful programmes is sustained over the long term.
- There is good evidence that education-only campaigns are ineffective.
- There is emerging interest in web-based programmes with personalised feedback for improving eating behaviour, but evidence of any sustained impact is lacking.
- There is no evidence as yet that nutrition and physical activity programmes have adverse effects on children and young people.

The World Health Organisation (2012a) has outlined three levels of approaches that are important for efforts to prevent child obesity and encourage healthy nutrition and physical activity:

- **Structures within government** to support obesity prevention policies and interventions. These include dedicated funding, a “health in all policies” approach, workforce development, and developing networks and partnerships to support more direct initiatives and community-based interventions.
- **Population-wide policies and initiatives** to create environments that support healthy diets and physical activity, such as laws and regulations (for example restrictions on the marketing of unhealthy foods and beverages to children, and regulation of nutrition labelling), food taxes and subsidies, and social marketing campaigns. They also include environmental interventions that reduce barriers to physical activity, transport policies, policies to create spaces for recreational activities and school curricula that promote physical activity.
- **Carefully planned multi-component community interventions** in multiple settings (childcare centres, schools and communities) tailored to the local environment and with strong community engagement and integration into other initiatives in the community (WHO 2012a, p. 11-12).

The WHO document provides eleven guiding principles which are set out in detail (p16-20) and which are in brief:

- integration: sustained interventions that are tightly integrated with other efforts at prevention of non-communicable disease
- policy support from multiple levels of governance
- prioritisation of vulnerable groups to ensure equity and inclusivity
- “upstream” approaches which shape the underlying determinants of health and social equity in society and “midstream” approaches in settings (educational, community and recreational facilities, churches etc) where population dietary patterns can be targeted rather than “downstream” (individual-based) approaches
- ongoing monitoring and surveillance
- concurrent engagement with multiple sectors and settings
- transparency, particularly where for-profit companies are involved
- contextualisation: policy options and priority areas are decided locally
- sustainability: long term planning and budgeting
- coordination: clear definition of roles and responsibilities and shared goals, and,
- explicit priority setting.

Although public health promotion programmes work to influence government policy, they are most active at the second and third level approaches described in the WHO summary. The sections below look firstly at the evidence for population-wide policies that promote healthy eating and obesity reduction followed by a longer section on community-level programmes specifically targeted at children and young people.

Initiatives to promote healthy food environments for populations

Taxes, price subsidies, labelling, and media campaigns for promoting healthy eating/reducing obesity

The idea of taxing some products is not new in public health, with general acceptance that taxation of tobacco and alcohol is one means of reducing consumption (Gonzalez-Zapata 2010). However, there is a relatively small volume of literature on the effect of taxes and subsidies in the promotion of better child nutrition and the prevention of obesity. Powell et al (2013) systematically reviewed literature published between 2007 and 2012 on the effect that food and beverage taxes and subsidies have on public health. The review located 21 consumption studies and 20 weight-related studies. Some studies were based on modelling, and others used longitudinal data on weight outcomes. Based on the available data, the review came to the following conclusions:

- Taxes that raised the price of fast food by 20% would be likely to reduce consumption by about 10%.
- There was fairly consistent evidence that increasing fast-food prices would reduce body weight among adolescents.

- Subsidising fruit and vegetables by 20% was likely to lead to around a 10% increase in consumption.
- There was evidence of an association between lower fruit and vegetable prices and lower body weight if the subsidies were targeted to low income populations.
- Studies of increases in taxes on soft drink sales showed the least effect on weight outcomes, but the reviewers noted that the issue was complicated by current tax policies that applied both to standard soft drinks and diet drinks.

Note that the studies were all conducted in the United States and used price and tax information applicable to that country, so may have limited generalisability elsewhere.

An Australian review (Black et al 2012) examined fourteen studies of food subsidy programs and their effect on the health and nutritional status of disadvantaged families in high income countries. All but four studies reported on the Women Infants and Children (WIC) supplemental program in the United States. The remaining studies were carried out in Scotland, Wales, New Zealand and one (non-WIC) study in the United States. Subsidies took a variety of forms: the WIC programs included monthly food vouchers for designated quantities of specific foods (for example, fortified cereal, fruit, vegetables, eggs, milk, cheese) for women during pregnancy and for a period after the birth, and food for infants and children up to four years. The other programmes provided subsidies such as family food packages, food vouchers, delivery of fruit and vegetable packages and supermarket discounts on healthier options.² The review found that there was some, though limited, high quality evidence of the impact of these programmes on health and nutrition status, mostly from the WIC studies. There was a 10-20% increase in intake of targeted nutrients in participants and a small, but significant, increase in mean birth weight of infants of women who smoked. There was little evidence of sustained impact on dietary behaviour as a result of any programmes.

Food labelling of both packaged and unpackaged foods has also been widely discussed as one means of promoting healthier food choices across all age groups, but the evidence for impact on obesity and health as yet appears to be potential rather than proven. The Harvard School of Public Health has published a number of detailed recommendations for food marketing and labelling:

- Limit marketing of unhealthy foods and drinks to children on television and other electronic media.
- Restrict food product placement in television shows and movies and restrict other marketing to children such as agreements between entertainment brands and food brands, and marketing in settings where children gather.
- Require restaurants to post calorie information on menus; give restaurants incentives to offer healthier items; set nutrition requirements for meals that offer toys or other incentives aimed at children.
- Standardise front-of-package health labelling and require more prominent per serving and recommended daily limit labelling.

² The supermarket discount refers to the New Zealand programme which made healthier foods available without the 12.5% GST (see Ni Mhurchu C et al 2010).

- Develop public service media and social marketing campaigns to promote healthy eating and counter-marketing campaigns to highlight the negative health impact of unhealthful foods. (Adapted from Harvard School of Public Health undated)

The recommendations are supported by references to high level policy documents and position statements from major medical and health organisations. However, there does not yet appear to be any strong evidence that these approaches have a measurable impact on food choices. As noted by Magnusson (2010), labelling and other information on nutritional content is only one part of "...a wide ranging basket of policies that will be needed if we are to improve the food and physical activity environments" (p. 8).

Media and other informational campaigns

The evidence on informational approaches to promote physical activity from the Community Preventive Services Task Force (Kahn et al 2002) detailed in the review by Begg (2006, p. 29) was updated with respect to the evidence for stand-alone mass media campaigns in a systematic review by Brown et al (2012). The update did not find sufficient evidence to change the earlier conclusion but was careful to note that "the finding of insufficient evidence does not mean that stand-alone mass media campaigns do not improve physical activity at population level, but rather that more research is needed to determine whether or not they are effective in achieving this goal." (p 563). The review reiterated that mass media campaigns can be a component of a successful community-wide approach that has multiple components at school, workplace, and population levels. The Task Force also noted in its update that they had not reviewed interventions using newer electronic media such as mobile devices and social networking media which were likely to play a role in mass media and multicomponent campaigns in the future (Brown et al, p. 553).

The earlier finding that point of decision prompts are effective in increasing levels of physical activity (for example, the number of people choosing to use stairs rather than an elevator) remains unchanged. Such interventions may be more effective when the prompt is tailored to target a specific group.

Breastfeeding

Promoting the initiation of breastfeeding

Breastfeeding confers short-term and long-term benefits on both child and mother and helps protect infants from a variety of acute and chronic disorders. The long-term disadvantages of not breastfeeding are increasingly recognized as important (WHO 2009). Interventions to promote the initiation of breastfeeding and support and encourage breastfeeding mothers are therefore a key part of promoting healthy infant growth and development.

A systematic review and meta-analysis that examined the effect of antenatal peer support on breastfeeding initiation (Ingram et al 2010), located seven studies of

universal peer support and four studies that targeted low-income women. Peer support was defined as any support offered by women who had themselves breastfed, who were from the same socio-economic background and locality as the woman they were supporting and who had received training. Only the targeted interventions showed a statistically significant effect of the intervention, however in two of the RCTs the rates of breastfeeding initiation in the control group was high, leaving little scope for improvement from the intervention. It was also noted by the authors that the intensity of interventions differed considerably between the studies which may have affected the findings.

A more recent review by Ibanez et al (2012) aimed to identify effective programmes that could be implemented in primary care settings to promote breastfeeding in low-income women. The evidence from the ten studies examined showed that educational programmes in the context of ongoing personal contact with a health professional were effective in promoting the initiation of breastfeeding and duration beyond three months compared to the control group. The successful programmes usually involved short follow-up appointments, with some also providing written or video information, and telephone support.

A Cochrane systematic review examined the effectiveness of antenatal education to increase the duration of breastfeeding (Lumbiganon et al 2012). The review located 19 randomised trials. Some studies had one educational method only and others used multiple methods compared to routine care. Most were considered poor quality and the magnitude of the effect was small. The review concluded that peer counselling appeared to be better than routine care for initiating breastfeeding, and that peer counselling, lactation consultation, and formal breastfeeding education during pregnancy appeared to increase breastfeeding duration. The review could not recommend one method of education as being better than another, but noted that in two studies lactation consultation in addition to a booklet and video was more effective than a booklet and video alone.

A Cochrane Database systematic review examining ante-natal interventions for promoting the initiation of breastfeeding (Dyson et al., 2005) was re-examined by the review group in 2007. Key conclusions, which remained unchanged from the 2005 review were:

- Health education interventions are effective in increasing the initiation of breastfeeding among low income women.
- Breastfeeding promotion packs may be an inappropriate use of resources where formula feeding promotion packs are widely distributed, as resources may be better directed elsewhere.

Pate (2009) identified three studies that had incorporated web-based interventions to promote the initiation of breastfeeding and reduce the time and intensity of health provider interventions. While these studies reported positive outcomes, two of them were non-randomised and two had very short follow-up times compared to most of the 18 provider-based studies with which they were compared. The author's conclusion that web-based support had a moderate effect compared to very little effect from provider based interventions did not seem justified. At most, it would appear that web-based support may be a potential additional tool alongside other face-to-face interventions for which the evidence is stronger.

Supporting breastfeeding mothers

A Cochrane systematic review (Renfrew et al 2012) examined 52 studies from 21 countries to determine whether providing extra support from professionals or trained lay people, or both, would help breastfeeding mothers with healthy infants to continue to breastfeed compared to normal care. The support included reassurance, praise, information, and the opportunity to discuss and to respond to questions. The review found that all forms of support had a positive effect on duration of breastfeeding as well as the length of time women breastfed without introducing other foods. Face-to-face support was more effective than telephone support, and services which relied only on responding to women who proactively sought help were not effective. The review recommended that women should be offered predictable, scheduled, on-going support visits and that the type of intervention should be tailored to the particular context.

These conclusions are consistent with the earlier conclusion and recommendation by the U.S Preventive Services Task Force (2009) that coordinated, multi-faceted interventions throughout pregnancy, birth and infancy are effective in increasing breastfeeding initiation, duration and exclusivity.

Another review of breastfeeding support for adolescent mothers (Hall et al 2007) included seven studies with a variety of research designs. Emotional support, esteem support (support to enhance adolescent mothers' feelings of self worth and counter the negative societal perceptions of adolescent pregnancy) and the availability of supportive peer and family networks were identified as key factors. Mothers were particularly important, but support from a known and trusted expert individual who was skilled in both lactation support and working with adolescents was also highly valued. All studies included informational support and there was some evidence to suggest that where this was individualised and relevant to the mother's situation it was also an important component. The review concluded that targeted breast-feeding education and support programmes designed specifically for adolescent mothers are effective in promoting initiation and duration of breastfeeding in this group. However, because of the diversity of the various interventions, the review was unable to identify which particular components of the complex interventions were the most effective.

A systematic review of practice interventions with health professionals who support women in breastfeeding (Spiby et al 2009) found that there was insufficient evidence to determine whether any particular approach was consistently beneficial in achieving longer duration of breastfeeding.

A number of authors have critically examined the evidence for breastfeeding having a preventive effect on later overweight or obesity (Beyerlein and von Kries 2011; Monasta et al 2010; Cope and Allison 2008). They all concluded that although an association has been shown in studies, there is no strong or consistent body of evidence available that demonstrates a causal effect, or the relative importance of the range of other determinants that may contribute to overweight and obesity. Beyerlein and von Kries (2011) summarised the issue by noting that "although a

priming effect of breastfeeding on body composition in later life appears plausible, it is difficult to prove empirically” (p. 1774S) in spite of the considerable number of studies that have been published. Associations between breastfeeding and a preventive longer-term effect on other diseases such as asthma and coeliac disease have also been suggested but a causal relationship has again not been proven.

School and community programmes to increase healthy nutrition and prevent childhood obesity

The evidence on programmes for preventing obesity and/or increasing physical activity in children has been extensively reviewed in the last few years. A Cochrane systematic review of interventions for preventing obesity in children (Waters et al 2011) included 55 studies, the majority of which targeted children 6-12 years. The review found strong evidence to support beneficial effects of programmes on reducing adiposity. The most promising strategies appeared to be:

- school curricula that include physical activity, healthy eating and body image components
- increased sessions for physical activity and the development of movement skills throughout the school week
- improvements in the nutritional quality of food supplied in schools
- environments and cultural practices that support children eating healthier foods and being active throughout the day
- professional development and capacity building of teachers to implement health promotion programmes and activities, and
- parent support and home activities that encourage children to eat more nutritious food, be more physically active and spend less time on screen-based activities.

There was insufficient evidence to distinguish which particular components contributed the most to the successful outcomes. The reviewers recommended that future research should focus on how obesity prevention research could be embedded in health and education systems to achieve long-term sustainable outcomes.

In a more recent review for Community and Public Health Christchurch, Mulrine (2013) examined 15 systematic reviews that focused on increasing physical activity, reducing sedentary behaviours, and promoting healthy eating habits in 6-12 year old children. Several of these studies reviewed more recent literature than in the work done by the Cochrane group (Waters et al 2011), but the overall conclusions were unchanged. The more successful interventions combined both diet and exercise, involved families, were delivered in multiple settings (school, home, community) and were of longer duration. Examples of particular strategies included group counselling, school food changes, health education, city policies, community awareness campaigns, social marketing and physical activity enhancements in the school and community. Interventions that were education alone or had minimal personal contact were not effective, and the only review of solely home-based interventions also proved ineffective. All the studies critically appraised for the systematic reviews were carried out in countries other than New Zealand.

Two New Zealand studies, Project Energise in the Waikato (Rush et al 2013) and APPLE (A Pilot Programme for Lifestyle and Exercise) in Otago (Taylor et al 2008) are detailed in the review by Mulrine (2013). Both interventions were primarily school-based, though the APPLE project also involved families and communities in some activities; both had control groups with which to compare outcomes of the intervention, and both provided a co-ordinator who worked with the school to implement the intervention. Similar strategies to those described in the international studies were used. These studies both reported positive, though modest, outcomes and indicated that "...the provision of a dedicated co-ordinator to increase physical activity and promote simple healthy eating messages can have some modest positive effects on the adiposity and health of primary school age children" (Mulrine 2013, p. 11). Other current nutrition and physical activity programmes used in New Zealand are also listed in this useful review.

Some concerns have been raised that interventions to prevent obesity could have adverse psychosocial or physical outcomes such as body image dissatisfaction, low self-esteem, disordered eating behaviours and attitudes, discrimination against obese individuals, and social stigmatisation. Mulrine (2013) noted that few interventions examined adverse effects and those that did were not usually powered to detect them, so that decisive conclusions about the potential for adverse outcomes are not possible.

As with other areas of health promotion with young people, there has been interest in computer and web-based interventions for promoting healthy eating. Hamel and Robbins (2013) reviewed 15 controlled studies using computer or web-based interventions that aimed to improve eating behaviour and/or diet related physical outcomes among children and adolescents. Eleven of the studies reported significant improvements in eating behaviour (based on self-reported food recall) and three studies reported statistically significant reductions in body weight or BMI compared to controls. Those based in schools were more effective than those that were home-based. This appeared to be due to the potential for support from classmates and teachers, and the ease with which computer-based interventions could be implemented in schools to replace print-based material. Personalised feedback to individuals also appeared to be a factor for greater effectiveness. However, only three studies used follow up measures and none of them were able to demonstrate that changes were maintained over a longer period. The authors concluded that online interventions to promote healthy eating are able to engage children to participate and make some changes but the effect is short lived. Programmes need to be complemented by other evidence-based strategies that are integrated into the whole school setting. None of the studies in this review included promotion of physical activity.

Dobbins et al (2013) examined 44 randomised studies of school-based programmes for increasing physical activity and fitness in a Cochrane systematic review. There was some evidence that the programmes led to an increase in the proportion of children who engaged in moderate to vigorous physical activity during school hours. Children in the intervention arms of the studies were more active, spent less time watching television, and improved in VO₂ max. The combination of interventions in each programme was different, as well as the duration, frequency and intensity of the interventions, meaning that no conclusions could be made about the most effective components. The interventions examined were not effective in increasing physical

activity among adolescents, reducing body mass index, cholesterol, pulse rate, or blood pressure.

Another Cochrane systematic review examined community wide interventions for increasing physical activity for the whole population (Baker et al 2011). Many of the 25 included studies were not well designed and effects were inconsistent, leading the reviewers to conclude that there was insufficient evidence to conclude that these interventions either were or were not effective. The review indicated that there was a need for well-designed studies in this field.

While the review by Baker et al (2011) found insufficient evidence for community-wide interventions alone, the Community Preventive Services Task Force endorses their effectiveness in broader multicomponent community-wide interventions that include individually oriented behaviour change programmes and activities, social support networks and environmental and/or policy changes. The Task Force found evidence that such programmes increase awareness and knowledge about the benefits of physical activity and change attitudes and norms, which in turn assists in creating a broader social environment supporting population behaviour change (Brown et al 2012).

Injury prevention

Evidence summary

Traffic safety

- Both community and school-based campaigns can increase compliance with wearing of cycle helmets, especially if free helmets are provided.
- Providing free booster seats is the most effective intervention to increase their use and correct fitting. However, education campaigns, (including media campaigns) and discount vouchers for booster seats also increase their use compared to no intervention.
- Continuing booster seat use in children up to age 8 years reduces injuries in motor vehicle crashes. Backless booster seats are likely to be more acceptable to children as they get older and are just as effective.
- Safety education can improve knowledge and behaviour of child pedestrians but there is no evidence about its effect on injury rates.
- Reflective bag stickers may be effective in increasing visibility of child pedestrians.

School-based programmes for reducing drinking and driving

- School-based instructional programmes can reduce the incidence of travelling with drinking drivers.
- Programmes run by adults appear to be more effective than those run by peers.
- There is insufficient evidence that instructional programmes reduce drinking and driving or that peer support programmes or social norming programmes reduce drinking and driving or travelling with drunk drivers.

Interventions to improve safety in the home

- Home safety interventions related to fire, falling, burns, poisons, and electrical hazards are effective in increasing preventive practices within the home.
- There is insufficient evidence that these interventions reduce injury rates but this does not mean interventions are ineffective.
- In disadvantaged communities, equipment needs to be provided and installed. Programmes are more effective if they are integrated into wider health programmes delivered by trusted authorities or part of a wider community campaign.
- Barriers to improving home safety include distrust of authorities, language barriers, transient families, and complex programmes that require a high level of staff training.

General injury prevention programmes

- The effectiveness of the WHO Safe Communities model is hard to determine as the type of interventions and the way they have been evaluated is widely different between communities. New Zealand studies included in a Cochrane systematic review showed a fall in injury rates in the communities of New Plymouth and Waitakere where the Safe Communities model had been adopted.

Interventions to prevent child maltreatment

- Effective child maltreatment prevention strategies need to take place at the societal, community, family, and the individual level.
- Legal reforms and human rights, social and economic policies, reducing inequalities and changing social and cultural norms are top level interventions that help prevent child maltreatment but that cannot be tackled by health services alone.
- There is strong evidence for the effectiveness of home visitation programmes targeting at-risk families that begin in pregnancy, continue for several years, and have the flexibility to be adjusted to the needs of individual families and children.
- There is strong evidence to support parent training programmes for parents of children 3-12 years. The Triple-P programme is recommended by WHO and can be implemented at different levels of intensity and in a variety of settings.
- There is insufficient evidence that programmes teaching children how to avoid potentially abusive situations can protect them in real-life situations and there is potential for some harms from these programmes.
- Kinship care by family members appears to give mostly better outcomes for children than traditional out-of-home foster care, but only after careful assessment of the needs of the child and the ability of the family members to provide safe care.

Traffic safety

A Cochrane systematic review (Owen et al 2011) of non-legislative interventions for the promotion of cycle helmet wearing by children considered 29 randomized trials and cost benefit analyses. The most effective schemes were those that were community based and provided free helmets. Promotion of helmets in schools was also effective, especially for younger children up to age 12. The review did not assess the impact of helmet programmes on injury rates or whether there were negative effects such as decreasing the number of children who cycled or examine the additional effect of interventions in countries where there is legislation requiring helmet wearing.

A Cochrane systematic review (Ehiri et al 2006) on interventions for promoting the use of booster seats in four to eight year olds travelling in motor vehicles was reviewed in 2011 with no change to the original conclusions. All interventions were effective in increasing the use of booster seats. The most effective were those that distributed free booster seats together with information about their correct use. However, education only or education plus discount vouchers for booster seats also increased use compared to no intervention.

The US Preventive Services Task Force (2007) found “good evidence that community and public health interventions, including legislation, law enforcement campaigns, car seat distribution campaigns, media campaigns and other community based interventions are effective in improving proper use of child safety seats, booster seats and seat belts.” The Task Force was not able to determine the incremental benefit of counselling over and above legislation and community interventions. The Task Force recommendations for proper use of child restraints were that:

- Infants weighing less than 10kg should be in infant-only seats; infants weighing up to 16 kg should be in rear facing convertible seats.
- Toddlers aged one to four years should be in forward facing or forward convertible seats positioned in the back seat.
- Young children aged four to eight years should be placed in a booster seat in the back seat.
- Lap and shoulder belt use is appropriate after the age of eight years.
- Failure to use the correct type of seat and correct positioning compromises the safety benefits.

Arbogast et al (2009) extracted evidence from a wider 10 year database of all crashes in 16 states in the US that covered 7151 children aged 4-8 years in who were involved in 6591 crashes. Their analysis confirmed the evidence that children aged from four to eight years who were seated in correctly positioned booster seats were 45% less likely to sustain injuries than similarly aged children who were using seat belts only. There was no evidence of a difference between backless versus high back boosters and the backless seats had the additional advantage of being cheaper and more acceptable to children at the older end of the age group because they looked less like a toddler restraint.

Begg’s review (2006) found evidence that effective interventions to improve child pedestrian safety included education from teachers and parents, simulated games, table-top models of traffic environments and training in a real traffic situation. Key conclusions were:

- Safety education can improve children’s knowledge and their observed behaviour.
- Effects of the observed behaviour on pedestrian injury are unknown.
- There is no evidence that any one type or combination of interventions are superior to another.

There appears to be little further evidence to change these conclusions. Recent randomised trials (Oxley 2008; Schwebel & McClure 2010) have focused on training children through the use of virtual reality simulators to develop the complex and perceptual and cognitive skills needed for safe street crossing. However, as yet, there are a limited number of trials with only small numbers of participants. An alternative

approach reported by Mulvaney et al (2006) aimed to increase child pedestrian and cyclist visibility by the provision of free visibility aids (reflective bag stickers or fluorescent strips that could be worn as arm or leg bands). At eight weeks follow up 61% of children who had been provided with the visibility aids were still wearing them. Bag stickers proved the most popular and were likely to remain the longest compared to the arm bands which were more likely to be worn only when the weather required wearing coats and jackets.

School-based programmes for reducing drinking and driving

No further systematic reviews were located to further update the findings from the review of evidence by Begg (2006). The 2006 report found three types of interventions used in school-based programmes for reducing drinking and driving and/or travelling with drinking drivers: instructional programmes including those focusing on self esteem, decision making, and goal setting; peer programmes (for example, Students Against Destructive Decisions, formerly Students Against Drunk Driving); and social norms programmes based on the premise that students over-estimate each other's alcohol intake and this influences them to drink more.

Key conclusions from the 2006 review were:

- There is sufficient evidence that school-based instructional programmes reduce the incidence of travelling with drinking drivers.
- There is insufficient evidence to determine the effectiveness of instructional programmes for reducing drinking and driving.
- There is insufficient evidence to determine the effectiveness of peer organisations for reducing drinking and driving and travelling with drunk drivers.
- There is insufficient evidence to determine the effectiveness of social norming programmes for reducing drinking and driving and travelling with drunk drivers.

Safety in the home

A Cochrane review of trials of parenting interventions for preventing injury to children in the home (Kendrick et al 2013) found that multi-faceted interventions were effective in reducing unintentional injury in children and improving home safety. Interventions included education and home visiting components and most were with disadvantaged families or those considered "at risk". This review concluded that it was worthwhile for health and social service agencies to make such programmes available.

Two systematic reviews focusing on home safety equipment (Kendrick et al 2012; Pearson et al 2010) found evidence that the provision and installation of safety equipment could improve safety practices and may reduce unintentional injuries to children. Families who received home safety interventions were more likely to have a safe hot tap water temperature, a working smoke alarm, a fire escape plan, fitted stair gates, socket covers, poison control numbers accessible, and to keep medicines and cleaning products out of the reach of children.

Two other detailed reviews and meta-analyses of childhood thermal injury prevention (Kendrick et al 2009) and falls preventions in the home (Kendrick et al 2008) by the same Cochrane review team found that home safety education and equipment was effective in increasing preventive practices in the home. There was insufficient evidence that these interventions were effective in reducing the rate of unintentional child injury, but the authors noted that the lack of evidence should not be interpreted as showing that the interventions were ineffective.

Factors associated with effectiveness of interventions in all studies were:

- Simply providing equipment is not effective. Equipment, combined with installation and advice were necessary for an increase in installation rates to occur, particularly in disadvantaged communities.
- In disadvantaged communities, home safety interventions that included equipment and installation were more effective if they were integrated into wider health programmes delivered by authorities who were trusted.
- Families where an adverse injury event had occurred had a statistically significant increase in rates of installation of equipment directly related to the event, but not necessarily for safety equipment unrelated to the event.

Two further systematic reviews of facilitators and barriers for home injury prevention interventions (Smithson et al 2011; Ingram et al 2011) with broadly consistent findings to those detailed above, provided additional confirmation of the evidence for the factors that constituted effective interventions. The review by Smithson et al (2011) also synthesised qualitative research studies.

Facilitators that increased safety in the home were:

- home visits including equipment provision and parent education or advice
- involvement and participation of the local community in a wider campaign
- partnership across organisations (health, local authorities, community groups)
- tailored interventions (for example for different ethnic and socioeconomic groups, different age groups of children)
- a focused, simple message that was perceived as personally relevant to the parents
- a known and trusted deliverer (child health provider; trained lay community member) or delivery setting (child outpatient department)
- reinforcement in the form of reminders from health professionals and prominent posters, and
- incentives such as vouchers, free first aid training, and crèche facilities while parents attended educational interventions.

Barriers that limited the effectiveness of home safety interventions were:

- Cultural barriers: distrust of authorities and fear of strangers entering the home; language barriers that prevented the uptake of home safety interventions.
- Socio-economic barriers: transient families who lived in rented housing or over-crowded conditions, and groups with low literacy, or economic constraints.

- Complex interventions that attempted to cover too much at one time or were dependent on the skill of the deliverer.
- Programmes that required a high level of staff training and/or took a long time to deliver and assess were not sustainable over a long period.
- Lack of parental motivation; beliefs that safety interventions were not needed or that accidents were a normal and inevitable part of life.

WHO Safe Communities

The WHO Safe Communities model³ introduced in 1989 has been adopted by a number of towns and cities around New Zealand as a way of coordinating community efforts to enhance safety and reduce injury. Communities can become accredited if they meet seven criteria:

- An infrastructure based on partnership and collaborations, governed by a cross-sectoral group that is responsible for safety promotion in their community.
- Long-term, sustainable programmes covering both genders and all ages, environments, and situations.
- Programmes that target high-risk groups and environments, and programmes that promote safety for vulnerable groups.
- Programmes based on the available evidence.
- Programmes that document the frequency and causes of injuries.
- Evaluation measures to assess programmes, processes and effects of changes.
- Ongoing participation in national and international Safe Communities networks.

According to the New Zealand Safe Communities website there are currently 24 Safe Communities in New Zealand. International Safe Schools have also been run in conjunction with the Safe Communities model. Fifty schools throughout New Zealand were accredited to the programme, but following withdrawal of funding, the schools programme no longer operates.⁴

A Cochrane systematic review (Spinks et al 2009) examined the effectiveness of the WHO Safe Communities model for preventing injuries in whole populations. The review included evaluations of the programme in 21 communities from five countries (Austria, Sweden, Norway, Australia and New Zealand). The New Zealand studies included were from New Plymouth and Waitakere. In both of these areas there was a reduction in child injury rates measured by deaths, hospital admissions, and emergency department presentations. Data from the rest of New Zealand was used as a comparison with the New Plymouth data, and Waitakere data was compared to the rest of Auckland. Although injury rates did reduce following designation as a Safe Community in some places, there was no consistent relationship between being a designated Safe Community and changes in injury rates. There was also limited information about the way the model was implemented, large differences between countries in what kind of interventions were undertaken, and inconsistency in the way

³ See <http://www.safecommunities.org.nz/>

⁴ See <http://www.safecommunities.org.nz/ssciap/>

results were reported, which made it difficult to draw any conclusions about its effectiveness. The authors also noted the lack of studies from middle and low income countries with higher injury rates than the ones reported in the available evaluations.

Other recent trials of child injury prevention programmes

The iPLAYschool programme (Injury Prevention Lessons Affecting Youth) focused on preventing injury in sports (Collard et al 2010) through a randomised trial involving 2210 children aged 10-12 years from 40 primary schools throughout the Netherlands. There were 20 schools in each of the intervention and control groups. The eight-month intervention was directed at both children and parents using newsletters aimed at improving knowledge, attitudes, and self-efficacy in preventing child injury. Exercises at the beginning and end of each physical education class aimed to improve speed, strength, flexibility, and coordination. The intervention did not reduce injury rate overall, but there was a significant reduction in physical activity injuries in less active (<7 hours/week) children in the intervention schools compared to the control schools.

Kendrick et al (2007) reported on a trial in 20 Nottingham primary schools of Risk Watch, a school based injury prevention programme for children aged 7-10 years. The Fire Service trained teachers to deliver the programme and provided teaching resources. Risk Watch aimed to improve bike and pedestrian safety, prevent falls, and increase safety related to fire, poisoning and burns. The main outcome measures were safety knowledge, observed safety skills and self-reported safety behaviour. Knowledge and self-reported safety behaviour were measured using written questionnaires. Safety skills were assessed in a random sample of children from each school by observation of role plays in age-appropriate injury scenarios. Results over one year showed that children in the intervention schools were significantly more likely to know what to do if clothes caught fire, and the right way to wear a cycle helmet than children in the control schools. The programme was more effective in increasing fire and burn prevention knowledge among younger than older children and in increasing bike and pedestrian safety among boys than girls. Children in the intervention group also demonstrated greater safety skills in the role play scenarios than in control schools. There was little evidence to show any impact on safety behaviour. The intervention was provided to control schools after the completion of the trial.

Manno et al (2011) reported on a study in Massachusetts evaluating the effectiveness of a mobile injury prevention unit in a bus. The bus contained a “safety street” that was designed to complement the school curriculum with 10 minute lessons on pedestrian, home and bus passenger safety. The various stations in the bus used simulation and hands-on activities and included role playing and problem solving. The intervention was a cluster design with Grade 5 students (aged 10 years) in sixteen matched pairs of elementary schools. Intervention schools received a visit from the mobile injury prevention unit and control schools completed the traditional classroom safety education curriculum. Evaluation was done using a ten-question test that was administered at baseline, immediately after the intervention or classroom curriculum, and six months later. Mean test scores rose from 5.67 at baseline for all groups to 7.43 for the intervention group and 6.48 for control schools afterwards. The authors reported that the intervention was limited by the time and resources available to

schools (including a safe place to park the large mobile unit), absenteeism, the weather and individual characteristics of classroom teachers.

Two studies in Auckland (Moran & Stanley 2006; Moran et al 2012) investigated the effect of educational interventions on water safety that ran in conjunction with toddler swim lessons over a 10 week programme. The first uncontrolled study addressed parental misconceptions of toddler water safety, resulting in significant improvements in understanding after the completion of the programme. The second study randomised 109 parents to control, pool-based, or home-based groups for instruction in child CPR. Post-intervention, confidence and knowledge improved significantly for both instruction groups compared to controls. The authors noted that swim lessons for very young children were a promising way of improving parent water safety knowledge but commented on a number of practical limitations: a shortage of qualified instructors, under-representation of fathers in the study, and cost to parents.

Preventing injury from child maltreatment

Recent recommendations on prevention of child maltreatment are available from the US Preventive Services Task Force (Selph et al 2013; Moyer 2013). The first of these (Selph et al 2013) was based on evidence from eleven randomised trials of behavioural interventions and counselling to prevent child abuse and neglect, ten of which focused on home visiting. The review concluded that, even though there were some inconsistent results, these types of interventions were effective in reducing abuse and neglect outcomes for young children. Home visiting in particular resulted in reduced reports to child protection services, emergency department visits, hospitalisations, and improved adherence to immunisations and well-child care. The second recommendation (Moyer 2013) examined the evidence for primary care interventions among children in the general population without any signs or symptoms of abuse. This was an update of a previous systematic review carried out in 2004, but conclusions remained unchanged. There was still insufficient evidence to recommend for or against interventions with general populations because of the heterogeneity in study methods, the type of intervention, as well as inconsistent and limited evidence of outcomes or how they were measured.

An older but more comprehensive guide to preventing child maltreatment from the WHO (Butchart et al 2006) defines four types of maltreatment: physical abuse, sexual abuse, emotional abuse, and neglect. The document sets out a typology of prevention strategies, focusing on the main elements and core principles of interventions rather than detail about the implementation.

At the top level are societal and community interventions:

- Implementing legal reforms and human rights such as incorporating the Convention on the Rights of the Child into national laws; strengthening police and judicial systems, and promoting social, economic and cultural rights.
- Social and economic policies that provide early childhood education and care, universal primary and secondary education, measures to reduce

unemployment and mitigate its adverse consequence, and investing in good social protection systems.

- Changing social and cultural norms that support violence against children and adults.
- Reducing economic inequalities by tackling poverty, and reducing gender and income inequalities.
- Reducing environmental risks including the availability of alcohol and reducing environmental toxins.
- Providing shelters and crisis centres for battered women and children and training health professionals to identify and refer at-risk families to the right services.

At the family level, WHO found strong evidence for home visitation programmes in preventing child maltreatment. They referenced work by Hahn et al for the US Preventive Services Task Force (2003) that found a reduction of up to 40% in child maltreatment by parents and families participating in home visitation programmes and that participation also appeared to reduce youth violence over the longer term. According to this work by the Task Force, successful programmes contain the following elements:

- A focus on at-risk families, that is, those with low birth weight and pre-term infants, children that are chronically ill or disabled, low-income, single mothers, and families with a history of substance abuse.
- Intervention that begins in pregnancy and continues until at least the second year of the child's life and preferably until the fifth year.
- Flexible programmes that can be adjusted to the needs of individual children and families.
- Promotion of positive physical and mental health behaviours and care giving.
- Broad coverage of a range of needs, not a single focus on child abuse.
- Measures to reduce stress in the family by improving social and physical environmental conditions.
- Home visits carried out by nurses or trained semi-professionals.

The WHO document (Butchart et al 2006) also specified key factors for effective parenting programmes that could be delivered individually in the home or to school groups or in other settings, such as a child health clinic. They recommended that programmes should focus on parents of pre-adolescent children aged 3-12 years and use step-by step teaching of child management skills, where each new skill builds on the last. The core components should teach parents to:

- identify and record problematic behaviours at home
- use positive reinforcement techniques such as praise and points systems
- apply non violent discipline methods such as the removal of privileges and time-out
- supervise and monitor child behaviour, and
- use negotiating skills and problem solving strategies.

The authors noted that most often parenting programmes measured effectiveness with “proximal outcomes”(p. 39) such as parental competence, reduced parent-child

conflict, and parental mental health rather than measuring a direct effect on child maltreatment.

The WHO document also noted that reducing unintended pregnancies, and increasing access to prenatal and postnatal services were also likely to help reduce child maltreatment although these approaches have been insufficiently evaluated for their direct effect on child maltreatment. Access to services also helps to identify prospective parents who would benefit from home visitation and/or parenting programmes for which the evidence is strong.

The WHO highlighted the Triple P Positive Parenting Programme (Sanders et al 2003) from Australia as an example of an effective programme. The Triple P programme is available in multiple levels of intensity and suitable for audiences across the full range of implementation settings from universal, to group, family, and individual applications. It also includes an enhanced version for families where the children have severe behaviour problems complicated by additional adversity factors.

Child education programmes

The WHO document mentions but does not endorse programmes that teach children how to avoid potentially abusive situations. It notes that although children can develop knowledge and acquire skills that relate to protecting themselves from abuse, their application in real-life situations has not yet been scientifically demonstrated, particularly in situations where the perpetrator is someone known and trusted by the child (Butchart et al 2006, p. 40). This is consistent with a Cochrane systematic review (Zwi et al 2009) which reached similar conclusions. While the 15 trials measuring improvement in knowledge and behaviour as a result of school-based sexual abuse intervention programmes reported significant improvements in knowledge measures and protective behaviours, it is uncertain whether these changes would result in prevention of child sexual abuse. Additionally, some harms were reported. The authors concluded that such school-based programs should, at best, be seen as just one part of a wider community approach.

Out of home care placement

A Cochrane systematic review (Winokur et al 2009) examined 62 studies reporting child welfare outcomes in relation to wellbeing, permanency and safety for both traditional foster care and kinship care. The review reported that current best evidence suggests that kinship care appears to give better outcomes in terms of behavioural development, mental health, placement stability and guardianship than traditional foster care. There was no difference between the groups in reunification, length of stay, family relations or educational attainment. The authors noted considerable methodological weaknesses in the studies and cautioned that even though kinship care is a viable option for out-of-home placement, it may not always be in the best interest of the child. Professionals should therefore carefully assess the needs of the children and the ability of the extended family members to provide the

care. They recommended against policies mandating kinship care for out-of-home placement.

Mental health

Evidence summary

Parenting

- The first five years of life are critical for mental, social and emotional development and mental health over the whole course of life.
- Both universal and targeted approaches are needed for the primary prevention of mental disorders and to support the mental health of children and young people. Parenting programmes for young children differ widely but have in common the sensitisation of parents to the needs of their child.
- There is evidence to show that universal programmes are generally modest in cost, avoid labelling parents as “failing”, and may prevent and address problems before they become more serious. Universal perinatal programmes supported by the evidence include skin-to- skin contact at birth, kangaroo care, abdominal massage in pregnancy, media-based pregnancy programmes, developmental and anticipatory guidance, and infant massage.
- Antenatal education programmes focusing on transition to parenthood and emotional and attachment issues are also promising but more research is needed to definitely establish their effectiveness.
- There is evidence to support targeted interventions for those in high risk groups, including parents with drug and alcohol addictions, mental illness, or those who abuse or neglect their children.
- Psychotherapeutic approaches, intensive, multi-component family support, cognitive behavioural parenting programmes, and anger management programmes are promising in high-risk families but there is not yet definitive evidence of their effectiveness.
- Parenting programmes must be implemented by skilled facilitators and be of sufficient intensity and duration to be effective.
- There is evidence that universal prevention programmes for post-natal depression and psychological debriefing after birth are not effective.
- There is a lack of evidence on support for fathers, and the best way to support families where parents have mental illness.

School-based programmes

- A robust universal approach with embedded targeted approaches for children with higher needs is the most effective approach for school-based mental health promotion programmes.
- The most effective interventions have a similar mix of cognitive behavioural and social skills training for children, with training for parents and teachers in reinforcement and better methods of discipline.

- To be effective, programmes need to be integrated into the curriculum and carried through in the classroom and throughout the whole school. The underlying school ethos and culture and the opportunities for young people to participate need to be a key focus.
- Teaching methods should be varied and interactive and take a positive, holistic approach rather than focus on “problems”.
- All leaders need extensive and intensive training. Specialist staff are likely to be needed initially but routine teachers need to take over to ensure that the programme is sustainable and is properly integrated into the school culture.
- Programmes should begin at an early age, with booster sessions in the older age groups. Programmes need to be at least nine months in duration to make a lasting impact.
- Programmes should have a sound theoretical base, well defined goals and rationale that are linked directly to the intervention components. They should have a direct focus on the desired outcomes, explicit written guidelines, thorough training, and identification of individual responsibilities.
- Programmes should only be undertaken if they fit the school context and can be implemented with fidelity and rigour.

School based programmes for preventing suicide and promoting resilience

- Identifying and responding to suicidal and potentially suicidal students can be improved by instituting school-based gatekeeper training programmes for teachers, administrators and school health professionals as well as parents. Refresher training is needed to strengthen and maintain the skills developed.
- Gatekeeper training must be paralleled by service development so that individuals can be referred to a service that will assist them effectively.
- Respected and trusted adults of ethnic minority and indigenous communities should be included in those who are trained in gatekeeper programmes.
- There is evidence that developmentally sequenced programmes with age-appropriate curricula enhance emotional wellbeing for all students. Specific programmes supported by the evidence are PATHS for preschoolers and primary-school aged children and the Penn Resilience Programme or FRIENDS for Life for at-risk intermediate and/or secondary school aged children.
- Children of all ages may benefit from being exposed to developmentally and culturally appropriate mindfulness programmes. However, there is as yet a lack of evidence on these programmes for children with high levels of distress or from different cultural backgrounds, as well as a lack of teacher training programmes.

Interventions to prevent anxiety and depression

- There is good evidence that both targeted and universal psychological or educational prevention programmes are effective in reducing depressive episodes in young people aged 5-19 years compared to no intervention.
- There is some evidence that exercise programmes may reduce anxiety and depression scores in healthy children, but no evidence that exercise is effective in children who are already being treated for anxiety or depression

Interventions to prevent eating disorders

- There is some evidence that media literacy and advocacy programmes are effective in reducing acceptance of societal body image norms.
- There is insufficient evidence that programmes that address eating attitudes and behaviours or aim to improve self-esteem are effective in preventing eating disorders.

Promoting self-esteem

- Exercise has possible short term effects on self-esteem in children and young people.
- Exercise has positive effects and no known negative effects and may be an important intervention in improving self-esteem.
- Exercise for improving self-esteem in overweight and obese children is an emerging area of interest.

Interventions to prevent conduct disorder

- There is evidence that interventions over a period of one to two years that target at-risk children and use parent training, child social skills training or a combination of the two can significantly reduce conduct-related symptoms.
- Successful interventions have been reported in homes, preschools and schools delivered by either clinicians or teachers.

Introduction

The first few years of life are increasingly recognised as being critically important for mental, social and emotional development during childhood and mental health over the whole course of life (Stewart-Brown and Schrader-McMillan 2011). Greater attention to prevention is needed to avoid the lifelong distress and disability associated with mental disorders, rather than treatment, which has tended to be more emphasised in health systems (Waddell et al 2007). Primary prevention of mental disorders and promotion of good mental health covers a range of both universal and targeted approaches, defined by the World Health Organisation as:

- Universal prevention: interventions across an entire population group that has not been identified on the basis of increased risk.
- Selective prevention: interventions targeted specifically for individuals or subgroups of the population whose risk of developing a mental disorder is significantly higher than average, as evidenced by biological, psychological or social risk factors.
- Indicated prevention: interventions targeted for high-risk people who are identified as having minimal but detectable signs or symptoms foreshadowing mental disorder, or biological markers indicating predisposition for mental disorder but who do not meet diagnostic criteria for disorder at that time. (WHO, 2004 cited in Begg 2006, p. 35)

The evidence presented in this section on promotion of mental health first covers effective programmes for parents (including before the birth of children), followed by evidence on school-based programmes for children and young people, and lastly, a short section on programmes aimed at preventing particular mental disorders. Two of these sections draw heavily on comprehensive documents prepared by the European Union DataPrev project (see <http://www.dataprevproject.net/>) This project aims to address the current lack of evidence-based knowledge on effective programmes for mental health promotion and mental disorder prevention and how to implement them. Four implementation settings were chosen for the DataPrev project, two of which (home-based and family-based programmes for infants and toddler and school-based programmes for children and adolescents) have been used.⁵

Parental mental health and parenting programmes

A Cochrane systematic review of group-based parent training programmes for improving parental psychosocial health examined 48 studies that covered three types of programme: behavioural, cognitive-behavioural and multimodal (Barlow et al 2012). Statistically significant short term improvements were found for parental stress, anxiety, anger, guilt, confidence and satisfaction with partner relationship. However, effects diminished over time with no significant effect remaining at one year, so that the reviewers concluded that further input would be required to maintain the effect. There was a lack of evidence about any effect for fathers or the comparative effectiveness of one type of programme compared to another.

The DataPrev project of the European Union located 52 high quality systematic reviews of parenting programmes designed to support mental health of parents and young children (Stewart-Brown and Schrader-McMillan 2011). These included both universal and targeted programmes from before birth and throughout childhood. The review was divided into four sections covering:

- i) antenatal parenting programmes and perinatal maternal mental health programmes
- ii) parenting support programmes in infancy and early years to enhance maternal attachment and infant attachment security

⁵ The other two settings are work-based programmes for adults, and home and community-based programmes for older populations.

- iii) formal parenting programmes, both universal and targeted at high risk groups, that aimed to prevent behaviour problems
- iv) parenting support for families with mental illness, addictions, or where abuse had already occurred.

The overall finding from the studies was that outcomes for children can be changed if parenting can be influenced for the better. The programmes examined were widely different but all had a focus on seeking to sensitise parents to their children's needs. There was evidence to support both low cost universal programmes and targeted programmes for higher risk groups and those with serious problems. The reviewers noted that universal programmes had the advantage that they avoided labelling parents as "failing" if they participated, and they may also prevent problems or enable them to be addressed before they became more serious.

This major review found evidence to recommend the following interventions and the population groups they applied to (Stewart-Brown and Schrader-McMillan 2011, p. i24):

Low cost universal interventions:

- skin to skin contact at birth
- kangaroo care
- abdominal massage in pregnancy, and
- media-based pregnancy programmes.

Slightly higher cost universal interventions:

- developmental guidance
- anticipatory guidance, and
- infant massage

Targeted programmes for high risk groups:

- psychosocial interventions offering emotional and practical support for the prevention of post-natal depression
- treatment for post-natal depression using cognitive behavioural approaches, interpersonal therapy or non-directive counselling
- long-term multi-component home visiting programmes starting before birth and offering parenting skills and practical support for parents, particularly teenage parents
- sensitivity focused interventions including parent-infant interaction guidance training for high-risk infants, and
- group-based and one-to-one parenting programmes addressing behaviour management and parent-child relationships.

The following were found to be promising but in need of more research:

- In all families: antenatal education focusing on transition to parenthood and emotional and attachment issues and programmes to support parenting by fathers.
- In families where there is a risk of abuse: parent-infant psychotherapy and infant led psychotherapy.

- In families where physical abuse has occurred: intensive, multicomponent, multi-systemic family support approaches and cognitive behavioural-based parenting programmes.
- In families where emotional abuse has occurred: parent-infant psychotherapy and, where relevant, additional anger management components.
- In families where sexual abuse has occurred: cognitive behaviour therapy for the non-abusing parent; abused children can also benefit.
- In families with drug abusing parents: one-to-one multicomponent programmes targeting affect regulation, parental mood and views of self as a parent, drug use and parenting skills.

Psychological debriefing after birth and universal approaches to prevent post-natal depression were found to be ineffective.

The review also noted that no matter how good the design of a particular programme may be, it does not in itself make for effectiveness but must be backed up by good implementation. The following were listed as the elements of successful implementation:

- High-risk groups require skilled facilitators. However, volunteer programmes can be useful for low risk families and possibly for outreach with higher risk families.
- Facilitator skills are critical but the non-judgmental, strengths-based approach is not something that health professionals are routinely trained in. Moreover, there are few studies that have measured facilitators' skills.
- A manual or curriculum for formal programmes that covers emotional communication and experiential learning where parents practice new skills like "time out" is an effective approach.
- Formal parenting programmes require at least two hours per week for at least 8-12 weeks to be effective.
- Frequent visits over an extended period of time are necessary for high-risk families where establishing trust is important.
- Recruitment and retention, especially in high risk groups is critical and is influenced by contextual factors (poverty, poor housing, unemployment, and other sources of stress). Promoting the fact that the programmes improve parents' psychosocial health may assist in recruitment and retention.

Finally, this review found some important gaps in the literature, namely the absence of studies of interventions to support fathers, and secondly, the need for more evidence on the best way to support high-risk families where parents have mental illness. The full review should be read for an understanding of how the conclusions were arrived at and the individual studies examined for the details of those programmes that were found to be most effective.

School-based mental health promotion

Schools-based programmes were the second of the four implementation settings for the Dataprev project. Systematic reviews of such programmes were examined in a

comprehensive review by Weare and Nind (2011). They identified 52 high quality systematic reviews most of which dealt with universal rather than targeted programmes for schools. Fifty of the reviews concluded that one or more of the interventions were at least in some way effective. Interventions had “wide-ranging benefits on individual children and young people, on classrooms, families and communities and on an array of mental health, social emotional and educational outcomes” (Weare and Nind 2011, p. 157). A helpful aspect of this major review is the identification of themes across reviews and the characteristics of the more effective interventions:

- *Targeted vs universal programmes:* Universal and targeted approaches both have their place and appear to be stronger in combination. Targeted approaches that are embedded and integrated within a robust universal approach appear to be the most effective.
- *Linking with academic learning:* Longer term impact of interventions occurs when interventions are linked with and integrated into the curriculum, rather than treated in isolation. Not only has this shown positive impacts on school achievement, commitment and attendance but it is also important to ensure that schools can justify the programme to sceptical staff, parents, governors, and funding bodies, and demonstrate that mental health issues impact on their core business.
- *Skills and competencies:* The acquisition of social and emotional skills and competencies was associated with a wide range of positive outcomes both for internalising problems (depression and anxiety) as well as externalising problems (conduct disorder, bullying). The interventions that were most effective had a very similar mix of cognitive behavioural therapy and social skills training for children, and training for parents and teachers in appropriate reinforcement and better methods of discipline. The teaching of these skills had a greater impact over the long term when it was integrated into and reinforced within the curriculum and daily classroom teaching.
- *Teaching methods:* Interactive methods using games, simulations, role play, and small group work were more effective than didactic teaching methods. A range of different approaches was more effective than just one or two (for example, a mix of whole class, small groups, and one to one). Successful programmes also took a positive holistic approach rather than focusing on “problems”.
- *Whole school/multi-component approaches:* Effective interventions moved beyond the individual classroom and were embedded in a complex, multi-component approach involving a wide range of agencies, people and teaching methods and mobilising the school as an organisation. Quality of implementation, however, is critical, to avoid diluting the intensity and focus of the intervention.
- *School ethos and culture:* The underlying values and attitudes that the school represents in the way staff and students treat one another, and the opportunities for young people to participate need to be a key focus of the intervention.
- *Effective leadership in delivering the intervention:* All programme leaders need extensive and intensive training. Specialist staff are effective at the start of the process. However, for the interventions to be sustainable and properly embedded in the life of the school and to affect academic achievement and attendance, routine teachers need to take over. Peers can be effective, but

care must be taken to avoid putting students with difficulties together as they can reinforce each other. Families and communities can add strength if appropriately involved and can support and reinforce messages. Moreover, some studies have found that the effect was two-way, with statistically significant changes in families and communities happening as a result of school-based interventions.

- *Age factors*: Most evidence points to the benefits of starting early with well designed and implemented interventions and following up with booster sessions in the later years.
- *Length and intensity*: There is no evidence to support single, brief interventions. Most studies found that a duration of between nine months and a year was necessary to make a lasting impact.
- *Implementation*: Carrying out a well-designed programme is not a guarantee of effectiveness. High quality implementation is also necessary and requires:
 - A sound theoretical base; specific, well defined goals and rationale communicated effectively to leaders and linked directly to intervention components.
 - A direct, intense, and explicit focus on the desired outcomes.
 - Explicit guidelines, thorough training, quality control and identification of individual responsibilities.
 - Complete and accurate implementation.
 - Ensuring that interventions are undertaken only if they fit the school context and can be implemented with fidelity and rigour.

School-based programmes to prevent suicide and promote resilience among students

A review of school based programmes to prevent suicide and promote resilience among students was recently completed by Appelhof (2013) for Community and Public Health South Canterbury. The review examined both generic programmes to promote mental wellbeing for all children, as well as those that explicitly aimed to address youth suicide by identifying and referring at-risk students and/or improving their skills in coping with distress.

Generic programmes for all students

These programmes aim to enhance emotional wellbeing among all students using a variety of mental health promotion and mental illness prevention activities. Most programmes are geared to children of a particular age group, with some being developmentally sequenced with age-appropriate curricula for children at different stages of their school life. The specific programmes recommended by the review were:

- Promoting Alternative Thinking Strategies (PATHS) with suitable curricula for both preschool (3-5 years) and primary school aged children (6-11 years).
- Zippy's Friends (children 6-7 years) was also associated with improvements in social-emotional competence and reduction in some problem behaviours.

However, this programme was not as highly recommended by the review as PATHS, the latter being supported by more rigorous research over a longer period of time and in more ethnically diverse samples of children.

- Penn Resiliency Program (PRP – children 10-14) and Friends for Life (children 7-12 and 12-16): both these programmes incorporate cognitive behavioural therapy approaches and appear to be effective in reducing symptoms of depression (PRP) and anxiety (Friends for Life). The largest effects from these programmes was experienced when the curricula were delivered to students with elevated baseline symptoms and when those implementing the programme were either clinically trained or had received extensive training and support from clinically-trained experts.
- Mindfulness-based programmes: these appear to have a range of benefits for children and young people including reduced stress, improved mental health and enhanced cognitive abilities. However, there is a lack of research to support the age-appropriateness of mindfulness programmes for different children or those with high levels of distress, or from different cultural backgrounds. There is also a lack of experienced teachers and training programmes. The review recommended however, that mindfulness programmes should be explored as a viable option for New Zealand school children.

Programmes for which insufficient high quality evidence could be found were the Social Decision Making-Problem Solving Program (SDS-PSP) and Travellers. Although the research supporting Strong Kids was found to be of a better quality, there were concerns about the validity of the method that was used to develop the programme, and an absence of longer-term follow-up data.

Overall, the review recommended that the resilience of school children could be fostered throughout their school experience by:

- delivering PATHS to preschoolers and primary school-aged children
- delivering PRP or FRIENDS for Life to at-risk intermediate and/or secondary school-aged children, and
- exposing children of all school ages to developmentally and culturally appropriate mindfulness practice.

The full review should be read for the details of these programmes and the relevant references.

Programmes for preventing suicide

Gatekeeper training programmes for adults: These programmes aim to enhance the ability of adult members of the school community (including some programmes that incorporate working with parents) to identify and refer students at risk of suicide. The evidence suggests that gatekeeper programmes are effective in increasing participants' confidence in their ability to identify and refer students and improving their knowledge of warning signs, risk factors, and recommended intervention behaviour. As skills tend to reduce over time, refresher training is likely to be needed

to strengthen and maintain the skills developed. Some limitations were noted in the review by Appelhof (2013):

- Ethnic minority students may be under-identified by those who are trained.
- A substantial proportion of the identified students may not access the services to which they are referred.
- The services to which the students are referred may not be effective in reducing suicide risk.

To address these limitations, the review recommended that:

- Gatekeeper programmes should be culturally sensitive and include respected and trusted members of ethnic minority and indigenous communities among the adults who are trained.
- Programmes should also investigate the degree to which the forms of support to which the students are referred are effective in reducing the suicide risk among ethnic minority and indigenous students.
- Gatekeeper training should be part of a broader district-wide suicide prevention programme that includes interventions aimed at overcoming the known barriers to students and ensuring effective follow up support.

The review found that identification and response to suicidal and potentially suicidal students could be improved by instituting school-based gatekeeper training programmes for school personnel (teachers, administrators, and school health professionals) as well as parents. The World Health Organisation (2012) in its document also supports gatekeeper training for suicide prevention in the whole population and notes that it must go hand in hand with service development so that identified individuals can be referred to a service that will assist them effectively.

Combined suicide-specific education and life skills training for children and young people: these programmes aim to enable students to identify the signs and symptoms of being at risk for suicide in themselves and others, increase the likelihood that students will seek the right kind of adult help, and promote the development of distress-coping and problem solving skills. The review by Appelhof (2013) found some evidence that these programmes can improve self-reported suicide risk, and coping potential, improved problem solving, and suicide intervention skills on behalf of a peer.

There were however some concerns that these programmes tend to frame suicide as a personal event linked to mental illness and deflect attention away from developing interventions that address the social determinants of mental health. There is also concern that they exacerbate the documented tendency of some indigenous young people to explain their suffering in terms of personal and collective failings. To offset this, the review suggested that schools should not offer standalone suicide-specific education programmes but embed life skills training in general mental wellbeing programmes. This is consistent with findings of other large reviews such as that by Weare and Nind (2011) outlined above.

The review did not find evidence to support the recommendation of suicide screening programmes, peer helping programmes, or individual school based psychotherapeutic interventions.

Programmes for preventing individual mental disorders

Mood disorders

A Cochrane review (Merry et al 2011) examined 53 randomised trials of psychological or educational prevention programmes (or programmes with both components) for young people aged 5-19 years that aimed to prevent the onset of depression. There was good evidence to support the effectiveness of both targeted and universal programmes in reducing depressive episodes compared to no intervention. Programmes were effective for up to a year and there was evidence to support some continuing effectiveness for up to three years. The review did not find evidence to support any particular type of programme compared to another.

Another Cochrane review (Larun et al 2006) looked for evidence that exercise could prevent and/or treat anxiety and depression in young people. From the limited number of studies available, there appeared to be a small effect favouring exercise in reducing anxiety and depression scores in healthy children. However, the trials were small and highly variable in the population, intervention and measurements used. There was no evidence that exercise was effective in children who were already having treatment for anxiety or depression. The review was updated in 2009 but no change to the conclusions was made.

Eating disorders

A Cochrane systematic review of interventions for preventing eating disorders in children and adolescents (Pratt and Wolfenden 2002) was re-examined by the review team in 2009 but the findings remained unchanged. The conclusions of the review as set out by Begg (2006) were that:

- There is some evidence for the effectiveness of media literacy and advocacy programmes aimed at reducing acceptance of societal body image norms.
- There is insufficient evidence to support the evidence of programmes designed to address eating attitudes and behaviours or to support the effectiveness of programmes designed to improve self esteem.
- There is insufficient evidence to show that harm was caused in any of the studies that were included in the review.

Self esteem

A Cochrane systematic review examining the evidence to support exercise as an intervention to improve self-esteem in children and young people (Ekeland et al 2004 cited by Begg 2006) has not subsequently been updated. The findings of the review were that:

- Exercise has possible short term effects on self-esteem in children and young people
- Exercise may be an important intervention in improving self-esteem as there are many positive effects of exercise on physical health and no known negative effects.

There do not appear to be any more recent systematic reviews. However, exercise for improving self esteem in overweight and obese children is an area which has attracted recent interest and there are individual trials that have shown some positive outcomes (Petty et al 2009; Duncan et al 2009; Daley et al 2006). However, these have been small trials with variable types of exercise regimes, duration, measurement scales, and short follow up times.

Conduct disorder

A systematic review by Waddell et al (2007) included a section on the primary prevention of conduct disorders in children. The review included nine RCTs of eight different programmes. Of these, seven trials (all in the United States or Canada) demonstrated significant reductions in at least two conduct-related symptoms and/or one conduct-related diagnostic measure at follow-up. Characteristics of the most successful programmes were the targeting of at-risk children on the basis of conduct symptoms and/or low income status and employing parent training, child social skills training, or a combination of both. The interventions were typically delivered over one to two years in homes, preschools or schools by clinicians or teachers. Two of the programmes measured outcomes over 15 years of follow up or more. There are multiple publications about these programmes which are referenced in the review.

Sexual health

Evidence summary

General sexual health promotion programmes

- There is no evidence that abstinence-only programmes are effective in preventing unintended pregnancy or sexually transmitted infections.
- Comprehensive risk reduction programmes delivered to adolescents are effective in reducing self-reported risk behaviour including sexual initiation, frequency of sexual activity, number of partners and frequency of unprotected sex. They also increase self-reported use of protection against pregnancy and STIs and the incidence of self-reported or clinically documented STIs.
- Direct evidence of effectiveness in reduced adolescent pregnancies or HIV is limited.
- Research is lacking on the effect on such programmes on the wider determinants of health, particularly the impact on education and employment.
- The impact of running an effective sexual health promotion interventions on staff, facilities and curriculum time needs to be taken into account when considering implementing sexual health promotion interventions in a school setting.

Programmes for preventing sexually transmitted infections

- School based interventions which provide information and teach young people sexual health negotiation skills can achieve improvements in knowledge and self-efficacy.
- Studies have not shown any significant difference between intervention and comparison groups in terms of condom use.
- Most studies had short follow-up times so that the extent to which recommended behaviour is adopted and sustained has not been evaluated.
- Cost effectiveness has seldom been considered but longer term follow up is likely to show more cost-effectiveness for school programmes delivered by adults than those delivered by peers because of the reduced need for training.

Programmes for preventing unintended pregnancies

- Multi-component interventions that combine school, community, media and health service provisions appear to have a greater impact on sexual behaviour and reduction of unintended teenage pregnancies.
- Financial incentives can encourage programme participation but incentives that enhance motivation, confidence and skill are more effective in the long term for achieving programme outcomes.
- Longer and more intense programmes produce more favourable outcomes but make a heavy demand on resources.

- Most approaches are designed for females; they show minimal impact on males and may be inappropriate for them.
- Addressing social disadvantage through preschool education, social support and skills training for young people has an impact on reducing teenage pregnancy. Happiness, enjoying school and positive expectations for the future can all help delay early parenthood.

The wider determinants of health including housing, employment, social connectedness, domestic violence and bullying appear to be important but have not been addressed in research.

The use of digital media in sexual health interventions

- There is current and increasing interest in the use of digital media for sexual health promotion but evidence of effectiveness is as yet very limited.
- The ability of online applications to reach diverse populations, and allow interactivity and tailoring to each individual appears to be a particular strength.
- Online health promotion interventions may need to be combined with other more personal communication modes to achieve desired outcomes.
- Rapidly changing technology tends to outstrip the usually lengthy trial and evaluation process. New methods of establishing evidence from such interventions are needed.

General sexual health interventions

Chin et al (2012) reported on two large systematic reviews for the Community Preventive Services Task Force that examined group-based behavioural interventions to prevent adolescent pregnancy, HIV and sexually transmitted infections. In both reviews, meta-analyses were conducted to establish the evidence for seven key outcomes: current sexual activity; frequency of sexual activity; number of sex partners; frequency of unprotected sexual activity; use of condoms or hormonal contraception; pregnancy; and STIs. The first review examined 23 abstinence programmes and concluded that there was insufficient evidence to establish their effectiveness for preventing pregnancy, HIV or STIs.

The second review looked at 66 studies of comprehensive risk reduction programmes for the seven key outcomes. Favourable results were found for most outcomes and the Task Force therefore recommended that these programmes were effective for:

- reducing the number of self-reported risk behaviours, including engagement in any sexual activity, frequency of sexual activity, number of sex partners and frequency of unprotected sexual activity, and
- increasing the self-reported use of protection against pregnancy and STIs and reducing the incidence of self-reported or documented STIs.

However, direct evidence of effectiveness in reducing adolescent pregnancy or HIV was limited. Most interventions were delivered by adults rather than peers. The reviews found no differential effect by gender, virginity status, age, race/ethnicity, setting, intensity and duration, who delivered the programme, or the study design. The Task Force recommended that future research should also evaluate the impact of such programmes from a societal perspective, for example, the impact on improved employment potential of participants. It also noted that the impact on school resources in terms of facilities, staff and time was considerable and should be considered in any intervention.

Several trials have been published later than those included in this major review and are described briefly.

- Three focused on enhancing communication between parents and children over sexual health issues (O'Donnell et al 2010; Schuster et al 2008; Miller et al 2011). All of these reported positive outcomes in self-reported communication but did not evaluate any behavioural outcomes.
- Snitzman et al (2011) focused on high risk African American adolescents who were exposed to television and radio messages in two intervention cities and were matched with participants in two control cities. The media intervention reached almost all participants in the intervention cities and showed improved condom-use expectancies, and increased sex refusal self-efficacy compared to controls.
- The Smart Girls programme (Graves et al 2011) was a teen pregnancy prevention intervention for girls in middle schools that was designed to build positive life skills, and increase self-efficacy and sexually responsible behaviour. Content was delivered over eight sessions and covered self esteem, healthy relationships, being able to refuse sex, avoiding STIs, and how to recognise and avoid a violent or abusive relationship. The study reported a statistically significant increase in personal sexuality expectations in the intervention compared to the control group. Pregnancy or STI outcomes were not measured.

None of these studies appears to change the conclusions of the review by the Preventive Services Task Force. Note that programmes that focus solely on increasing knowledge are known to be ineffective.

Interventions for reducing sexually transmitted infections

A review of the effectiveness and cost effectiveness of behavioural interventions for preventing STIs in young people aged 13-19 years examined 15 randomized controlled trials (Shepherd et al 2010). Criteria for inclusion in the review were that the study evaluated a behavioural intervention, included factual information on STIs, had some element of skills development for negotiating safer sex, and was delivered in a school setting. Studies also needed to assess at least one of the following sexual behavioural outcomes: initiation of sexual intercourse, condom use, sexual intercourse, contraception and pregnancy, and number of sexual partners. Other outcomes that were reported included knowledge, skills and self-efficacy, attitudes,

and behavioural intentions. Findings from this review established evidence for the following:

- School-based behaviour interventions which provide information and teach young people sexual health negotiation skills can achieve improvements in knowledge and self-efficacy.
- There were few significant differences between intervention and comparator groups in terms of changes in behavioural outcomes such as condom use.
- Most studies had relatively short follow-up periods at a time when the majority of participants were just becoming sexually active. Longer term follow up would enable an assessment of the extent to which the behaviour is adopted and maintained into adulthood.
- Teacher-led interventions are cheaper than peer-led interventions because of the less frequent need for retraining
- Cost effectiveness has seldom been considered, but it is likely that longer follow up may show greater cost effectiveness.

Two Cochrane reviews examined the effectiveness of different types of programmes for preventing HIV in high income countries. The first review of abstinence-only programmes (Underhill et al 2007) found no evidence of their effectiveness. Compared to various controls, the seven programmes involving almost 16,000 young people did not affect incidence or frequency of unprotected vaginal sex, number of partners, sexual initiation or condom use. Limitations of the included studies included under-reporting of relevant outcomes, reliance on programme participants to report their behaviours accurately and methodological weaknesses. The second review (Underhill et al 2008) examined 39 randomised and quasi-randomised studies of programmes that encouraged abstinence but also promoted condom use and safer sex strategies for those who were sexually active (termed “abstinence-plus” programmes). The included studies took place in varied settings including schools, community centres and healthcare facilities. Twenty three of the 39 studies found a significantly protective effect in the intervention group participants in reducing HIV risk behaviour over the short and longer term. Favourable effects were consistently found for HIV knowledge. There was no evidence that programme participation led to reduced rates of STIs or unintended pregnancies.

An ongoing Cochrane review (Mason-Jones et al 2011) is examining the effectiveness of school and mixed school-community interventions for STI and HIV interventions in adolescents. This review is not limited to high income countries and no date is given for the expected completion of this review.

Interventions to prevent unintended pregnancies

A systematic review investigating the effectiveness of social marketing in reducing teenage pregnancies in developed countries (Wakhisi et al 2011) examined 12 studies of programmes which assessed one or more of the following outcomes: reduction of teenage pregnancy, delayed sexual initiation, contraceptive use at last intercourse, knowledge of reproductive health and contraception, and self-efficacy to refuse sex. To be considered as social marketing the studies met all of the following four criteria:

- The intervention aimed to change behaviour and had a specific, measurable goal.
- Formative research was conducted to identify the characteristics and needs of the target group, and the intervention had been pretested with that group.
- The intervention was tailored to and directed at a particular target group.
- A strategic application of marketing mix was used: product, price, place, and promotion (Wakhisi et al 2011, p. 59).

The programmes varied in content, follow-up periods, settings, and the particular outcomes measured. No meta-analysis was carried out. The main findings were:

- Multi-component interventions that combined school, community, media and health service provisions reported greater impact on sexual behaviour and reduction in unintended pregnancies.
- There is some evidence that incentives to encourage behaviour change are effective, particularly in hard-to-reach groups. However, evidence on their sustainability in the long term is limited. Financial incentives are more effective for encouraging short-term, discrete, time-limited actions such as keeping appointments or enrolling in a programme. Different types of incentives that enhance motivation and skill are needed for effecting complex behaviour change. These include, for example, providing personalised goals and action plans, individual feedback, life skills coaching, and other strategies that enhance confidence and self-efficacy (see Jochelson 2007).
- Longer programme duration and intensity consistently produced more favourable outcomes than short term interventions. However, the resource implications of longer and more intensive programmes are a major challenge.
- The minimal impact of any interventions on males compared to females was a concern. Evidence on male participation is limited; the study concluded that most of the current approaches to prevention of unintended pregnancy are designed for females and may be inappropriate for males.

Another study looked at reducing teenage pregnancy through addressing social disadvantage (Harden et al 2009). This systematic review incorporated 10 controlled trials that aimed to reduce social disadvantage. Outcome measures were teenage conception and/or births. The overall pooled effect size showed that teenage pregnancy rates were 39% lower among individuals receiving an intervention than in those receiving standard practice or no intervention. Qualitative studies were also examined in a separate section of the review. The authors' conclusions were:

- Early childhood interventions and youth development programmes can significantly lower teenage pregnancy rates.
- Preschool education and support appear to exert a long term positive influence on the risk of teenage pregnancy as well as on other outcomes associated with social and economic disadvantage, such as unemployment and criminal behaviour.
- Programmes of social support, educational support and skills training for young people have a more immediate impact on reducing teenage pregnancy.
- The qualitative review found that happiness, enjoying school, and having positive expectations for the future can all help to delay early parenthood.

- Housing, employment, community networks, bullying and domestic violence were important in young people's accounts, but are yet to be addressed in interventions or evaluations of the wider determinants of teenage pregnancy.

Interventions using digital media

Sexual health promotion using digital media is a developing field and one that is hard to evaluate, as rapidly changing technology tends to outstrip the lengthy randomized trial and evaluation process. One systematic review of ten studies using various forms of interactive digital media located ten studies published between 2006 and 2011 that aimed to evaluate the impact of interventions on sexual knowledge, attitudes or behaviour (Guse et al 2012). Outcomes were measured in one or more of five areas: sexual activity, reproduction, sexually transmitted infections, HIV, condom and other contraceptive use. Two trials used digital media in conjunction plus face-to-face components, but the remainder used digital media only. The interventions varied widely, ranging from one email message from a physician advising participants to be mindful of making sexual references in their online pages, to an intensive intervention consisting of twenty four 45-minute structured group lessons and parent-child homework activities. There were studies from China, Africa, and Brazil, as well as the United States. Some interventions included young adults up to 24 years of age and others were limited to middle school pupils (mean age 13 years). Some interventions were tailored to individuals, with participants creating an online personal profile which then enabled a more personalised intervention. Findings were very mixed. One study found that the intervention group was significantly more likely to delay sexual initiation compared to the control group, and another found a small but significant difference in condom use in favour of the intervention group. Seven studies showed significant effects in psychosocial outcomes, but some of these showed the opposite effect from that which the study aimed to achieve. Most studies showed a significant increase in knowledge in the intervention groups compared to controls, but, as the authors noted, knowledge does not necessarily carry over to any reduction in risk behaviour. The authors were able to conclude only that the use of digital media for sexual health promotion is an area of emerging potential, particularly because of its ability to reach diverse populations, tailor an intervention to a particular individual, and allow user control and interactivity.

Two further randomised trials published later than those considered for the systematic review were both conducted in Australia. Lim et al (2012) recruited participants from a music festival. The intervention group received text and email messages promoting safe sex for the prevention of STIs and the control group received no intervention. All participants were surveyed at three, six, and twelve months about STI knowledge and prevention practices. Knowledge improved in the intervention group but there was no impact on condom use. A second trial (Gold et al 2011) established an intervention group that received phone messages promoting safer sex, and a control group that received messages about sun safety. Changes in knowledge and behaviour were measured using questionnaires administered by mobile phone at the end of the four month intervention period. The participants received phone credits as an incentive to complete the surveys. The results showed that the group receiving the safer sex messages had significantly higher sexual health knowledge, were less likely

to report having multiple or new sex partners, and more likely to report using a condom with new partners than participants in the sun safety group. There were no differences between groups in STI testing.

New Zealand research

There has been considerable research in New Zealand into sexual issues for young people. Some has focused on rates of sexually transmitted infections, teenage pregnancy, and a significant number of theses are available on attitudes and experiences of young people, including some focusing on particular ethnic groups. However, no controlled trials of sexual health promotion interventions in young people such as those reported in this section were located for this review. A good source for locating New Zealand theses and other research is at <http://nzresearch.org.nz/>.

Oral health

Evidence summary

Preventing caries

- There is strong evidence that all types of fluoride help to prevent caries in children and young people. Community water fluoridation is effective across all socioeconomic groups and therefore reduces oral health disparities. People living in non-fluoridated water areas get some benefit from consuming food and beverages processed where there is a fluoridated water supply.
- The benefits of fluoride toothpastes are firmly established, with clear evidence that the concentration should be at least 1000 ppm.
- There is no evidence that fluoride gels, mouthwashes, varnishes or supplements (for example, tablets) are superior to fluoride toothpaste, however, when used in addition to fluoride toothpaste they may provide a modest reduction in caries compared to toothpaste alone.
- In areas where the community water supply is not fluoridated, fluoride toothpastes and sealants remain the primary interventions for caries prevention.
- Non-fluoride agents: sucrose free xylitol or polyol gums and lozenges may provide some additional benefit to children at higher risk of caries. There is inconclusive evidence for the use of chlorhexidine varnish.

Oral health promotion

- The most important issue in communities without fluoridated water is how to improve the access to and uptake of fluoride in oral health. The most effective way to achieve this is still uncertain.
- School-based programmes appear to be the best method of delivering dental sealants to students, particularly in disadvantaged areas.
- Promoting oral health in adolescents is challenging and has received little attention in recent years. Studies using educational methods have failed to have significant impact and reports of other approaches are lacking. There is some evidence that girls are more motivated than boys to maintain good oral health.
- There is meagre and inconclusive evidence about the effectiveness of interventions to promote the use of protective equipment such as helmets, mouthguards, and facemasks to prevent oral and facial injuries in sports.

Community water fluoridation

There is strong evidence for all types of fluoride in reducing caries in children and young people. Fluoride acts to impede demineralisation and enhance remineralisation of dental enamel, both of which prevent caries. The US Community Preventive Services Task Force (2013b) recommends community water fluoridation to reduce dental caries as a population health measure, noting that available data suggest that it is effective across all socioeconomic groups and it therefore reduces oral health disparities. Additionally, people who live in non-fluoridated areas may receive benefits when they consume food and beverages processed in fluoridated areas. The Task Force found no evidence in its most recent update that community water fluoridation results in severe fluorosis at the levels used for community water fluoridation, nor any association with bone fractures and skeletal fluorosis.

The Task Force update found some evidence gaps still exist, namely the effect of fluoride from sources other than water, the effect of bottled water, the role of water hardness on bioavailability of fluoride, the effect of fluoridated water over and above dental sealants and varnishes, and other potential health effects.

Fluoride has been added to foods in some countries via salt and milk but there is limited scientific evidence available to judge effectiveness. In Germany, France and Switzerland fluoridated salt is widely used. A meta-analysis of salt fluoridation (Yengopal et al 2010) found that there were significant caries prevention benefits but these results were based on only two studies that had measured outcome by DMFT⁶ scores. Moreover, even though salt is an effective method of distributing fluoride because of its wide reach throughout society, it conflicts with other public health messages advocating the reduction of salt in the diet (Yeung 2011). A very recent systematic review of fluoridated food in caries prevention (Cagetti 2013) found that fluoridated milk had shown some efficacy in reducing caries but the scientific evidence was low. The review concluded that the literature on the effectiveness of fluoridation in foods is scant and almost all studies have been conducted in children so that there is no evidence about the effect in adults.

Topical fluoride: toothpastes, gels, mouth rinses, varnishes

A number of Cochrane systematic reviews have reviewed the benefits of topical fluoride in different forms. The benefits of fluoride toothpastes are now considered to be firmly established (Marinho et al 2003) with clear evidence that they are effective in preventing caries when used at a concentration no less than 1000 ppm (Walsh et al 2010). The level of fluoride concentration for children under six years however, needs to be balanced with the risk of fluorosis for very young children. The review by Wong et al (2010) that examined the risk of fluorosis from topical fluoride found some, though limited, evidence that starting the use of fluoride toothpaste in children under 12 months of age may be associated with an increased risk of fluorosis. The review recommended that if the risk of fluorosis is of concern, the fluoride level

⁶ Decayed, missing or filled teeth

of toothpaste for young children (under 6 years of age) is recommended to be lower than 1000 parts per million.

There are a number of Cochrane systematic reviews examining the effectiveness of fluoridated gels, mouth rinses, and varnishes separately or in various combinations with fluoride toothpaste to prevent dental caries (Marinho et al 2013; Marinho et al 2009; Marinho et al 2003a; Marinho et al 2003b). The most recent of these reviews (Marinho et al 2013) found that fluoride varnishes applied by dental services have a substantial caries-inhibiting effect in both primary and permanent teeth. The previous reviews found no evidence that any of the varnishes, mouth rinses or gels are superior to another or that any of them are superior to fluoride toothpaste. Moreover, acceptance was likely to be greater for toothpaste. Fluoride toothpaste combined with additional use of a gel, mouth rinse or varnish was able to achieve a modest reduction in caries compared to toothpaste alone.

Fluoride supplements: tablets, drops, lozenges, gums

A recent Cochrane systematic review (Tubert-Jeannin et al 2011) concluded that in areas where the community water supply is not fluoridated, the use of any fluoride supplement is associated with a substantial reduction in caries in permanent teeth. The effect on deciduous teeth was unclear in the trials included in this review. There was no difference in effect in studies that compared supplements with topical fluoride applications.

Non-fluoride caries-preventive agents

The American Dental Association (Rethman et al 2011) reviewed evidence from 50 randomised controlled trials and 15 non-randomised studies to assess the efficacy of various non-fluoride caries preventive agents. After an extensive review of the evidence they recommended that sucrose-free chewing gum containing either xylitol or polyol combinations or xylitol lozenges may provide some benefit as adjunctive therapies to children and adults who are at higher risk of caries. They emphasised that fluoride toothpastes and sealants remain the primary interventions for caries prevention.

Promoting good oral health

In the earlier review of child and youth health promotion, Begg (2006) noted that while the evidence was clear that the use of fluoride prevents and ameliorates dental caries, the important issue in communities without fluoridated water was how to improve the access to and uptake of fluoride in oral health. Oral health promotion generally focuses on developing life long tooth brushing habits to remove plaque, motivating attendance at regular dental checks and eating a healthy diet as the cornerstones of preventing caries and periodontal disease. Some promotional

programmes through schools also include clinical interventions such as dental sealants and fluoride varnishes (Bidwell 2010).

Prevention of early childhood caries

Two systematic reviews of evidence for the prevention of early childhood caries (Ammari et al 2007; Twetman 2008) examined programmes that targeted pregnant women and/or preschool children. The review by Amari included seven randomised trials and that by Twetman (2008) included 21 studies of a range of interventions (not all randomised) with mothers and children under age 3 years. Nearly all studies targeted disadvantaged communities or populations. The particular interventions were varied in nature, and most combined one or more of prenatal and early postnatal counselling, prenatal fluoride administration, motivational interviewing, distribution of free fluoridated toothpaste, home visiting, and the use of xylitol gum by mothers. It was therefore not possible to compare across programmes and identify the most effective type of intervention. Both reviews concluded that the scientific evidence supports daily use of adult strength (1000 ppm) fluoridated toothpaste, with the review by Twetman (2008) also recommending professional application of fluoride varnish twice yearly for high risk children. However, the most effective way to implement this remains uncertain.

Chlorhexidine varnish has also been trialled for its caries prevention effect in primary and secondary teeth based on the inhibiting effect of chlorhexidine on *Mutans streptococci* (MS) which plays a major role in caries initiation and development. James et al (2010) systematically reviewed trials of chlorhexidine varnish but found inconclusive evidence for its effectiveness. Although two trials reported a reduction in caries increment, both were conducted in countries where exposure to fluoride was low or unreported, leading the authors to conclude that the applicability in developed countries was questionable (p.339).

School-based dental sealant programmes

Dental sealants are resinous materials applied to the chewing surfaces of the back teeth to prevent dental caries. The Community Preventive Services Task Force (2013) recommends school-based programmes to deliver dental sealants to students particularly in disadvantaged areas where children may be at greater risk for caries. There is strong evidence of the effectiveness of sealants in preventing tooth decay, and that school-based programmes increase the number of children who receive sealants. The findings of the Task Force draw on a recent Cochrane systematic review by Ahovuo et al (2013) and are consistent with it.

Oral health promotion in adolescence

There is little recent literature on oral health promotion in adolescence as oral health promotion is now largely focused on preschool and the early school age. An overview of oral health promotion in adolescents (Brukiene and Aleksejuniene 2009),

noted that adolescence was the most challenging time to motivate good oral health behaviour and yet it is also a critical time for establishing habits that continue into adult life. The overview found that almost all studies used conventional methods of teaching about the causes of dental disease combined with instructions in tooth brushing and flossing methods. While most studies achieved gains in knowledge, very few were able to report improvements in attitudes or behaviour and those that did report improvements found that they relapsed over time without regular reinforcement. Some studies used before and after plaque scores or gingival index scores to measure change objectively. Results were mixed, with positive changes tending to regress towards baseline in time or failing to reach statistical significance. There was some evidence, however, that girls' results were more positive and more resistant to deterioration than boys.

An intensive approach in Finland (Hausen et al 2007) targeted 250 children in one town for intervention and compared them with 247 children in another town as controls. All children in both groups were aged 11 or 12 at the start of the study, had at least one carious lesion and were considered "at risk". The children in the intervention group were given an individualised regime of fluoride and chlorhexidine varnish applications, provided with toothpaste, toothbrushes and xylitol lozenges, and individual counselling. The children in the control group received usual dental care from the public dental service. Children were examined at baseline, at two years, and at completion of the study (3.4 years). Results showed that decayed missing and filled teeth increased by 2.56 (95% CI 2.07-3.05) in the intervention group and 4.6 (95% CI 3.99-5.21) in the control group ($p=0.0001$). The authors commented on the "huge effort" (Hausen et al 2007, p.390) that was needed to achieve this result with an average of seven times the number of varnish applications per child and three times the number of counselling sessions in the intervention group than for the control group.

Preventing oral and facial injuries

The US Community Preventive Services Task Force (2002) finding that there is insufficient evidence to determine the effectiveness of population-based interventions that encourage the use of helmets, facemasks and mouth guards in contact sport for decreasing sports related injuries remains unchanged. A recent review (Sigurdsson 2013) again found that the few studies available were of too poor quality to be considered evidence. This review noted that "... for ethical reasons it is difficult to do a true prospective randomised study on the effectiveness ... of protection devices [so that] ... there remains a large hole in our evidence-based knowledge on prevention of dental trauma." (p. 189)

Alcohol and other drugs

Evidence summary

In pregnancy

- Drinking alcohol in pregnancy increases the risk of a wide range of negative effects for the developing child. The safest choice for pregnant women is not to drink alcohol at all as there is no firm evidence about a safe lower limit.
- There is some evidence that universal psychosocial and/or educational interventions for women who are pregnant or planning to become pregnant may increase abstinence from alcohol. There is very limited evidence about any effect of the intervention on the health of the mother or child.
- Home visits for women who have problems with alcohol or other drugs may increase their engagement with drug and alcohol services and increase the use of contraception. There is no evidence about the effect on the health of the mother or baby.
- There have been insufficient studies done to establish the effectiveness of pharmacological or psychosocial interventions for pregnant women enrolled in drug and alcohol programmes.

School-based interventions to prevent alcohol and drug misuse

- There is evidence that universal psychosocial and developmental school-based programmes are effective in preventing and/or reducing alcohol misuse. The Life Skills Training Programme, the Unplugged programme, and the Good Behavior Game are examples of recommended programmes.
- Social and emotional skill-based programmes are the most effective form of school-level intervention for reducing and/or preventing early drug use.
- Programmes typically cover teaching young people how to recognise and resist social pressures to use drugs and alcohol, as well as self-awareness, coping strategies, critical thinking, goal setting and decision making.
- A difficulty of such programmes is achieving consistent implementation when they are delivered by teachers.
- A positive school culture that promotes health, achievement, identity and student engagement has a positive effect on reducing the use of alcohol and other drugs.
- Web-based programmes for reducing drug and alcohol misuse are emerging and appear promising. They place relatively low demands on schools and can be implemented consistently across many sites as well as being adapted to particular contexts. There is, as yet, not enough evidence from high quality studies to judge their effectiveness and no data from long-term follow-up.
- There is some evidence that programmes beginning in the early school years are more effective than those that begin in middle or high school.
- There is as yet little long-term data from school-based interventions.

Programmes in other settings

- There is limited evidence that some family-based interventions may be effective for preventing alcohol and drug misuse. Family programmes use a combination of interventions to develop parenting skills training with parents and psychosocial and peer resistance skills for children. However, the Cochrane systematic review that reviewed such studies found insufficient evidence to recommend any particular programme.
- There is currently no evidence that multi-component programmes delivered in schools as well as with parents/families are more effective than programmes delivered in one setting alone.
- There is insufficient evidence to establish the effectiveness of media campaigns in reducing drug use by young people.
- Programmes that draw on cultural identity and traditions to change attitudes to drinking and drugs appear promising for disadvantaged minority groups.

Introduction

It is well documented that women who drink alcohol in pregnancy increase the risk of a wide range of negative effects for their developing child. These include birth defects, intellectual disability, mental health problems, and a range of neurodevelopmental disorders. However, there is no firm evidence on the exact nature of the relationship and whether there is a safe level below which no harm will occur. Although there is no strong evidence to implicate levels of alcohol exposure, it appears that there is likely to be a low threshold and it may differ according to the dose, pattern and timing of the exposure. O’Leary and Bower (2012) in their recent systematic review of the evidence on acceptable risk for alcohol during pregnancy concluded that “...we may never be able to conclusively prove whether low levels of prenatal exposure are safe” (p. 178), and therefore recommended that the safest choice for pregnant women is to completely abstain from alcohol. However, they noted that information must be presented in a way that avoids causing stress and anxiety to women if they had drunk alcohol before knowing they were pregnant, or causing them to conceal their drinking or avoid seeking treatment for alcohol-related problems.

General interventions in pregnancy for general populations

A Cochrane systematic review investigated the effectiveness of psychological and/or educational interventions for reducing alcohol consumption in women who are pregnant or planning to become pregnant (Stade et al 2009). From the limited number of studies of sufficient quality that were included in the review, the reviewers found evidence that either type of intervention may result in increased abstinence from alcohol and/or a reduction in alcohol consumption during pregnancy. There was

insufficient evidence to establish whether one type of intervention was more effective than another, and very limited information on the effects of interventions on the health of women and their babies.

Interventions for women with alcohol and drug problems

Another Cochrane systematic review (Turnbull and Osborn 2012) examined the evidence for the effectiveness of home visits during pregnancy and after the birth of their child for women who have an alcohol or drug problem. The home visits in the studies examined were by health professionals such as community health nurses, paediatric nurses, trained counsellors, midwives and lay health workers. The review concluded that home visits may increase the engagement of women in drug and alcohol services and the use of contraception, but without more studies being done there was not enough evidence to recommend their routine use or to assess whether they would improve the health of the mother or baby.

Two further Cochrane systematic reviews aimed to examine the effectiveness of pharmacological interventions (Smith et al 2009) or psychosocial interventions (Lui et al 2008) for women enrolled in alcohol treatment during pregnancy. The reviewers were not able to draw any conclusions on either type of intervention because they were unable to locate any studies of sufficiently high quality to meet the inclusion criteria.

An investigation by Montag et al (2012), examined approaches to reducing alcohol consumption in indigenous women of reproductive age in the United States. The authors reviewed interventions in any setting with any type of study design. They found that standard medical approaches had produced discouraging results with almost all participants continuing to be dependent on or abuse alcohol. Community-based programmes had more success using various combinations of motivational interviewing, enhanced case management, vocational training, counselling, home visits, and an emphasis on cultural identity. The most successful interventions were those that worked to change the community culture to be less tolerant of drinking and revived traditional structures and rituals (for example, talking circles, healing ceremonies). Many of these programmes had a dual approach, aiming to both reduce alcohol and drug use and also increase the consistent use of contraception to avoid unplanned pregnancies and therefore the number of children negatively affected by foetal alcohol syndrome. The authors noted that although the literature was limited by the small size of studies, low follow-up rates, reliance on self-reported data, and the lack of control groups, it provided an understanding of promising approaches and barriers that needed addressing. Important factors for success included having community input into all programme aspects (particularly ownership and acceptance by community leaders), tackling both alcohol dependence and unintended pregnancy, addressing logistic barriers such as transport and child care, respecting cultural identity, and incorporating traditional activities where appropriate.

School based interventions

Interventions to prevent alcohol misuse

A Cochrane systematic review (Foxcroft and Tsertsvadse 2011) examined 53 randomised trials of universal⁷ school-based programmes for preventing alcohol misuse in children and young people up to the age of 18. Six of eleven trials of alcohol-specific interventions showed evidence of effectiveness compared to the usual school curriculum. Thirty-nine trials evaluated interventions with a wider focus on prevention of drug use/abuse and antisocial behaviour as well as alcohol misuse. Fourteen of these demonstrated significantly greater reductions in alcohol use either overall or in a particular sub-group. The review concluded that there was enough evidence to suggest that certain psychosocial and developmental programmes were effective, including the Life Skills Training Program (Hahn et al 2002), the Unplugged Program (Caria et al 2011), and the Good Behavior Game (Kellam et al 2012; Poduska et al 2008).⁸

The findings of studies published since the Cochrane review have further supported the effectiveness of the psychosocial approach. A systematic review of preventive programmes used in Australian schools (Teeson et al 2012), located eight randomised trials of seven universal prevention programmes. Programmes generally targeted 13-14 year old high school students and used either a social influences approach to teach young people to recognise and resist social pressure to use alcohol and drugs, or a cognitive behaviour therapy approach to help students analyse their negative thought patterns, emotional reactions and behaviours. All but two of the seven trials demonstrated positive outcomes in preventing or reducing the use of alcohol, tobacco, and cannabis at follow up. However, the effect sizes were generally small and all trials relied on self-report for the outcome measures. The authors noted the difficulty of getting consistent implementation of programmes in schools when delivered by teachers. They drew attention to the advantages of emerging methods in computer delivered prevention interventions, as long as they were flexible enough to be adapted to suit different contexts.

Caria et al (2011) reported a randomised trial that was conducted across seven European countries: Austria, Belgium, Germany, Greece, Italy, Spain and Sweden. Students from 143 junior high schools were randomised either as control school or to receive the Unplugged programme as an intervention. The programme covered knowledge and psychosocial skills including communication, self-awareness, interpersonal relationships, critical thinking, coping strategies, goal setting and decision making. The students who received the intervention were less likely to report alcohol related problems at 18-month follow up (OR 0.78, 95% CI 0.63-0.98) and also progressed more slowly towards more frequent drinking than controls.

⁷ Universal: delivered to all students in a year group regardless of their level of risk for alcohol and/or drug use.

⁸ References lead to publications with more specific detail about each of these programmes.

However, the overall frequency of alcohol consumption was not significantly different between the two groups.

Also of interest for its unusual approach is a recent study of a voluntary after-school programme to prevent alcohol use with middle school students (D'Amico et al 2012). Sixteen schools were randomised to intervention and control schools and the CHOICE⁹ programme delivered to intervention schools during the academic year. Small incentives were provided for students to attend (snacks, drinks, and a \$5 voucher for attending all five sessions). The school-level analysis showed that students at intervention schools were significantly less likely to initiate alcohol use during the academic year (OR 0.70), than those at control schools. However, a major limitation of the study was the low uptake. Only 15% of students at intervention schools participated in the programme at all, and two thirds of them did not complete all sessions.

Interventions to prevent drug use

The conclusions of the Cochrane systematic review of 32 studies of school-based prevention for illicit drugs use (Faggiano et al 2005) detailed in the 2006 document by Begg are still considered valid, and are largely consistent with the findings from the more recent alcohol reviews. The 2005 review evaluated the effectiveness of school-based interventions aimed at improving knowledge, developing skills, and preventing or reducing drug use compared to usual curricular activities or to a different school-based intervention. Key findings were that:

- knowledge-focused programmes improve drug knowledge, and
- skill-based programmes increase drug knowledge, improve decision-making skills, self-esteem and peer pressure resistance, and reduce marijuana and hard drug use compared to the usual curriculum.

The review concluded that programmes that develop individual social skills are the most effective form of school-level intervention for the prevention of early drug use. However, they noted that there was very little available on the long-term effects of such programmes, and nearly all were conducted in the United States and may not be generalisable to other contexts.

Other recent reports of randomised studies have been consistent with the Cochrane review's conclusions. In Taiwan, Huang et al (2012) investigated the effectiveness of integrating life skills into a drug-use prevention programme based on the theory of planned behaviour. Junior high students (n=441) from two schools were randomised to three different groups. The intervention group received ten 45-minute sessions using interactive teaching methods covering issues such as self awareness and critical thinking, attitudes and insight into drug use and social norms, skills and strategies for managing stressful situations, and practising drug refusal skills. The classroom sessions were extended for 8-10 weeks with homework exercises involving parents and guardians. The intervention group was compared with a second group who

⁹ CHOICE combines knowledge, interactive discussion, role plays, reinforcing skills, in a non-judgemental manner (D'Amico et al 2012, p.416)

received two non-interactive didactic classroom sessions on the negative effects of drugs, and a third group with no intervention. Results showed that compared to the other two groups, the experimental group had statistically significant higher post-test scores for attitude, subjective norms, perceived behavioural control, and life skills. Both the intervention group and the didactic group had higher scores than the control group on intention not to use drugs. Limitations of the study were that it was conducted in only two schools, relied on self-report, and there was no data available on actual drug use among the students.

O'Neill et al (2011) conducted a randomised study of the Michigan Model for Health with elementary students in 4th and 5th grade (9-10 years). The programme, consisting of 52 sessions in all was implemented for a three month period in each of two years with the same students. Content focused on social and emotional health, interpersonal communication, social pressure resistance skills, drug use prevention and conflict resolution skills. Each year self-report survey data were collected at baseline, immediately after the intervention, and six weeks later. Statistically significant intervention effects were found for social and emotional health, interpersonal skills, and drug refusal skills, decrease in aggressive behaviour, and intention not to smoke cigarettes or drink alcohol over the next 12 months. Students in the intervention group also showed greater improvement in the odds of avoiding drug use. Pro-social behaviour and self-management skills did not show a significant difference between groups but both intervention and controls improved in these respects over the course of the programme suggesting a developmental effect as the children grew. While this study showed positive results, the authors' conclusion that programmes in elementary school were more effective than those starting in middle school or high school (p. 328) was unsubstantiated by long-term data, and the supporting references cited were of targeted interventions with high-risk children rather than universal programmes in schools.

A number of authors have drawn attention to the benefits that a positive school culture promoting health, achievement and identity appears to have on reducing drug use and delinquency. Fletcher et al (2008) in a wide-ranging systematic review of interventional and observational studies found that actions to improve school ethos and student engagement were consistently associated with positive effects on reducing drug use. They recommended that improving school ethos to combat disaffection is a valuable complement to current curriculum-based drug prevention interventions. This conclusion is supported by other more recent studies. Tobler et al (2011) using data from 61 schools in Chicago found that in schools where student achievement and attendance exceeded what would have been expected from the socio-demographic profiles of the students, there was a lower incidence of alcohol, cigarette and marijuana use, stealing, and participating in fights. Similarly, Clark et al (2011) reported that substance use prevention programmes were less likely to be effective in poorly performing schools and Jensen and Lleras-Muney (2012) found that students who stayed longer in school were less likely to drink and smoke and more likely to have positive health-related behaviours.

Programmes delivered in non-school settings

A Cochrane systematic review (Foxcroft and Tsertsvadze 2011) of universal family-based prevention programmes for alcohol misuse in young people examined 12 randomised controlled trials. The interventions typically consisted of parental support, developing parenting skills and nurturing behaviour, establishing clear boundaries for children, and parental monitoring. Some also included interventions with children to promote social and peer resistance skills, positive behavioural norms and peer affiliations. Most studies showed evidence of effectiveness compared to the control group and, though the effects were small, they persisted into the medium and long-term. Another Cochrane systematic review (Gates et al 2006) examined 17 randomised controlled studies of interventions in non-school settings for the prevention of drug use by young people. The interventions were diverse: some were interventions with parents in family groups; some had separate sessions for parents and children; others were family interventions as an addition to a school-based programme. Most interventions were not well reported. The review concluded that some family-based interventions may be effective but further research was needed before any approach could be recommended. The review was updated in 2009 but the conclusions remained unchanged.

The same Cochrane group (Foxcroft and Tsertsvadze 2011) also examined 20 trials of programmes delivered in more than one setting (for example, a school programme with an associated parenting intervention). Two thirds of the trials showed some evidence of effectiveness compared to a comparison group. Seven trials presented results so it was possible to assess the benefit of delivering the intervention in two settings rather than one, but only one of these showed that two settings resulted in greater effectiveness than one. The review concluded that while there is some evidence that multi-component settings can be effective for preventing alcohol misuse, there is little evidence that they are more effective than interventions with single components.

Media interventions

A recent Cochrane systematic review (Ferri et al 2013) examined 23 studies published up to and including 2012 evaluating the effectiveness of mass media campaigns in influencing young people up to age 25 in their attitudes to or use of illicit drugs. The studies, which were carried out in the United States, Canada and Australia, included randomised trials, prospective cohort studies, interrupted time series, and before and after designs. The studies used different evaluation measures, and reported mixed effects. The review concluded that at present there is insufficient evidence to establish the effectiveness of media campaigns on illicit drug use by young people.

Web-based screening and brief intervention for reducing alcohol and drug use

An online alcohol, tobacco and other drug intervention in 22 middle schools in the United States (Evers et al 2012) targeted students who had ever tried any of these substances with a web-based programme for cessation. Schools were randomised to

intervention and control, and intervention schools received a web-based cessation programme consisting of three 30-minute online sessions of assessment, feedback, images and short movies tailored to their specific need (based on their responses to the assessment questions). All students in both intervention and control groups underwent one pre-test assessment and two follow up assessments at three and fourteen months. The intervention resulted in significant treatment effects compared to controls at three months but they were no longer significant at 14 months follow-up. The investigators noted that because of the relatively low demands online programmes place on schools and their lower cost in terms of teaching resources, there needs to be more research into how the initial effects of such a programme can be sustained over the longer term.

Although with university students rather than being school-based, a recent report of a web-based alcohol intervention for Māori university students is worth including both for its local context and different approach (Kypri et al 2012). In this study, an email invitation was sent to all Māori students aged between 17 and 24 years who were enrolled in New Zealand universities (n=6697). They were asked to complete a brief questionnaire including a screening tool for hazardous and harmful drinking. Of those responding (n=2355) 1789 were eligible and were randomised to either an intervention or control group. The intervention group received personalised feedback on their scores with an explanation of the associated health risk and information about how to reduce that risk, estimates of their average monthly expenditure on alcohol, and a graph showing their consumption compared to other students and the general population of the same age and gender. Follow-up data were obtained at five months post-intervention from 80% (682) of the control group and 78% (733) of the intervention group. The intervention group were statistically significantly less likely to drink as often (RR=0.89, P=0.01), consume as much overall volume of alcohol (RR 0.78, P<0.001), or have academic problems because of their drinking (RR 0.81, P=0.01) compared to the control group. They also had reduced odds of heavy drinking leading to chronic harm (OR=0.65, P<0.001) but not of acute harm from binge drinking. Overall those who received the intervention drank 22% less alcohol than controls at follow up and their alcohol problem scores were 19% lower. The authors concluded that even though the results from this relatively well educated population may not be generalizable to other indigenous population, the findings showed:

... it is possible to proactively reach a large number of indigenous drinkers via the internet and engage them in reflection upon their drinking, leading to reductions of public health significance.(Kypri et al 2012, p. 337)

Of particular interest is that following distribution of the findings, all participating universities expressed their intention to implement the intervention routinely from 2012.

Other New Zealand research

Three relatively recent New Zealand publications are described. Two of these focus on young people who already had problem behaviour or addictions. Although the level of evidence they provide falls short of that of the systematic reviews and

randomised studies described above, they are included because of the paucity of relevant literature about the New Zealand context, particularly in relation to Māori and Pacific populations.

Southwick et al (2008) evaluated the achievements and outcomes of Le Ala, an innovative intervention to raise awareness of alcohol issues in Pacific communities and develop community approaches to reducing the misuse of alcohol and other drugs. A “story telling” approach, informed by Pacific cultural perspectives was used to form community groups that began by meeting together and sharing experiences. Once groups were established, the aim was to design a community-based intervention to reduce alcohol misuse. This project was successful in engaging Pacific communities and raising awareness of alcohol issues, and it appeared to have had some success in primary prevention. While it did not succeed in developing evidence-based interventions to reduce the misuse of alcohol and other drugs, the evaluation concluded that it would probably not have been possible within the three-year timeframe of the project. They noted that “in effect, the Story-Telling phase became the community intervention” (p.62). The approach was evaluated as being culturally relevant and responsive, particularly as it worked within the language of the group and their cultural norms.¹⁰ There were also some unexpected achievements in strengthening friendship and support for those attending, and identifying the need to develop safe drinking messages which would resonate with Pacific people. The intervention also succeeded in increasing intergenerational communication between youth and older adults, which was considered an additional and important positive outcome.

A report by McClellan (2006) evaluated the High on Life (HOL) intervention, a secondary school-based alcohol and other drug (AOD) intervention programme. HOL was implemented in the four high schools in the Whanganui urban area and eleven of the thirteen high schools in Taranaki. It was designed to operate on two levels:

- A whole-of-school approach that complemented the drug education component of the health and physical education curriculum.
- A complementary support strand provided by regionally based clinicians from AOD agencies who facilitated on-site, clinical and educative small-group sessions for students identified as having AOD issues.

The sessions used a non-prescriptive, guided self change approach based on principles of motivational interviewing, cognitive behavioural and stages of change theory. Sixty four students in Whanganui and 65 in Taranaki (total 133) attended these sessions.

The evaluation found that the programme produced a number of positive results:

- Schools appreciated the availability of free, on-site external support from AOD agencies which avoided cost or transport barriers for students and therefore improved participation and attendance compared to referrals of students to off-site AOD services.
- Drug-related suspensions fell from 2.4 to 0.6 and 8.0 to 1.1 per 1000 students in Whanganui and Taranaki respectively. However, the drop in suspensions in Taranaki appeared to be caused by awareness of their higher than average

¹⁰ There were three Samoan groups, one each of Cook Island and Tokelauan participants, and two of mixed Pacific ethnicities.

suspension rate and hearing about the initiatives that the Whanganui schools were already trialling as it occurred immediately after the Principals' pre-launch meeting and before the implementation of the programme.

- All schools adopted a less punitive approach to drug-related problems and aimed to keep students at school wherever possible. Most of the schools made attendance at the AOD small group sessions a condition for returning to school after a stand-down or suspension for drug related issues.
- Schools indicated that there had been desirable behaviour change among individual students, but were not able to say whether there had been a general positive change in the behaviour or learning outcomes of all students who had attended the support sessions.
- Nineteen of the 65 Taranaki students who participated in the small group sessions completed post-intervention evaluation forms, the majority of whom indicated that they had made changes in their alcohol and drug use and were getting into less trouble at home and at school.

A limitation of the programme was that AOD services were thinly stretched and were not always able to meet demand. There was also a lack of AOD counsellors of the appropriate gender, particularly Māori males who would have been more appropriate for the high proportion of Māori in the Whanganui schools. These factors meant that schools were not confident about the sustainability of the programme into the future.

The evaluation found that the HOL approach could be promoted to the schools and communities as an effective model to reduce harm and promote more positive outcomes for young people with issues with AOD. The following recommendations were made for implementation:

- Principals are important 'change agents', so need to be the first port of call when planning this type of initiative.
- A whole-of-school approach is important. Before the commencement of the project there should be wide buy-in from school staff, Boards of Trustees and parents.
- An intersectoral steering group should drive the HOL initiative in order to enhance the schools' and their communities' engagement.
- A collaborative relationship between the health and education sectors needs to be fostered.
- Schools may also wish to up-skill their in-house guidance counsellors and social workers in evidence-based AOD intervention so that schools are not entirely reliant on external providers.
- Schools and communities need to consider the needs of Māori students and any influences, both societal and within the school, that may be contributing to a higher rate of representation in suspensions (adapted from McClellan 2006, p. 44).

A report on the Youth Retention Study (Schroder et al 2007) investigated factors that promoted youth retention in alcohol and other drug (AOD) treatment programmes. This is not a health promotion intervention so is not described in detail. It drew from 79 face-to-face interviews and a file review of a further 105 young people who had participated in a variety of residential, day and outpatient AOD programmes using

mainstream, kaupapa Māori and Pasifika approaches. Key factors that enhanced retention were found to be self-motivated participants and programmes which had good relationships between staff and participants. A highly significant association was found between participants' perceptions of being involved in the process of goal-setting and treatment retention. Early treatment drop-out was significantly more likely if participants felt they had not been included in the process of setting treatment goals ($p=0.001$) or felt uncomfortable, unsafe, or unable to express themselves openly and honestly ($p=0.004$). In contrast, the socio-demographic characteristics of participants were not associated with treatment retention. The study made seven recommendations based on their findings.

All three of these New Zealand studies are freely available at <http://www.alcohol.org.nz/research-resources/research-publications?page=1>

Consistent themes across all subject areas

Educational institutions (early childhood, primary and secondary schools) appear to provide the most favourable settings for health promotion interventions across all the fields discussed in this document. Extended multi-component programmes that are based in schools and also involve families and create partnerships with community organisations appear to be the most effective of all.

A whole school ethos and culture is needed to effectively promote the desired behaviours and attitudes of a particular health promotion programme so that the students receive consistent messages in all parts of their school life. This may involve changes to school policies, and to the physical and social environment of the school. There needs to be leadership and support at governance level, by the school principal and teachers, school administration, and student leaders. The programmes also need to engage students and their families and, link with community activities when appropriate.

Characteristics of the programmes themselves that make for success are that they are integrated into and woven through the curriculum, involve interactive, age- and developmentally-appropriate activities by students rather than didactic teaching, and are of longer duration. An excellent programme on its own, however, cannot be effective unless it fits with the context of the school, is adequately resourced, and implemented fully and accurately.

Having a dedicated coordinator to get a health promotion programme started in an educational setting has been shown to be important, but ultimately programmes need to become self-sustaining to be viable over the long term. A key part of all successful health promotion programmes is professional development for teachers so that they are able to carry the programme forward independently.

Online applications and other electronic formats are attracting a great deal of interest but there is as yet, limited evidence about their effectiveness. They offer advantages in being appealing to children and young people, and reducing the time that is needed

by health promoters to present material in person. They can be administered consistently to the target group, but can also be adapted for different contexts. Some are also designed to provide a level of personalised feedback based on information input by the user. They appear promising in a number of health promotion areas, but it seems more likely that they will be complementary to, rather than a replacement for, existing interpersonal interventions.

Evaluation of health promotion programmes is challenging. Even high quality systematic reviews of randomised trials frequently find it difficult or impossible to draw conclusions about what is and what is not effective because of the variety of measures used to assess outcomes, the predominance of self-report in relation to behaviour change, and the lack of long term follow up. There are also many confounding factors outside the school setting which influence the effectiveness of health promotion programmes and which are difficult to account for.

Many studies have been able to report an increase in knowledge of healthy behaviours through surveying participants in such programmes, but it is well documented that better knowledge does not necessarily lead to behaviour change or change in health outcomes. Some programmes have been able to use physiological measures (for example change in BMI in physical activity and/or nutrition programmes), but these are in the minority. Assessing change in alcohol and drug use, for example, generally relies either on self-report or proximal outcomes such as number of students referred to alcohol and drug services, or number of suspensions from school.

Limitations of this update of the evidence

Each of the subject fields covered by this update of evidence is vast in its own right. A full and comprehensive review of each one has not been possible. The most recent systematic reviews of randomised trials have been used as an indicator of the best possible evidence and in places very recent individual trials have also been included. Randomised trials provide “gold standard” evidence but are not always the most useful design for studies in public health. The update has not reviewed the individual studies included in the systematic reviews or sought out excluded studies which were initially identified but fell outside the criteria for inclusion in some way (for example, their methodology, reporting, or the types of participants). Qualitative studies were not specifically sought for this update, but were included in some studies that used mixed methods and in a number of reviews that considered both quantitative and qualitative evidence. This may mean that some issues of relevance have been omitted.

There are a number of topics that have not been included in this update. These include health promotion interventions related to infectious disease control, immunisation uptake, or sun protection, and the most recent literature discussing evaluation methods.

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