



Behavioural interventions in primary care

What works in practice

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Summary

- Unhealthy lifestyles from smoking, risky drinking, being overweight and lack of exercise remain a widespread cause of morbidity and premature mortality.
- Behaviour change is complex and influenced by multiple personal and contextual factors that are outside the control of primary care.
- Primary health care professionals can support people to make positive behaviour change. There is relatively strong evidence that behaviour change interventions in primary care can motivate people to attempt behaviour change and for some people this may lead to sustained change.
- Provision of information alone is inadequate.
- Most recent studies that have investigated the best way of addressing unhealthy lifestyle behaviour have focused on using motivational methods that take an empathetic approach, attempt to understand the patient's point of view and help them to resolve their ambivalence about change.
- Motivational methods adapted for the reality of time-limited consultations in primary care have been developed. Studies using these adapted methods have shown promising results and have been found acceptable to patients.
- A pre-existing positive relationship between the patient and their GP and/or a primary care nurse can be a key factor in engaging the patient in thinking about change. Tailoring the intervention to the patient's circumstances also seems to promote a positive response.
- The same approach towards engaging with and motivating the patient to change has attracted widespread interest in encouraging self-care and compliance with treatment in a range of conditions, including diabetes, COPD, psychiatric disorders, and cardiac rehabilitation, among others.
- Although the evidence is mixed on the extent and duration of follow up sessions after initial counselling, it seems likely that ongoing support is needed to provide the patient with encouragement and realistic strategies for change. This may be done within the primary care practice, referred to suitable agencies, or both.
- Technology is increasingly being used to reduce the face-to-face time required for health professional input but cannot altogether replace personal contact with a key support person. Applications range from screening and assessment programmes with individualised feedback, to online, text, and email support services to help sustain motivation or to provide advice. A number of these have been developed in New Zealand.
- Training for primary care professionals can be done in a relatively short time, though low uptake has been reported in studies where training has been offered.
- Implementing a behaviour change programme in primary care requires change in the way the practice works. Significant time and resources are needed initially and practices also need resources and support to maintain enthusiasm over the longer term.
- Evidence on the effect on health outcomes is as yet limited, but this may be because most studies have been of relatively short duration. It seems likely that consistent implementation of behaviour change counselling in routine practice over a long period would be needed to measure any meaningful change in health outcomes.

Introduction

It is well documented that a healthy lifestyle, (not smoking, drinking only small amounts of alcohol, eating healthily and getting sufficient exercise) can prevent or reduce the burden of chronic disease. In spite of the growing evidence about these preventive effects, unhealthy lifestyles remain a widespread cause of morbidity and premature mortality (Noordman et al., 2012). Changing behaviour requires motivation, time and effort and patients are often ambivalent about or resistant to change. Nor is implementing behaviour change interventions easy for practices. A 2005 study that evaluated 17 interventions for integrating behaviour change tools into the primary care setting concluded that it required time, effort, and specialised expertise, and that even simple interventions required practice change (Cohen et al., 2005). This study recommended that versatile, multifaceted solutions involving new tools, technologies and multidisciplinary care teams were needed for behaviour change techniques to be incorporated into everyday primary care practice routines. In spite of numerous research studies since this evaluation was published a decade ago, and growing evidence of the most effective techniques, there still appears to be a relatively wide gap between this evidence and implementation in the daily reality of primary care practice.

Purpose of this paper

This background paper was requested by Dr Lynley Cook, Population Health and Community Engagement Team, Pegasus Health.

The paper aims to describe the characteristics of effective interventions to promote lifestyle behaviour change in general practice setting, therefore:

- Interventions must be practical to implement within the primary care setting, either within a general practice or initiated within the practice and referred to an external provider.
- Interventions should be transferable across the range of lifestyle behaviours, including smoking, alcohol and drugs, nutrition and exercise, gambling, or parenting.

Sources of information for this paper include papers indexed by the Medline and Web of Knowledge databases, systematic reviews from the Cochrane Library, and government documents from New Zealand, the UK and Australia. Initial searches were limited to publications from the last ten years and up until June 2014. Retrieved papers were also scanned for relevant references, including older key articles. Note that selected examples only from the published literature have been used. The document is not a systematic review. Where possible, New Zealand examples have been used.

The paper is set out in the following sections:

- Models and theories of behaviour change
- Behaviour change techniques for the primary care setting
 - Motivational interviewing
 - Brief interventions
 - Mindfulness
 - Goal setting and action plans
- Training of primary care practitioners
- Costs to practices
- Using technology to support behaviour change interventions
- Discussion and conclusions

Models and theories of behaviour change

It is well documented that information alone, though necessary, is not enough to motivate people to change their behaviour. The range of factors that drive behaviour is different for each individual; they include the way each person trades off the costs and benefits to themselves, the social and environmental constraints of their particular situation, and the way various options are presented to and interpreted by them.

According to a major overview of behaviour change models (Darnton, 2008), the interacting influences that drive behaviour are:

- Values, beliefs and attitudes of the individual
- Social (external) and personal (internal) norms
- Agency, efficacy, and control: an individual's sense that they can successfully carry out an action and that it will bring about the expected outcome.
- Habit and routine that may bypass deliberative processes
- Emotions: the difference between "cold cognition" and "hot evaluation" which affect decisions, particularly about risk
- Feedback and self-regulation: the way internal and external factors interact to shape behaviour
- External factors: the context in which the decision is made as well as the individual's perception of those factors.
- Wider societal factors that affect the way people live: individual, family/community, and general socio-economic cultural and environmental conditions.

Understanding what drives behaviour, and which behaviours put people at risk of poor health, does not provide a great deal of help in knowing how to motivate people to change unhealthy lifestyle behaviour. The next section looks at the most promising approaches for the primary care setting that have been identified in published studies.

The primary care setting

The general practice is the first-line provider of health and medical care for patients at risk of developing life-style related chronic illnesses and therefore primary care needs to be at the forefront of efforts to improve both individual and population health (Noordman et al., 2012). However, lifestyle issues are not necessarily easy to raise in the course of a primary care consultation. GPs have time constraints which make it difficult to explore behavioural issues when patients present for other reasons, and patients may feel uneasy when asked about their behaviour if they have sought an appointment for quite a different reason (Goodyear-Smith et al., 2013). It has also been shown that repeated brief advice on lifestyle from their GP can be damaging for the doctor-patient relationship and have a counterproductive effect on changing behaviour (Butler et al., 2013).

To identify the most promising approaches to changing lifestyle behaviour in primary care, Noordman et al (2012) conducted a systematic review of communication-related behaviour change techniques used in face-to-face interventions in primary care. The review addressed two main questions:

- Which face-to-face communication-related behaviour change techniques are most effective for primary care providers to intervene in relation to patients' lifestyle behaviour?
- Which health care provider in primary care (doctor or nurse) is more effective in using face-to-face communication-related behaviour change technique?

Fifty randomised trials of face-to-face counselling in primary care were included. Twelve were carried out in North America, 20 in European countries, eight in the UK, five in Australia, three in New Zealand¹, and two in Asian countries. Lifestyle issues addressed were physical activity and nutrition, smoking, and alcohol consumption and combinations of any or all of these. Most were aimed at primary prevention, but some also included secondary prevention after a person had been diagnosed with cardiovascular or respiratory disease or diabetes. Most studies measured outcomes with both self-report and objective measures; eight used self-report only, and two used objective outcomes only. All studies took place in primary care and the behaviour change techniques were provided by a doctor, nurse or both, and sometimes in combination with other professionals such as dieticians or physical activity counsellors.

Twenty-six of the studies reported significant outcomes from the behaviour change techniques used. Fifteen of the 26 studies that used behavioural counselling had significant outcomes; eight of the 14 studies that used motivational interviewing; seven of 14 that used education; and seven of the 16 that used advice. However, all these techniques were also used in some of the ineffective studies.

The main conclusions from this comprehensive review were:

- There is some evidence that behavioural counselling², motivational interviewing, education and advice can be used as effective communication-related behavioural change techniques by physicians and nurses.
- Feedback, risk assessment, goal setting and cognitive behaviour therapy appeared to be less effective, though the number of studies using these techniques was small.
- There was no evidence to suggest that one primary care professional (doctor or nurse) was superior to another in delivering behaviour change interventions. However few studies compared one with another.
- There are opportunities for dividing the workload between doctors and nurses and other primary health care professionals in primary care because of the time-consuming nature of counselling patients face-to-face.
- Simple advice appeared to be as effective as intensive advice and just as effective as motivational interviewing, but this was not consistent across all studies.
- No conclusion could be reached about the impact of the intensity of the intervention on outcomes because the number and duration of the face-to-face time with the patient varied so widely between studies.
- Effective studies were more likely to use a theoretical foundation (16 of the 26 effective studies) but in general there was a lack of theory underpinning many interventions.
- Many studies described their interventions inadequately; general descriptions of 'counselling sessions' or 'education and advice' concealed underlying mechanisms that may have been crucial to the outcome. The authors noted that a more precise description of interventions is needed in future studies.

Like many systematic reviews, this one also ended by noting the need for more research into understanding the underlying mechanisms of communication-related behaviour change techniques and their suitability for primary care providers and patients.

The following section examines in more detail several of the most promising techniques that were identified in the review using selected examples from the New Zealand and international published literature.

¹ All the NZ studies were interventions for increasing physical activity.

² Behavioural counselling was not defined in the review. However, the individual studies are tabulated and each intervention is described.

Motivational interviewing

Motivational interviewing (MI) was originally devised by Miller (1983) for work with problem drinkers, but has been further developed and refined since then (Miller and Rollnick, 2002, Rollnick et al., 1997, Rollnick and Heather, 1992). MI is a client-centred counselling style for motivating behaviour change by helping patients to explore and resolve ambivalence. It is grounded in the basic principle that people must have a strong desire from within themselves to change before any progress can be made. The spirit in which motivational interviewing is approached is more important than any particular technique used. Motivational interviewing acknowledges that readiness to change fluctuates in any individual and the counsellor needs to be non-confrontational and help the person to examine and resolve their ambivalence. In MI the counsellor needs to forego their role as an “expert” and instead take a partnership approach. There are four basic principles:

- express empathy: see the world through the client’s eyes
- support self-efficacy: clients are responsible for choosing and carrying out actions to change
- roll with resistance: the counsellor does not fight client resistance, does not challenge statements about resistance but uses the client’s “momentum” to further explore the client’s views
- develop discrepancy: motivation for change occurs when people see a discrepancy between where they are and where they want to be³.

MI training focuses on developing therapist behaviours that aim to understand the person’s point of view, listen reflectively, express acceptance and affirmation, reinforce the client’s own self-motivational statements, ensure that resistance is not generated by jumping ahead of the client, and affirm the client’s freedom of choice and self-direction. The term “motivational” has not always been correctly used; interventions that offer direct advice, prescribe solutions, or take an authoritative expert stance leaving the client in a passive role, cannot be considered as part of the motivational approach (Rollnick and Miller, 1995, p.330).

Brief motivational interviewing (BMI) using these principles has been developed for practical use in primary care (Rollnick and Heather, 1992, Rollnick et al., 1997, Spanou et al., 2010, Lane et al., 2005). It is designed to be useable in time-limited consultations and flexible enough to be used with patients in various stages of readiness to change. Training of practitioners in brief motivational interviewing takes no more than 12-15 hours, teaches interviewers to raise the subject of behaviour change in a sensitive and respectful manner, and has a set of concrete strategies to assist practitioners. Although originally developed for problem drinkers, it is also applicable to other lifestyle behaviours including smoking, exercise, and nutrition and has also been used to encourage compliance with treatment for people with chronic conditions such as diabetes and depression. The following section outlines the evidence from large systematic reviews and studies in primary care settings.

Systematic reviews of motivational interviewing for behaviour change

Three Cochrane systematic reviews have examined the effectiveness of motivational interviewing. Note that these reviews focus on MI rather than the primary care setting. The first of these (Lai et al., 2010) examined the effectiveness of MI for smoking cessation compared to brief advice or usual care. Fourteen 14 randomized trials that took place between 1997 and 2008 and included over 10,000 smokers were included in the review. The review found that MI was modestly more successful for smoking cessation compared to brief advice or usual care, but had a lower effect size than that reported in other Cochrane systematic reviews of group therapy or individual counselling. It could not

³ See: <http://motivationalinterview.org/Documets/1%20A%20MI%20Definition%20Principles%20&%20Approach%20V4%20012911.pdf>
Accessed 29.4.14.

be determined whether this was attributable to the limited evidence base for MI, the inclusion of smokers with no or low motivation to quit in the included trials, or to the lower efficacy of MI techniques. There was some evidence that primary care doctors were more effective using MI than nurses, counsellors, or research workers, suggesting that the doctor's previously established rapport with and knowledge of the patient as well as ongoing contact with the patient through regular health care may be key factors rather than the motivational interviewing technique itself. There was also some evidence that longer MI sessions (>20 minutes) were more effective but the evidence on the optimum number of follow up sessions (either in person or by phone) was unclear.

A second Cochrane systematic review (Smedslund et al., 2011) investigated the effectiveness of MI for various types of substance abuse (other than smoking). Fifty nine studies with more than 13,000 participants were examined. MI compared to control participants who had no treatment showed a significant effect on substance abuse immediately post intervention, however the effect faded over time and was not significant at long-term follow up (12 months or longer). MI also did better than assessment and feedback for medium follow up. There was no significant difference between MI and any other active intervention at any follow up time, nor was there a difference between MI and treatment as usual. The authors concluded that with an average of only one to four sessions, expectations of MI to effect change in substance abuse outcomes should not be too high, but was superior to doing nothing at all. They noted that MI appeared to be neither superior nor inferior to a range of other therapies that include paying attention to the patient and establishing a therapeutic alliance, which may be more influential than any approach-specific theory and technique.

A third Cochrane review investigated MI for improving outcomes for young people living with HIV found only two trials with a total of 237 participants that were of sufficient quality for inclusion (Mbuagbaw et al., 2012). There was moderate evidence from both trials that MI improved viral load and condom use, and from one trial, that MI reduced alcohol use. There was insufficient evidence to establish whether MI had any effect on adherence to medication, mortality or quality of life.

Studies of motivational interviewing in primary care

Apart from these systematic reviews, a number of studies have reported results from the use of motivational interviewing methods in primary care. The most detailed of these is the study by Butler et al (1999) who conducted a randomized trial in 21 general practices in Wales. The trial compared the effect of one motivational consultation for 270 smokers in one arm, with one brief advice consultation for 266 smokers in the other. The MI approach used was specifically designed to be suitable for opportunistic consultations in general practice (Rollnick et al., 1997). Twenty four general practice registrars were trained to deliver the intervention. At the six month follow up smokers who had received the motivational intervention were significantly more likely to report not smoking in the previous 24 hours, delaying their first cigarette of the day, making a quit attempt that lasted at least a week, and be more ready to change their smoking behaviour. Motivational interviewing proved to be more effective than brief advice in this study, especially among those who had not considered cutting down or quitting, however few patients actually quit. This study also calculated the time and costs involved in training the registrars for four 2-hour sessions each and the 10 minutes that the motivational intervention took compared to two minutes for the brief advice. Although the costs were clearly higher for the former, both the clinicians and the patients preferred the motivational approach. Moreover, patients reported that repeated brief advice could be damaging for their relationship with their doctor and had a demotivating effect on quit attempts. The conclusion of this study was that motivational consulting had more potential as an approach for those less ready to give up smoking, but that quit levels were low. They noted however, that "focusing on quitting alone may understate efficiency on a wider range of related objectives such as reducing addiction or moving smokers toward the action end of the stages of change continuum" (p. 615). Note that this study is now 15

years old and used registrars (i.e. already in training) rather than recruiting the regular doctors who worked in the practices.

The Healthy Aging Demonstration Project (Bennett et al., 2005) also used a motivational approach. This project was designed to test a new model of primary care nursing focused on supporting an individualised health plan for community living older people with chronic conditions through behavioural coaching. Nurses received 24 hours of training in motivational interviewing, with the principal aim being to test its acceptability in clinical practice and primary care settings rather than rigorously test the efficacy of the intervention. Participants (n=111) were divided between 66 in the intervention group and 45 controls. Intervention participants decided on a behavioural goal to work on during the next six months in an initial session with a nurse coach lasting around one hour, and received follow up contacts by email or phone. Outcomes were measured using validated scales for general health, social/role activities limitations, health distress, and illness intrusiveness. All participants were enthusiastic about the study with a high proportion of measurement surveys returned at the completion of the study; however there was only a small effect on health status outcomes. Health distress and illness intrusiveness were lower in the intervention group compared to the controls, but there was no difference in any of the other outcome measures. Moreover, even the statistically significant results were not clinically significant in relation to health outcomes. The authors suggested that this may have been because the participants were relatively healthy and may simply not have had room for a great deal of improvement. There was no correlation between the number of contacts participants received from nurses and outcomes, suggesting that it was the content of the contacts rather than their frequency that was important. The conclusion from the study was that nurse coaching proved to be a promising method of communicating with older adults about their health and behaviour, and the study added to the limited literature on using MI as a method to develop new and healthy behaviours rather than focusing on addictions.

An exercise and healthy nutrition study involving girls aged 12-17 years with BMI at or over the 90th percentile in a large primary health organisation in the Pacific North West (DeBar et al., 2012) had 105 participants randomised to the intervention and 103 to usual care. This was a medium intensity study over five months with sixteen 90 minute group meetings that covered dietary change, increasing physical activity, addressing psychological issues associated with weight gain in adolescent girls (eg depression, poor body image) and 12 separate group sessions for parents. The control group received usual care plus a packet of material with guides to healthy eating and a list of resources available to support behaviour change. Follow up was at the end of the intervention and at 12 months. The study was run by research staff who were not the participants' regular providers. However the participants had an individual counselling session with their primary care physician at the beginning and end of the study and the physicians received training in "motivational enhancement techniques" (p.e614) to encourage the participants to set and maintain one or two behavioural goals. The study reported high participant satisfaction, positive psychosocial outcomes and a statistically significant (although modest) BMI reduction in the intervention compared to the control group. However, the motivational training techniques offered to the primary care providers were not described or referenced and there was no indication whether these were thought to have been influential in the results. There was also no indication as to whether the physicians had found the training helpful or would incorporate it into their regular practice.

Mental health

Motivational methods in primary care have also been used to address mental health conditions. Roy Byrne et al (2009) reported using MI methods to assist primary care patients with anxiety disorders. The initial visit focused on establishing rapport, understanding the patient's motivation for receiving treatment and reviewing possible barriers to treatment. Once patients were interested in pursuing

treatment, they were guided to see how they could develop a state of self-activation whereby they decreased avoidant behaviour and adopted a more activated life approach. Treatment using cognitive behavioural therapy approaches, relaxation techniques, exercise and medication then followed. This report was part of an ongoing study funded by the National Institute of Mental Health (Sullivan et al., 2007) and focused on the use of MI methods. Results of the study were not reported.

In another study addressing mental health, Hoek et al (2011) compared motivational interviewing with brief advice as a way of engaging adolescents in an internet-based depression prevention intervention. In the brief advice approach, the physician directed the adolescent to the internet program, whereas in the MI approach, the physician helped the adolescent to identify their own motivation for engaging in the program. The intervention itself took the form of a primary care physician interview before and after the internet programme as well as three safety assessment calls during the intervention. The MI group also received three motivational phone calls and completed a questionnaire before the intervention. The internet intervention which all participants were referred to had 14 modules using different psychological techniques helping participants to develop a sense of mastery over emotions. Eighty-three adolescents in 13 different primary care practices participated and were followed up at six months. Results showed that there were no significant differences in depressed mood between the groups, but the MI group had a lower cumulative prevalence of clinically significant depressive episodes and hopelessness. The authors noted a number of limitations to the study (including a lack of power and the possibility that symptoms resolved over time), but concluded overall that using a short-term psychological intervention through the internet in a primary care setting may be more cost effective and more accessible to adolescents than a relatively longer treatment.

Other research

Two other studies of motivational interviewing conducted as part of university research programmes are worth mentioning because of their potential application to primary care settings. Both recruited participants from the wider community and used a single face-to-face session of MI, followed up with email or phone calls. The first of these, Davis et al (2011) compared motivational interviewing to prescriptive advice for smokers who were not ready to quit in a study designed to simulate GP visits. Participants were randomised to receive either a 15 minute prescriptive (n=114) or motivational (n=116) interview. Results were measured using self-report as well as biological verification at one and six months post intervention. One third of participants reported making at least one 24 hour attempt to quit during the six months but there were no significant differences between the two groups. More smokers were lost to follow-up in the prescriptive group, suggesting that an authoritative approach may drive people away, while the MI approach may leave the patient open for further intervention. The authors noted that smokers make multiple quit attempts before giving up and any quit attempt represents progress.

The second study, Ingersoll et al (2013) recruited 217 community women who were at risk from alcohol-exposed pregnancy and randomised them to received either a printed information brochure, an informational video, or a 60 minute face-to-face motivational intervention. In the MI session, the counsellors focused on building rapport, providing personalised feedback on drinking and contraception, and evoked participants' interest in changing one or both behaviours using MI strategies and techniques. At the end of 90 days outcomes assessed were drinks per drinking day, ineffective contraception rate (percentage of days with unprotected sexual encounters), and alcohol exposed pregnancy risk. All three of the interventions reduced all three of these risk factors across the time of the study, and the counselling intervention decreased ineffective contraception and alcohol-exposed pregnancy risk but not drinks per drinking day compared to the other two interventions. However, the overall risk reductions were smaller than those achieved in earlier studies

of more intensive interventions. Although the authors were disappointed at the small effect, they commented that there may still be a role for the single-session intervention at the low-risk end of the spectrum or in situations where more intensive interventions are not possible.

In contrast to the studies with positive results, a single-session of motivational interviewing failed to make any difference compared to traditional oral health education in a trial with adults attending a university dental service for periodontic problems (Brand et al., 2013). All participants (29 in the intervention group and 27 controls) received usual oral health advice and the intervention group received an additional MI session of 15-20 minutes delivered by a trained counsellor. Although statistically significant changes in oral health compared to baseline were found for both groups, there were no oral health differences between groups, or differences in motivation, autonomy or knowledge. The authors concluded that a single session of MI in this population of poorly controlled periodontal patients was insufficient to improve oral health behaviour beyond that which was achievable by traditional oral hygiene education.

Motivational interviewing and disease self-management

There is widespread interest, not limited to primary care, in using motivational methods for improving self-management and compliance with treatment in many other chronic conditions. The recent clinical trial and secondary care literature provides examples of using motivational methods in diabetes (Dellasega et al., 2012, Gao et al., 2013, Rees et al., 2013, Rosenbek Minet et al., 2011), antiretroviral therapy for HIV (Golin et al., 2006, Naar-King et al., 2009), COPD (Benzo et al., 2013, Benzo, 2013), kidney disease (Russell et al., 2011), cardiac rehabilitation (Pack et al., 2013, Zarani et al., 2012), sleep disorders (Aloia et al., 2013, Lancee et al., 2013, Olsen et al., 2012), musculoskeletal disorders (Chilton et al., 2012), and some psychiatric disorders (McMurrin et al., 2013, Simpson et al., 2010) among others. The same key factors as have already been noted in the primary care literature are recognised as aiding in effective interventions: developing a partnership between the patient and provider that embraces the patient's own values (Benzo, 2013, Dellasega et al., 2012, Gao et al., 2013), creating personalised programmes that recognise individual preferences and differences (Crane and Eckhardt, 2013, McMurrin et al., 2013, Rees et al., 2013, Yuen et al., 2013), and providing ongoing support and feedback (Austin et al., 2013, Rees et al., 2013). Evidence about effectiveness has been mixed but studies are difficult to compare, because of the wide range of different study designs, the specific nature of the intervention, and by whom it has been delivered. Together, however, they show a general move away from didactic methods and towards motivating the patient to engage in a combined partnership with a health provider (whether, a doctor, nurse, pharmacist or other health professional) in a combined effort to address their health need.

Brief interventions

There is a large literature on brief interventions for behaviour change in primary care. Key characteristics of brief intervention for behaviour change are that they are firstly, opportunistic, because the behaviour (for example, harmful alcohol use) is not generally the reason for the consultation, and secondly, that they need to be time-limited because primary care physicians have only a short period of time with each patient (Kaner et al., 2009). Many reports of brief interventions also refer to motivational components, so that the distinction between the two is not clearly defined.

A key difference between motivational interviewing and brief interventions would appear to be a greater focus on the method for the motivational interviewing literature whereas in the brief interventions literature the focus is much more on the behaviour being addressed. Most commonly,

this is one of four lifestyle behaviours: harmful drinking, smoking, insufficient exercise, or overweight/obesity. Because of the volume of literature, systematic reviews and recent trials have been selected for inclusion in this section.

Studies of brief interventions for harmful alcohol use

The brief intervention literature is dominated by studies of reducing harmful drinking behaviour. A Cochrane systematic review and meta-analysis (Kaner et al., 2007, Kaner et al., 2009) examined 22 randomised controlled trials that evaluated outcomes in 5800 patients. A particular feature of this review was that it differentiated between “real world” (effectiveness) interventions (i.e. those that took place with genuine patients who presented to their routine practitioner and the intervention was delivered in standard consultation times) and those that took place in trial conditions (efficacy trials). In these trials, brief intervention took various forms including simple advice, motivational counselling, cognitive behavioural therapy, self-completed action plans, information leaflets, requests to keep drinking diaries and exercises to complete at home. Most trials reported a single brief intervention session though some reported up to five, with the median amount of time 25 minutes (range 5 – 60 minutes). Control conditions varied between assessment only, usual care, nurse or GP recommendation to cut down drinking and provision of leaflets. Five of the trials had extended interventions ranging up to seven sessions with a total mean intervention time of 100 minutes. Results of the review and meta-analysis showed that at one year follow up there was a significant reduction in alcohol consumption (-38g per week, 95% CI -54 to -23g per week) in intervention participants compared to those in the control group.

Subsequent studies have tended to focus more on subgroups of drinkers, rather than repeat the work done in this widely cited review and meta-analysis. Saitz (2010) for example, re-examined studies used in systematic reviews [including the one by Kaner et al (2007)], as well as those published subsequently for evidence about the effectiveness of brief interventions for very heavy or dependent drinkers. Of the 16 trials that they examined, all but two had excluded heavy drinkers. Moreover, the two studies where heavy drinkers were included had small sample sizes; one included only women, and the other only Mexican Americans. There was also some evidence that many patients with very heavy drinking do not take up the referral and treatment options offered to them. This investigation concluded that there was as yet insufficient evidence to support brief intervention in primary care for patients with very heavy drinking or alcohol dependence and new approaches are needed.

Several other studies have examined the potential for community pharmacists to provide screening and brief intervention for people with harmful alcohol use; however this approach is still in its early stages. There has been considerable recent interest in New Zealand in this topic. A postal survey of community pharmacists in Auckland (Sheridan et al., 2008) and a subsequent study where community pharmacists were interviewed in 22 English and 18 New Zealand pharmacies to further explore pharmacist attitudes (Horsfield et al., 2011) both found that pharmacists considered that intervening in risky drinking as part of general health promotion in community pharmacy was acceptable overall, but were concerned about the possibility of offending their customers, as well as their lack of time, training, skills, and confidence in this area. Pharmacists believed that before they could undertake such a role successfully there was a need for increased privacy in pharmacies, a system for remuneration, and a public health campaign to raise awareness that pharmacists would be undertaking this work.

Most recently attitudes of pharmacy customers to being asked about problem drinking in their community pharmacy were examined by Sheridan et al (2012). In this investigation a cross-sectional anonymous survey was carried out of people attending a random selection of New Zealand community pharmacies. The Alcohol use Disorders Identification test and attitudes to pharmacists

engaging in screening and brief interventions for risky drinkers were completed by 2384 pharmacy customers. In this survey 20% of respondents returned scores that were consistent with risky drinking. Overall, respondents were positive about pharmacists carrying out brief interventions; however risky drinkers tended to be less positive and potentially more likely to be embarrassed by being questioned. An ongoing study has randomised volunteers from British pharmacies to either an intervention group with a 10 minute motivational discussion or a control group with an information leaflet only (Dhital et al., 2013). This study was due to end at the end of 2013, and no reports in the published literature appear to be available as yet.

Another focus of recent studies has been on ways to spread the workload across the general practice team, so that brief interventions for harmful drinking are more practical to implement widely. Sullivan et al (2011) conducted a systematic review and meta-analysis of thirteen studies where brief interventions were delivered in primary care at least in part by non-physicians (nurses, physician assistants, health educators or psychologists). Five of these compared physician with non-physician brief advice; two examined physician combined with non-physician compared to physician alone, and the remainder were interventions by non-physicians alone. The meta-analysis showed that non-physician interventions were associated with 1.7 (95% CI -.03 to -3.5) fewer standard drinks per week than control conditions and were therefore modestly effective at reducing drinking. There was insufficient evidence to determine whether the collaborative model (physicians plus others) were more effective than non-physicians alone. Other studies on reducing clinician workload have used electronic support methods and these are discussed in the section below on technological support.

Studies of brief interventions for encouraging smoking cessation

Personalised letters from their doctor have been used as a form of brief intervention in two studies on encouraging smoking cessation with positive results. A New Zealand study (Watson et al., 2010) examined the impact of mailed GP brief advice letters plus nicotine replacement vouchers on attempts to quit smoking. Personalised letters from GPs advising their patients who were smokers to quit, together with a voucher for one month's supply of nicotine gum were sent to 831 patients in one Auckland DHB. The comparison group were smokers in another Auckland DHB. Calls to Quitline and numbers of vouchers redeemed were measured in both areas before and after the study. The vouchers from the study were of a unique design so they could be tracked easily. Follow-up surveys of patients and GPs were carried out to assess the acceptability of the intervention. Results showed that calls to Quitline did not increase significantly, but the number of vouchers redeemed were significantly higher in the intervention area ($p=0.005$), with almost 9% of the vouchers being exchanged for NRT gum. Both GPs and patients rated the intervention as acceptable and patients particularly liked receiving the vouchers, but only a third of the 15 participating GPs responded to follow up and only 21 of the patients consented to being contacted after the intervention for their feedback. However, several GPs described positive feedback from their patients about the mail-out and that it had opened up a conversation about smoking on a subsequent visit. The authors concluded that if scaled up, this approach had the potential to reach a large number of smokers and increase attempts to quit smoking. They noted that a large randomised trial would be needed to evaluate any effect on quit rates.

In another similar study, brief physician interventions for smoking cessation were compared with tailored computer-generated letters for their effect on smoking behaviour in 1499 patients in 34 primary care practices in Germany (Meyer et al., 2008). Patients in the tailored letter group received up to three individualised personal letters. Brief advice was provided during routine care in the comparison group. There was also an assessment only control group. Results were measured by self-reported prevalence of smoking and prolonged abstinence at six monthly intervals for the following two years. Analysis of all follow ups showed statistically significant positive effects in both

intervention groups compared to the control participants. Among patients completing all follow ups, prolonged abstinence at 6 months was 18.3% in the tailored letters group, 14.8% in the brief interventions group and 10.5% in the assessment only control group. Based on these results, the tailored letters proved to be a promising option for providing smoking cessation interventions in primary care. A further report of this same study (Klein et al., 2010), examined the effect of the intervention in reducing cigarettes per day in the 89% of smokers who did not quit during the 2-year period. They found that both interventions were equally effective in effecting a small but significant reduction in the number of cigarettes per day. The reduction occurred in the first six months and was sustained until the 2-year follow up. The authors noted that implementing such an intervention among unselected smokers, most of whom are not ready to change, can still lead to a significant reduction in tobacco consumption and hence to tobacco-related disease. A third publication from this study (Haug et al., 2010) examined predictors and moderators of the intervention. Being female, having a higher level of education, having an intention to quit smoking, and smoking cessation self-efficacy were all positively associated with 6-month self-reported abstinence, whereas nicotine dependence and having a partner who smoked were negatively associated with abstinence. This study concluded that smoking interventions may be more successful if they are tailored to the demographic and smoking related variables identified.

A different study applied the 5A model of brief intervention for smoking cessation⁴ (Ask, Advise, Assess, Assist, Arrange) with 773 women of reproductive age attending primary care clinics in Chile (Puschel et al., 2008). The study compared women attending an intervention practice with two other primary care practices where the intervention was not provided. Results showed that more than 70% of the women in the intervention clinic were asked, assessed and received advice about smoking compared to <15% in the control clinics. At the end of the 18 month trial 15.2% of the women reported quitting for at least one month compared to 7.8% in one of the control clinics ($p<0.01$), but without significant differences with the second control clinic. Reasons for this difference between control clinics were not suggested.

Studies of brief interventions to encourage physical activity

A number of studies have investigated the effectiveness of brief interventions in primary care for increasing exercise and/or improving healthy eating. Several New Zealand studies have examined the effects of implementing the Green Prescription in primary care⁵. The first of these was a cluster randomised controlled trial involving patients from 42 general practices in the Waikato region (Elley et al., 2003). Participants were 878 sedentary patients aged between 40-79 years. Patients in the intervention group (n=451) used a form supplied by the researcher to prompt their GP or practice nurse during the consultation to deliver the Green Prescription intervention. The control group patients received usual care. A subsample of GPs estimated spending an average of 7 minutes and practice nurses 13 minutes per patient delivering the intervention. Patients were then referred to the agency that provided further support and encouragement over the next few months. Outcome measures were the change in energy expenditure, cardiovascular risk (blood pressure and coronary heart disease risk) and quality of life assessed using the SF-36. Most outcome measures improved in both groups over the 12 months, however, total expenditure of energy increased more in the intervention group than in controls, as did general health, vitality, bodily pain, and physical role scores on the SF-36. The proportion of patients who achieved 2.5 hours of moderate physical activity per week increased by 14.6% in the intervention group compared with 4.9% among controls. There were no significant differences between the groups in blood pressure improvement, the risk of coronary heart disease, or the odds ratio of having a fall or a hospital admission. The authors believed that getting patients to prompt their GP for the intervention and having the usual practitioner as the agent

⁴ See <http://www.youquittwoquit.com/Counseling.aspx>

⁵ See <http://www.sportcanterbury.org.nz/new-zealand/green-prescription/>

of the intervention (rather than visiting activity specialists) had contributed to the success of the trial. The study was considered to have widespread generalizability as it had high rates of participation from a diverse group of patients from all socio-economic groups across a large region.

Subsequent studies from the same team of researchers have reported on other aspects of Green Prescription interventions. A purposive sample of fifteen patients who had completed the intervention reported in the previous study were interviewed in depth about their experiences of the programme (Elley et al., 2007). Tailoring the activities to an individual's circumstances and capabilities were found to be particularly important. Barriers included lack of time, motivation, and self-discipline as well as factors outside the individual's control such as the weather or the lack of footpaths in rural areas. Internal motivators mentioned by participants that contributed to success were feeling the immediate benefit of exercise, wanting to stick with the programme once a commitment had been made, knowledge that it would benefit health, fear of ill health, and a beneficial connection between the mind, body and spirit. GPs, exercise coaches, social contacts and even pets were also helpful in encouraging long term behaviour change. There was a mixed reaction to prompts by the exercise coordinators during the follow up period; some people found them helpful, but others saw them as annoying or patronising. Participant ideas for improving the intervention included face-to-face feedback, group meetings, and more social interaction with others in the programme. The authors concluded that individual motivators and barriers were different for each individual, so that tailored advice for each patient, a contract to adhere to, and structured ongoing support appeared to be the key to influencing behaviour change and ongoing adherence.

Another study by researchers from Lincoln University (Sinclair and Hamlin, 2007) also looked at self-reported patient benefits using a retrospective survey of 124 individuals who had been prescribed the Green Prescription between 2001-2002. Participants were recruited through the Sport and Recreation Council (SPARC). All those participating were aged between 50 and 79 and two thirds were female. Seventy percent reported that they had continued to be physically active following the Green Prescription though some had moved on to other activities. Reasons given by those who were no longer physically active were illness or injury, time and motivation. Eighty percent of the respondents had noticed positive changes in their health including breathing more easily, weight loss or stabilisation, a reduction in medication use, and generally feeling better overall. Nearly all participants had found the support received from the Regional Sports Trusts personnel and the group physical activities helpful or very helpful, but only a minority reported that their doctor had noticed or commented on these positive changes. The authors noted that the collaboration between primary care and sports organisations was unique and may improve further if GPs gave further input and feedback.

A third study by Elley et al (2011) reported on an enhanced version of the Green Prescription in women recruited from 17 general practices in the Wellington region. The participants who received the intervention had 10 minutes brief advice and a written exercise prescription from a primary care nurse, with telephone support from an exercise coach at a regional sports trust over the next nine months and a half hour face-to-face interview with the nurse at six months. The control group received usual care. Of the 1089 participants enrolled in the trial, 92.6% attended the 12 month follow up and 89.4% the two year follow up. Physical activity levels were higher in the intervention group compared to controls at both 12 months (120 vs 75 minutes/week) and two years (105 vs 90 minutes/week). More participants in the intervention group achieved the target of 150 minutes/week in the intervention group compared to the control group at both time points. All these results were statistically significant. The primary aim of this study was to examine cost effectiveness of the intervention. Both direct and indirect costs were taken into account at baseline, 12 months and two years⁶. The authors were able to conclude that even though the proportion of participants who

⁶ For the exact costs and how they were calculated, see the original article. Costs are based on those at the time of the study (2004-2006).

became and remained active was quite small (13% at 12 months and 6.7% at 24 months) it was still cost-effective as the cost of delivery was small.

Other than in New Zealand, Ma et al (2013) reported a randomised trial investigating whether a lifestyle intervention for weight loss (the Diabetes Prevention Program for high risk adults) could be implemented effectively in primary care settings. Adults with pre-diabetes or metabolic syndrome (n=241) were recruited from a primary care clinic and randomised to one of three groups: a coach led group intervention, a self-directed DVD intervention for use at home, or usual care. The intervention ran for three months during which a weight loss curriculum with physical activity and nutritional advice components was delivered by the lifestyle coach to small groups. Both the personally coached and DVD groups also received lifestyle change coaching and support via email and a website for goal setting and self-monitoring. The primary outcome measure was change in BMI between base-line and 15 month follow up. The percentage of participants who achieved the 7% weight loss goal was 37% in the coach-led group (p=.003) and 35.9% in the self-led group (p=.004) compared to 14.4% in the usual care group. Both intervention groups also had greater improvements in waist circumference and fasting plasma glucose levels. The authors concluded that the programme was effective and could be scaled up for wider implementation in primary care practice.

A further study of a brief intervention by Bolognesi with overweight and obese patients in an Italian primary care setting (Bolognesi et al., 2006) used the PACE protocol (patient assessment and counselling for exercise) and found positive outcomes in respect of BMI and abdominal girth at six month follow up among the 48 intervention participants compared to the control group of the same size. Intervention group participants also progressed in their readiness to exercise and their self-efficacy. This study lacked the collaborative aspect and ongoing support provided in the New Zealand studies.

Studies of brief intervention to increase fruit and vegetable intake

There appear to be few studies of brief interventions in primary care for increasing fruit and vegetable intake. One uncontrolled study (Buyuktuncer et al., 2014, Kearney et al., 2005) in a deprived area of northern England provided discount vouchers for fruit and vegetable purchases at local stores along with brief counselling on the benefits of eating five portions a day on reducing rates of heart disease and cancer. The intervention was delivered by a member of the primary care team (GP, nurse, health visitor or midwife) in the process of a routine visit. Posters and leaflets advertising the five a day theme were distributed, and free fruit was offered in the waiting room for those waiting to be seen. A total of 621 patients received the prescription and 124 were interviewed by phone to survey changes in consumption over the short and medium term.

Three quarters of those interviewed had used the vouchers to buy a wide range of produce, however there was no significant difference in consumption of fruit and vegetables. A number of participants said their consumption had increased and that the vouchers and promotion had been an influence; however, others stated that their consumption had not increased because of the vouchers, stating that they already ate five portions a day, or citing poor quality of the produce available in the associated shops, and insufficient value of vouchers. Participants suggested that extending the value and time period of the vouchers and increasing the range of places where they could be used would be an improvement. Based on self-report, knowledge of the five a day message was high, but knowledge of portion size was limited. General barriers to consumption mentioned by participants included the cost, availability of high quality produce, likes and dislikes in the household, knowledge of ways to prepare fresh fruit and vegetables and lack of time to prepare fresh food. The intervention and surrounding promotion was, however, successful in engaging patients as well as the wider community and local media, and was found highly acceptable to patients. Health professionals also appreciated

having a promotional intervention that required only 1-2 minutes. A number of limitations were noted by the authors: the study was small, had no control group, relied on self-report, and appeared to have failed to recruit those families who needed it most. The participants were a self-selected group who were mostly female, non-smokers and already had a relatively high consumption of fresh produce at baseline. The authors concluded that although the “fruit and vegetables on prescription” scheme was an effective method of engaging participants and the community, a more intensive intervention would be required to produce a significant impact on behaviour change.

In another study, people from a primary care practice in Michigan were recruited and randomised to one of three intervention groups: education materials only, education materials and a form for formulating a plan for dietary change, and education materials, a written plan, and three telephone counselling sessions from a dietitian (Djuric et al., 2010). The goal of the 12-week study was to increase fruit and vegetable consumption by two servings a day and reducing the intake of less nutritious foods. Dietary assessments and questionnaires on self-efficacy were done at baseline and 12 weeks, and blood samples taken at each point. Ninety six participants were recruited with 73 completing the 12 weeks of the study. Drop-out rates were similar in all three study groups. At the end of the study fruit and vegetable servings within the group with the telephone counselling had doubled, with the other two groups showing no significant change ($p=0.04$). There was also a slight tendency for weight loss in this group. More participants in this group also had an increase in serum carotenoids. Participants who received the telephone counselling were more likely than the group which did not receive the telephone support to complete and return the written plan for dietary change, suggesting that the telephone support was important in formulating the plan and motivating participants to follow up on their intentions. The authors concluded that the simplicity of an implementation intentions plan makes it suitable to use in primary care brief interventions along with follow up telephone support. Although dieticians did the follow up in this study, it was suggested that other primary care staff may also be effective given the proper training. Note that this study, though aimed at use in primary care, was conducted by researchers, did not involve the participants’ primary care team and took place outside the primary care setting itself.

Brief interventions for parenting

Studies of brief intervention for parenting in the primary care setting have taken one of two main approaches: either conducting a low intensity intervention requiring limited input from physicians that include all children who attend for routine appointments; or alternatively, screening all children and then referring those at-risk and their families to a more intensive intervention with specialist services. Most studies have focused on developing parenting skills to prevent or address overweight or behaviour problems in children.

Low intensity interventions

A study of a brief parenting intervention in a primary care practice randomised 259 parents of children aged 1-5 years to watch the Play Nicely video on appropriate methods for responding to childhood aggression or receive usual care in their well child visit (Scholer et al., 2012, Scholer et al., 2010). Parents were then interviewed briefly to assess whether they had been helped with how to discipline their child. Overall, parents in the intervention group were 12 times more likely to have been helped than those in the control group, more likely to start a discussion with their physician, and more likely to report they planned to do less spanking of their child. The authors concluded that this brief intervention was a valuable way to incorporate counselling about childhood aggression and discipline into a routine well-child visit.

Another preventive intervention in primary care provided resources and counselling on healthy eating and exercise with parents of 5-10 year old children attending routine appointments in primary care (Kubik et al., 2008). Parents/children from two primary care clinics (43 in the control clinic and 74 in the intervention clinic) participated. At the intervention clinic, child-focused take-home resources encouraging healthy behaviour were given out in the waiting room, and health care providers were requested to provide BMI screening and weight related behavioural counselling during the visit. Parents surveyed post-intervention were more than three times more likely than those in the comparison clinic to report being questioned about their child's physical activity and fruit/vegetable intake, more than five times more likely to have been questioned about sweet drinks, and more than eight times more likely to have been asked about screen time. More than 80% of parents across the whole sample believed it was important to hear information about their child's height and weight from their health care provider but significantly fewer in the control clinic than the intervention group actually received this information at the visit. Few parents reported that they were uncomfortable with being asked the questions related to lifestyle. However, the intervention did not result in a measurable difference across the two groups in intention to change. Only the intention by intervention parents to ensure their child had five or more servings of fruit and vegetables a day neared significance. Although outcomes from this study were modest, the approach was found to be feasible by providers and acceptable to parents in routine primary care settings, including with children who were attending for an unwell visit. The constructive use of waiting time and the encouragement of providers to include behavioural counselling were considered strengths of the study.

The Healthy Homes/Healthy Kids study still currently in progress (Sherwood et al., 2013) is a randomised trial of brief counselling in primary care for children who are at risk for obesity. It combines brief counselling with a paediatric primary care provider during a routine well child visit and follow-up telephone counselling to help parents make changes in healthy eating and increased activity for their child. The intervention group (n=212 parents/children) will be compared with an alternative group (n=209) who receive a safety/injury prevention intervention. The study has six monthly follow ups for two years. The primary outcome is child BMI and there are no fewer than 35 secondary outcome measures covering child and parental attitudes and behaviour on a wide range of diet, exercise, safety, and other health-related issues. Participants are given monetary incentives to participate in each follow up. This trial is due to end in October 2014.

Higher intensity interventions

A study by Lavigne et al (2008) compared three different methods of intervening with parents of 3-6 year old children who met the DSM-IV criteria for oppositional defiant disorder (ODD). Group 1 (n=49) was randomly assigned to a 12-session parent training programme run by primary care nurses in the primary care setting; Group 2 (n=37) received the same 12 sessions within the practice but delivered by doctoral level clinical child psychologists; and Group 3 (n=31) received a minimal bibliotherapy intervention named *The Incredible Years*⁷. Participating families were from a wide range of paediatric primary care practices in Chicago. At the end of the study there had been significant improvements in parent-reported symptoms in all three groups but no significant difference between groups on any of the outcome measures. However there appeared to be a dose effect with greater improvement in those parents/children who had attended more therapist sessions. The authors noted that in contrast to efficacy studies which had overwhelmingly reported significant benefits from therapist led groups, this study sought to test effectiveness in realistic primary care situations. Although the delivery of the programme by primary care nurses may have meant an overall reduction in effectiveness compared to these other studies, the results were more representative of what could realistically be achieved in primary care settings. The authors concluded that specialist therapist interventions should not be

⁷ See <http://incredibleyears.com/>

recommended as the first line of treatment for children with ODD as similar treatment gains could be achieved with a minimal intervention. Based on their results they recommended bibliotherapy as an initial intervention with therapist-led more intensive treatment reserved for those cases that did not respond. However, they noted the possibility that families may become discouraged and not attend for a second round, if the minimal intervention was unsuccessful.

Most other reported studies of parenting reported in the literature involved screening children in primary care and then referring to a specialist programme or bringing in specialist staff to the primary care setting. The Helping Hand intervention (O'Connor et al., 2013) was a feasibility study that targeted children with BMI in the 85-99th percentile and their parents to improve weight related behaviours. Forty parents/children were randomised to receive a six month intervention in a community paediatric service or wait listed for the same programme after the end of the study. The intervention was delivered by allied health staff described as "health advisors" who were specially trained for the intervention and assigned to work with particular families. The health advisors contacted each family once a month to select one of seven behaviours to target that month (for example, be more active, eat more vegetables, eat healthy snacks, drink more water). Special worksheets were used to assist the child to set behaviour specific goals and develop an implementation plan for the month. The health advisors also followed up by telephone to assess progress and help problem solve during the month. The only significant effect of the intervention for children compared to the control group was a reduction in TV viewing ($p < 0.05$). There were no significant intervention effects on children's BMI score, dietary intake or physical activity outcomes. Parenting practices in role modelling, non-directive control and logistic support, however, were significantly changed in the intervention compared to the control group. Interviews with parents at the end of the intervention showed that parents liked the broad selection of lifestyle behaviour to target and enjoyed involving themselves with their child. Some families would have liked more contact times and more phone calls, and many felt that their doctor was not aware of or interested in the intervention. The authors concluded that the Helping Hand intervention was feasible for further evaluation in a larger trial as it had good participant retention and had resulted in clinically relevant improvements in some child and parenting behaviours.

In another study, parents of 30 children with sub-clinical behaviour problems on a series of assessment scales were randomised to receive either a 4-session group preventive intervention (face-face parent child interaction therapy from graduate students in clinical psychology) or written material covering the same content as was provided in the live sessions (Berkovits et al., 2010). All participating parents were given a number to call if they wished for additional guidance during the study period. The investigators had hypothesised that the group receiving the face-to-face intervention would show better results but at the end of the study no significant differences were found in any of the outcome measures at either post treatment or at 6-month follow up. Substantial improvements in child behaviour were reported in both groups and these were maintained at six months, suggesting that both interventions may have lasting effects. The authors believed that the success of the written materials and resources, which was contrary to other studies where face-to-face intervention had been more successful, was likely to have resulted because of the theoretically grounded and very specific, well-defined steps for implementing the interventions that were clearly described and easy for parents to follow.

Perrin et al (2014) used *The Incredible Years* programme to intervene with 273 parents of toddlers with behaviour problems from 11 diverse paediatric practices in the Boston area. The programme emphasised nurturing parenting without harsh punishment, play, praise and rewards, limit setting, and handling misbehaviour and ran for two hours a week for 10 weeks. A total of 150 parents were randomised to either intervention or wait list control groups, and a third group of parents were directly assigned to receive the intervention without randomisation. A feature of this intervention was the involvement of a member of the clinic staff (nurse, social worker or paediatrician) as a co-leader of

each group in partnership with a clinical psychologist or social worker experienced in the programme. Outcomes were assessed with two validated parent-reported questionnaires and researcher observations of parent-child interactions. Compared to the wait list group, both intervention groups had greater improvement ($p < .05$), with parents reporting more change in self-reported outcomes and video observations being consistent with the self-reported improvements. There was no difference between the randomised and non-randomised intervention groups. This study had considerable problems both with recruitment and retention, which the investigators attributed to the research burden and length of the programme. They concluded, however, that the study demonstrated the feasibility of offering an effective preventive mental health service to a diverse population and that regular staff could effectively co-lead parent training groups.

Two other studies referred families to parenting interventions outside the family's main primary care provider. Borowsky et al (2004) reported on a study which involved screening children between seven and 15 years for violent behaviour in the primary care setting. Parents of those children who screened positive were then randomised to be referred to a telephone counselling parenting service. At the nine-month follow up children in the intervention group had reduced aggressive behaviour, delinquent behaviour, attention problems, fighting and fight-related injuries, and reports of being the victim of bullying compared to the controls. In another study, parents who had requested help with child behaviour problems and their own parenting skills were referred to the Primary Care Triple P-Positive Parenting Program (Turner and Sanders, 2006) and compared to families on a waiting list for the same intervention. Four 30-minute sessions on separate days were given by specialist child health nurses in a community child health service. Compared to the control group, the intervention resulted in lower levels of behaviour problems, reduced parental anxiety and stress, and reduced dysfunctional parenting. These results were maintained at the six month follow up.

Studies reporting brief interventions in other areas

Brief interventions have also been applied in other areas such as low back pain (Jensen et al., 2012), insomnia (Fernando et al., 2013), and mild to moderate mental health conditions. A systematic review examined nine randomised trials of brief interventions for depression that could be applied in primary care settings by practitioners with little or no training in psychotherapy and without the support of additional health care professionals (McNaughton, 2009). Most interventions used some form of cognitive behaviour therapy either with printed or online resources given to patients to work through. Most also included weekly contact from a therapist or general practitioner who monitored progress and answered questions or screened for suicidal thoughts but did not provide any additional therapy. Interventions lasted between one to eight months and included between five and 10 sessions. Follow up periods ranged from three to six months. Overall completion rates were highest for interventions with more structure and those with frequent contacts. Statistically significant differences in depression scores were seen in six of the included studies. In spite of a number of limitations to the included studies, particularly small sample sizes, the review concluded that bibliotherapy, CBT-based websites, and CBT-based computer programmes backed up by regular contact with patients all appeared to offer a valid and effective intervention for patients with mild to moderate depression that could be implemented by primary care physicians with minimal training. Assigning chapters, pages or modules to patients and scheduling regular follow-up sessions to discuss patient progress would be likely to increase both compliance and effectiveness (p. 795).

New Zealand research

Of particular interest in the field of mental health are two New Zealand studies of a brief intervention for sub-threshold mental health syndrome (Mathieson et al., 2012, Collings et al., 2012), one of which

was a special adaptation for Māori. Although these are treatment interventions and fall into a different category from the lifestyle behaviour change literature reviewed above, the New Zealand content and the applicability of the brief intervention to primary care is likely to be of overall relevance. The intervention was developed to address a high degree of perceived unmet need for treatment for people with mild to moderate mental disorders and a desire by primary care clinicians in New Zealand to offer a brief intervention themselves. The research team (from the Department of Psychological Medicine University of Otago Wellington) developed an “ultra brief intervention” (UBI) that could be delivered by a GP or a practice nurse. The intervention was devised using strategies from cognitive behaviour therapy, problem solving and motivational interviewing and was designed to be delivered by clinicians with only a small amount of training. The approach to development was collaborative, involving researchers, clinicians, and patients. The intervention required an hour’s time from a clinician over three appointments, (one 30 minutes and two of 15 minutes) over a five-week period. A guided self-treatment manual was used to work through questions designed to help the patient clarify their problem, identify helpful and unhelpful behavioural coping strategies, problem solve, build motivation and produce their own action plan which is then printed out as a prescription. Booklets and other self-help resource material were provided and progress reviewed in a follow-up phone call or email from the clinician.

In the study which trialled this intervention, a convenience sample of 19 patients with psychological distress and six clinicians were recruited from primary care. Clinicians had one 2.5 hour training session. Sixteen patients completed all three sessions and all three assessments in the study. Apart from some dissatisfaction with the length of the sessions (which were considered inadequate), there were high levels of clinician satisfaction with the method at the end of the study period. Patient satisfaction surveys at two and six weeks post-intervention also showed high satisfaction with most aspects, though again the number and length of the sessions were felt to be inadequate, and the self-help booklets were considered not always relevant. Global psychological distress of patients measured on the Kessler-10 (K-10) scale improved by a mean 6.8 points ($p < 0.001$) compared to baseline. Limitations of the study noted by the authors were the small, convenience sample, and the untested assumption as to how many points improvement on the K-10 scale represented meaningful clinical improvement. The authors concluded that the UBI appeared promising as a way to remove cost and referral barriers for patients, and the stigma of explicitly seeking help for mental health problems. They suggested it might also offer some protection against worsening mental health symptoms, and act as a model for counselling support by primary care clinicians in other areas. They noted that future work should address concerns over the length and number of sessions and be tested with a random sample of clinicians, ideally using a randomised controlled study design.

Subsequently the intervention and the resource materials were adapted to for use with Māori after consulting with nine GPs and nine primary care nurses (four of whom identified as Māori), and six potential patients, all of whom identified as Māori. All felt the same format could be retained but needed to have less of a “middle class European flavour” (p. 233). Adjustments were made in the form of more Māori imagery, language, fewer words, more relevant scenarios in the vignettes, and the addition of an optional karakia (prayer) or whakatauki (proverb) and whakawhanaungatanga process (forming connections). Clinicians were also encouraged to share a little bit about themselves such as their family background and work history and encourage the patient to do the same. The same outcome measures as for the initial study were used and in addition all participants were interviewed and asked a series of semi-structured questions on their likes/dislikes and any changes they would like to see. Five clinicians and 11 patients completed the study. Results were similar to those of the initial study, however, mental health status which showed statistically significant improvement at two weeks and six weeks was no longer significant by three months post-treatment. A disappointing factor was the low uptake among the clinicians that were trained. Reasons given were not finding suitable patients and being busy with other demands. Suggestions for change included providing top-up training and assistance with Māori pronunciation. The authors concluded that despite the

limitations (particularly the small sample size), a cultural adaptation of the programme was possible and proved to be highly acceptable to both clinicians and patients.

Gambling

Addressing problem gambling in primary care has received little mention in studies of behaviour change in primary care. Two studies that mention gambling (Goodyear-Smith et al., 2006, Rodda et al., 2012) both note the importance of screening within the primary care practice with suggestions for management primarily involving referral to external providers (Rodda et al., 2012).

Mindfulness approaches

Receiving recent attention has been the approach termed “mindfulness”. According to Simpson (2011), mindfulness was introduced to New Zealand in 2005 by a psychologist from the University of Massachusetts Medical School who trained 40 health professionals to offer mindfulness-based stress reduction courses. The study reported by Simpson and Mapel (2011), the authors, who practice in Napier, recruited 36 patients with a variety of chronic conditions, including chronic pain, depression, anxiety or stress. The mindfulness training was relatively lengthy – 20 hours over eight weeks. The aim of the intervention was to reduce physical signs and symptoms, increase coping ability, and decrease psychological difficulties. Positive results from this study showed that participants’ depression, anxiety and stress scores, which were mild prior to the mindfulness training, fell significantly afterwards to within the normal range. There were also significant decreases across the group in pain perception scales. Patients reported that their physical and social functioning had improved, as well as their mental health, energy and overall general health. The authors noted limitations to the study, including the small and non-representative sample, and the lack of any physiological measures that would have confirmed self-reported data on stress levels. They concluded that motivated individuals could improve their quality of life and reduce the need for medical intervention through this type of education to help them cope with chronic conditions.

Other mindfulness literature shows the same sort of applications of mindfulness training to support coping and self-management in people with chronic pain (Rosenzweig et al., 2010), COPD (Benzo, 2013), stress eating/obesity (Daubenmier et al., 2012), and diabetes self-management (Gregg et al., 2007). All these studies were done by research groups rather than by primary care clinicians. Mindfulness coaching to support a healthy lifestyle (Frates et al., 2011), or help cardiac patients make sustained change to a more healthy behaviours (Goodwin et al., 2012) has also been reported. Other work has assessed the association between mindfulness traits in people and their ability to sustain healthy behaviours such as avoiding smoking and getting sufficient exercise (Black et al., 2012, Roberts and Danoff-Burg, 2010, Murphy et al., 2012, Ulmer et al., 2010). Clinician mindfulness was also found to be a key character trait in those physicians who were selected by patients as exemplars of healing in a study by Scott et al (2008).

Mindfulness is as yet relatively untested, and although it appears to be promising as another approach to behaviour change that may appeal to some people, it does not yet have a developed evidence base. Additionally, the available studies describe relatively lengthy interventions that would not be practical to implement in primary care without referral to another provider. Mindfulness is, however, endorsed by the New Zealand Mental Health Foundation which provides a link to training providers throughout the country. It was also highlighted as a promising approach in a review of programmes in schools to prevent suicide and build resilience among students (Appelhof, 2013). This review, however, noted that training programmes were as yet not well developed in New Zealand. It

remains to be seen whether this approach will in time build a stronger evidence base for effectiveness and be further developed for practical application in primary care

Goal setting and action plans

Goal setting and action plans are components used in many behaviour change interventions but appear to be seldom used as a single approach, so are not reviewed in detail in this paper. Action plans are designed to accomplish a small behaviour change with a high likelihood of success rather than a large change that is difficult to achieve. When patients can achieve a small success, their self-efficacy and confidence in their capacity to make positive lifestyle changes increases, which has been associated with improved health related behaviours (MacGregor et al., 2005). There are examples of actions plans being used to support behaviour change both for specific conditions such as diabetes (Dellasega et al., 2012, Griffin et al., 2011) or for the promotion of generally healthy lifestyle behaviour (Dickinson et al., 2013). Although action planning has been found to be helpful by primary care physicians in discussions with patients about lifestyle behaviour change, it is considered difficult to achieve within the confines of the time-limited primary care visit and the clinician's "overfilled plate of responsibilities" (MacGregor et al., 2005, p.S40). Goal setting is used in a similar way, often as a prior step to developing an action plan, Goal setting is considered part of motivational interviewing, rather than something to be done in isolation and needs to be done in conjunction with assisting the patient to work out how the goal is going to be achieved from working with patient on how the goal is going to be achieved. For one of the many examples of goal setting, see Ma et al (2013) where goal setting was used within a motivational programme for diabetes prevention in overweight or obese adults.

Training primary care practitioners

The most developed literature in training primary care practitioners in techniques to encourage lifestyle behaviour change is that developed for motivational interviewing. Work by Miller and Rollnick is mentioned in numerous studies, particularly adaptations that have scaled back the time taken in training so that is more realistic for primary care practitioners (Butler et al., 1999, Butler et al., 2013, Chossis et al., 2007, Lane et al., 2008, Lane et al., 2005, Miller and Rollnick, 2002, Rollnick et al., 1997, Rollnick and Heather, 1992, Spanou et al., 2010).

While a number of studies have assessed clinician perceptions of training, fewer have followed through to investigate whether there was an effect on patient behavioural outcomes. The study by Butler et al (2013) is of key interest in this respect. In this study 27 practices were randomised into intervention (13 practices) or control (14 practices). The intervention group of clinicians (n=25) received a behaviour change counselling programme called the Talking Lifestyles learning programme. The content and learning methods are described in the article: the first six sessions included two practice based seminars, three e-learning modules and a simulated consultation in a practice setting with feedback. Clinicians were trained to shift away from a directive to a guiding style in relation to behaviour change, use an agenda setting strategy to negotiate what change to focus on and to use a range of other strategies to encourage patients to clarify why and how they might change. The authors note that though methods derived from motivational interviewing were taught, compromises were made so that it was realistic for use in routine primary care consultations. All 25 participating clinicians completed the first six sessions (up to the first simulated consultation with feedback), but only four completed the final three sessions. These consisted of two more e-learning modules (mostly reflection and online discussion forum material) and a second simulated consultation. The authors did not comment on the low rate of completion of the final three modules by

clinicians, but it appears to suggest that the participating clinicians believed that they already had sufficient skills following the first feedback session assessing their skills.

Clinicians who had received training gave a single behaviour change counselling session during a routine practice consultation to intervention patients who had agreed to participate (831 intervention, 996 controls). To be eligible to participate, patients needed to be at risk for at least one lifestyle behaviour (poor nutritional intake, smoking, alcohol intake or inadequate exercise). Outcomes were assessed using a composite measure of beneficial behaviour change across the four behaviours⁸ at three and 12 months post the counselling session. The study did not find a significant effect on the primary outcome, at either time point, and there was no effect on biometric or biological measures related to risky behaviours. However, more patients seen by the clinicians who had been trained in behaviour change counselling reported that the clinician had spoken to them about their behaviour (91.1% vs 55.0%) and more stated that they intended to change their behaviour (72.1% vs 49.3%). At three months more intervention patients reported an attempt to change (39.5% vs 31.8%), and more reported they had made a sustained change (34.7% vs 28.1%) in one of the behavioural domains. There were significant differences at 12 months in favour of the intervention group in healthy eating, fibre intake, and physical exercise scores for those who were screened for diet, however these differences were small and the clinical effect was uncertain. No difference was found between interventions delivered by a GP compared to those delivered by a practice nurse. The authors concluded that exposure to a trained clinician in a single consultation during which other needs were discussed was able to affect intention to change and perception by patients of having made a sustained change. The lack of more significant results, however, suggested that there were patient difficulties with adherence to an intended plan and that the single consultation would need structured follow up or referral of patients to achieve greater and lasting change in biometric and biochemical outcomes.

The greatest proportion of training time in this study was for the online learning modules; seminars were an hour each and simulated consultations with feedback also took some time. Overall time was around nine hours. The availability of practice-based training for the face-to-face components and online modules would have been likely to reduce the time required for individual clinicians though may have increased the overall cost to the trainers from visiting each practice.

An editorial published alongside this report (Kaner and McGovern, 2013) described the study as a great step forward in the difficult field of behaviour change because the training and intervention were precisely described and the condensed version of motivational interviewing was a helpful development for busy practices with time-limited consultations. The editorial commented that it was unclear whether the trial's null findings related to measurement error, factors to do with the training, the application of the training, or the inability of training to change behaviour or a mixture of all those factors. and concluded that more research in the area was a priority.

Two other training courses for GPs in motivational interviewing to encourage behaviour change also used the methods developed by Miller and Rollnick (Miller, 1983, Rollnick and Heather, 1992, Miller and Rollnick, 2002). In the first of these GPs in the Netherlands were offered training in motivational interviewing skills (Broers et al., 2005). The training took nine hours overall and incorporated two hours of role play with actors playing the part of unmotivated and 'difficult' patients. Of the GPs who completed the training (17 of 19), all were positive about the course, had gained confidence in applying the skills learnt and were applying them in their practice. The role play with actors was considered particularly valuable. Two thirds of them believed that what they had learnt was feasible for applying within the time of a normal consultation. Uptake of the training was low, however, with some of those who declined believing that motivating adherence was not their role.

⁸ The precise instruments used to measure the different behaviours are described in the article

Another study with GPs in Belgium (Thijs, 2007) was driven by the focus by their professional organisation that every GP in the country should have basic knowledge of the principles of lifestyle improvements and be able to give brief advice to high risk patients. The transtheoretical model of behaviour change and brief motivational interviewing as a communication skills method were used in this study, with the approach being promoted under an ABC concept: Ask, Be the guide, Continuity. Smoking, alcohol, healthy eating and physical activity were the behaviours targeted. The programme was tested in three GP peer review groups, with an e-learning website added later as a further development. It was well received by the test groups but no further evaluation was provided from more general dissemination, which was still in progress at the time the article was written. No information on training time or costs was provided, though the incorporation into peer review group meetings may have made the time factor relatively unimportant for the GPs involved. Neither of these studies followed up to assess effectiveness of implementation in primary care practice.

A Danish RCT study Rubak et al (2011) aimed to evaluate whether training GPs in motivational interviewing have an additional effect if added to intensive poly-pharmacy treatment of type 2 diabetic patients. The study included 65 GPs from 48 practices and 265 of their patients with type 2 diabetes. All GPs were trained in intensive treatment of type 2 diabetes but only those GPs randomised to the intervention group also received a 1.5 day course in motivational interviewing with two half day follow up courses during the following year. Patients did not receive an intervention in either group but completed four validated questionnaires after one year that assessed aspects such as their relationship with the doctor, their beliefs and understanding about diabetes, and the extent to which they were self-determined and practised self-care. At the end of one year patients of the MI trained doctors were more motivated and more autonomous than those in the control group ($p=0.03$); they also were statistically more likely to have received more detailed advice on diet, exercise, smoking, and testing for glucose than those in the control group and more likely to be optimistic in their views about their ability to control the disease and prevent complications. The study concluded that the addition of MI training to intensive diabetes management by general practitioners resulted in a significant effect on patients' understanding of diabetes, beliefs regarding treatment, and their motivation for behaviour change.

A subsequent paper from this study (Rubak et al., 2011) examined change in metabolic status and adherence to medication of the patients who participated in the study at baseline and after one year. Results showed a significant improvement in metabolic status (blood pressure, lipids, HbA1c and BMI) and adherence to medication in both the intervention and control groups but no significant difference between the groups. An interesting finding of the study was that the general practitioners trained in MI had not used their quota of longer consultations for which they had received extra funding. It was concluded that the improvement in both groups was the result of the intensive training in treatment for all GPs, and the failure of the MI trained GPs to use all the opportunities available to them for MI.

A small Canadian study examined the perceptions of ten health professionals (dietitians, social workers, pharmacists and nurses) after they had attended a one-day (7.5 hours) workshop in motivational interviewing for facilitating behaviour change (Wiley et al., 2012). The workshop in Co-Active Life Coaching was designed to bridge motivational interviewing principles with a set of skills and competencies that could be readily applied in practice. The 10 participants were given practical tools for working with patients including attaching behaviour change goals to patients' personal values, avoiding assumptions, and using specific types of agreements. At four month follow up after the workshop, participants believed they had adopted a more partnered, patient-centred way of working, gave less advice, and had more confidence in approaching behaviour change topics with patients. They reported that raising behaviour change with patients was now less stressful for both them and their patients. The authors recommended that a larger study with objective measures for both practitioners and patients was warranted to follow up from these initial results.

Most other studies have not provided a great deal of detail about the methods or time component needed for training primary care practitioners, though it is clear that approaches to reduce the time have been common. Visiting practices to deliver the training, for example, appears to be one method of increasing uptake by primary care clinicians. One approach was to disseminate “best practice” for behaviour change using practice site visits by a quality improvement team (Ornstein et al., 2013). This study focused on screening and brief intervention for patients with diabetes or hypertension who also had high risk drinking or alcohol use disorders. The training itself consisted of participatory planning and discussions about best practice in 19 primary care practices. No information was provided on time taken for training. Elsewhere, behaviour change techniques have been included as part of registrar training (Chossis et al., 2007, Stanton et al., 2012) using such methods as standardised patients, interactive and small group work, with a limited number of didactic sessions. Simulated patients were also used in an Australian study of GP training to address child obesity (Gerner et al., 2010). Almost all of the 67 GPs from 47 general practices rated the simulated patients as useful for learning, though only a small minority said they would pay for this training. However, Lane et al (2008) reported that it was not absolutely necessary to use simulated patients and practising with a peer proved to be just as effective. The importance of engaging the entire practice team in the training for health behaviour change was emphasised in several studies (Cohen et al., 2005, Levy et al., 2011, Taylor et al., 2011), particularly the need to clarify the roles and responsibilities of those involved and communicate the aims and potential outcomes of the intervention.

Costs to practices

While research has identified the most promising approaches to encourage lifestyle behaviour change, it is also clear that implementing these routinely in day-to-day practice has significant costs, at least initially and requires changes to the way practices run (Dodoo et al., 2008, Noordman et al., 2013). This may be responsible for the low uptake and relatively high attrition rates of GPs from reported studies (Thijs, 2007, Butler et al., 2013). It is noticeable in the studies reported above that those that took place in real primary care settings with usual patients have either been subsidised financially for time taken by GPs and practice nurses (Butler et al., 2013, Rubak et al., 2009), have been undertaken by researchers with external funding, or have incorporated training into professional development courses in some way so that the health professionals involved do not expect to be paid (Berkovits et al., 2010, Butler et al., 2013), for example, the GP registrars trained by Butler et al (1999).

Several articles have addressed the cost to practices of training staff and systematically implementing behaviour change interventions. Although the monetary values provided in these studies are not relevant to the New Zealand situation, the general findings about the type of expenses involved are of interest. Costs taken into account have been the initial set-up, training costs and ongoing costs of time taken or support needed to follow up and/or refer patients. A modelling study in the UK that examined cost effectiveness of alcohol screening and brief intervention in primary care (Purshouse et al., 2013) concluded that opportunistic screening and single brief (5-minute) intervention by a practice nurse for those who screened positive was estimated to be cost saving and health improving compared to current practice. They noted, however, that their model did not take into account the costs associated with a specific setting (for example, emergency departments and primary care), or how those costs would be affected by other policies. The study by Butler et al (2013) also considered cost and related it to the specific parts of the training. Costs included trainer and learner time, and time online with the e-learning modules. Practices were paid to keep four consultation slots per day open to offset the extra time taken during this study, something which would not apply to ongoing implementation after the end of the study.

US studies have been more concerned about the likelihood that reimbursement by insurance packages would be available for behaviour change interventions implemented in primary care. Dodoo et al (2008) used expenditure data for ten different interventions related to smoking, risky alcohol use, and diet/exercise in 29 primary care practices taking into account start up and ongoing costs for information technology, new and/or modified staff roles, staff training, and non-staff and capital expenses. The cost per patient counselled and any extra costs associated screening, outreach, or referral components was also calculated. The authors noted that even minor differences in time taken by individual physicians or by individual patients could add up to a significant extra expense overall, so that any estimate of cost could not be exact. In spite of the undeniable expenses that primary care practices would implement behaviour change interventions, they concluded that "... given the likelihood that they can help undress unhealthy behaviours that underlie serious and expensive chronic conditions", it is important to understand how practices can be compensated for providing these services (p.S429). Another more recent study, (Bray et al., 2012) took their cost estimates from published papers. A wide range of costs was taken into account including screening and providing the intervention. They found that costs were lower in primary care settings, when the intervention was shorter, and when the provider was not a doctor. Neither of these studies looked at the effectiveness in health outcomes for patients.

Technologies for behaviour change

Electronic technologies to support behaviour change interventions are becoming more widely used both as a way of offsetting the cost of face-to-face involvement by primary care staff as well as providing more convenience for patients in reducing travel and appointment times. A number of the studies already reviewed have included an electronic component (Klein et al., 2010, Ma et al., 2013, McNaughton, 2009, Sullivan et al., 2007, Hoek et al., 2011). Although few of these have relied solely on electronic methods, screening tools, supportive and educational websites (some designed for interactive feedback), follow up text messaging and email have been used to complement face-to-face interventions. These technologies are low cost once set up, mobile, have wide uptake among young people, and are well used by those in lower socioeconomic groups, including many hard-to-reach target audiences. Not only can messages be designed to go to target audiences, but the recipients can respond, and in some applications can interact with one another (Lefebvre, 2009). To date these interventions have largely been limited to research studies rather than being incorporated into routine primary care practice, but the positive results obtained suggest that with time, such technologies will be in widespread use. Moreover, this is an area, where New Zealand examples are available and appear to be at the leading edge of the field.

The eCHAT (electronic case finding and help assessment tool) is an example that has been trialled in New Zealand primary care settings (Goodyear-Smith et al., 2013). eCHAT is intended for use with all adults, and addresses both behaviour and mood states that affect health and wellbeing. It is self-administered before a primary care visit, either remotely, or in the waiting room; the data are automatically analysed and forwarded to the relevant clinician(s) along with diagnostic and decision support tools. eCHAT includes a "help" question which asks the patient if they would like help with any specific issue now or at a later time. This pre-information facilitates the conversation between the patient and clinician about things they consider important and wish to change, and encourages the patient to participate actively in self-management. Stepped interventions range from self-care resources, to primary care interventions, referral to community interventions or to secondary services. eCHAT has been piloted in general practices with positive results among both patients and general practice staff. Pilot practices have continued to use eCHAT routinely, and it is now being rolled out to 30 primary care practices. A clustered RCT is planned to look at effects on patient outcomes in

practices with eCHAT compared to those without. It is also being trialled in a low decile school, with help requests responded to by the school nurse.

A series of studies by Kypri and colleagues with students attending New Zealand university health centres has focused on using electronic applications without personal contact to facilitate behaviour change (Kypri et al., 2008, Kypri and McAnally, 2005, Kypri et al., 2010, Kypri et al., 2012, Kypri et al., 2003, Kypri et al., 2014). Starting over a decade ago, this team began with a survey of 1910 university students to evaluate the acceptability of web based screening and intervention for hazardous drinking (Kypri et al., 2003). This initial survey found that acceptability was high (81% of all students, and 82% of hazardous drinkers). A web-based primary care intervention to reduce risky drinking, encourage fruit and vegetable consumption and promote exercise followed. The intervention randomised 218 students to one of three groups: i) web-based assessment and personalised feedback; ii) assessment only; or iii) minimal contact (Kypri and McAnally, 2005). At follow-up six weeks later, there were significant differences in the proportion meeting recommendations for fruit/vegetable consumption and physical activity in group i) compared to group iii). Hazardous drinking prevalence however, did not vary by group. The authors concluded the method was appropriate and acceptable for implementation in primary care settings.

A further study (Kypri et al., 2008) screened 975 students in a university primary care service using the Alcohol Disorders Use Test. Of the 599 students who screened in the harmful or hazardous range, 576 consented to participate in a randomised trial with three groups: i) an information pamphlet only; ii) a single web-based motivational intervention; iii) a web-based motivational intervention with further interventions one and six months later. Outcome measures were self-reported frequency of drinking, total consumption of alcohol, and academic problems. Results showed that both the single and multiple intervention group had significant reductions compared to the information pamphlet group in all outcome measures at six months and the effect was still significant at one year. In this study the single intervention proved to have a significant effect on hazardous drinking, and the additional sessions did not provide a greater effect.

The authors concluded that the positive results of 5%-35% reduction in alcohol consumption, and the 13%-25% in the incidence of problems that were maintained for up to a year were sufficient to warrant implementing this type of intervention in student health care settings. Drop-out rate from the study was low (83.9% of participants completed the study) and the intervention had additional advantages in not requiring health professional time, its acceptability to users, and its ability to reach a large number of patients. A limitation was the reliance on self-report. Although this study was described as using motivational methods, there is no indication given as to what extent the web-based intervention was based on established motivational theory or methods, particularly as it was also described as a "brief intervention" in other parts of the article. However, drawing attention to drinking behaviour which would otherwise not have been considered by the participants and giving them information that appeared to motivate them to reduce it is nevertheless consistent with motivational methods used in primary care and the semantics may be less important than the results.

In a more recent study Kypri et al (2012) reported on a web-based alcohol intervention for Māori university students. An email invitation was sent to all Māori students aged between 17 and 24 years who were enrolled in a New Zealand university. They were asked to complete a brief questionnaire including a screening tool for hazardous and harmful drinking. Of those responding (n=2355), 1789 were randomised to either an intervention or control group based on their level and/or frequency of alcohol consumption. 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 was 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 groups, the findings showed it was "...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). Following the results of these studies all participating universities expressed their intention to implement the intervention routinely from 2012.

The most recently published study by Kypri et al (2014) however, was not able to report such positive results. This study was a national intervention with 3422 students with harmful drinking behaviour from seven of the eight New Zealand universities. Students were randomised either to receive screening only or assessment plus 10 minutes of feedback (comparison of their drinking behaviour with norms for alcohol consumption and information about where to get help). Outcomes measured were the frequency and amounts of alcohol consumed, and academic problems. No significant difference was found between the groups in any of the outcomes apart from a minor difference in the amount of alcohol consumed per drinking occasion. The authors concluded that web-based alcohol screening and brief intervention was not enough alone to address harmful drinking in university student populations but should be used in conjunction with effective environmental interventions such as restricting the physical availability and promotion of alcohol (p. 1223).

Using computerised screening prior to a routine visit was also applied in a study by Harris et al (2012) that compared adolescents attending nine primary care practices in the Eastern US and ten practices in Prague. Those attending in the first 18 months received usual care, and those seen in the following 18 months completed a five minute computerised screening for alcohol and cannabis use, with the results forwarded to the physicians who then gave two to three minutes of brief advice during the appointment based on the results. Results showed that provision of advice by physicians doubled in the US and quadrupled in Prague following receiving the computerised screening results. Compared to usual care, the group that received the computerised screening had significantly lower rates of alcohol use at three and 12 months follow up in the US and significantly lower rates of cannabis use in Prague at both time periods. Cannabis use was low at baseline in the US sample and the sample size may have been insufficient to detect an intervention effect. No effect on alcohol use was detected in Prague, which the authors suggested was because of the normalisation of drinking Czech society. An interesting feature of the study was that providers were more likely to advise the adolescents not to start drinking/taking cannabis, than to advise them to stop, possibly because of an unwillingness to confront adolescents who had a drinking problem.

In contrast to the largely positive outcomes reported in these studies, not all technological applications have proved worthwhile. The addition of a web-delivered brief alcohol intervention for US veterans who screened positive for harmful drinking on a routine primary care visit (Cucciare et al., 2013a, Cucciare et al., 2013b) did not find that it was more effective than usual care. At six-month follow up both intervention and control groups improved significantly in mental health functioning, depressive symptoms, and coping as well as showing a significant reduction in alcohol quantity and frequency and alcohol-related problems compared to baseline and there was no differential effect in the group who had received the additional web-based treatment. In another study Dickinson et al (2013) also found that only 2.2% of 7756 patients targeted in primary care practices actually used a website for behavioural intervention to which they had been referred. The authors of this study suggested that

website interventions are likely to work better when integrated as a component of interaction between primary care clinicians and patients rather than as a standalone intervention.

Web-based applications have also been used for training health professionals, for example the e-learning modules referred to in the Talking Lifestyles training (Butler et al., 2013), and the development of an e-learning website referred to in the study by Thijs et al (2007). Such applications clearly have advantages for time-poor busy health professionals if they reduce the time needed to attend training courses. Online learning is now well accepted in university and continuing education courses in all fields so further developments in this area would appear to be likely. Note, however, that all of these studies included an element of face-to face interaction rather than being purely impersonal.

Finally, email and text messaging are already well established applications of technology in primary care for appointment reminders, sending test results, monitoring medication compliance, and encouraging self-management in conditions such as asthma and diabetes (Krishna et al., 2009). They have also been used successfully for maintaining motivation for goal oriented programmes such as smoking cessation or increasing exercise among inactive people (Bramley et al., 2005, Prestwich et al., 2010) and as an alternative for telephone feedback and follow up after brief interventions (Bennett et al., 2005, Ma et al., 2013). Email and text messaging have obvious advantages of being able to be sent and read at any time, though the reduction in personal contact may reduce their appeal for some people. Text messaging and phone applications for smoking cessation in pregnant women are emerging as an area of interest, and may have relevance for primary care. So far, however, it appears they have been used only in research studies. While they appear to be promising, studies so far have been small, and either uncontrolled (Fujoka 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.

Discussion

While it is clearly an important role for primary care clinicians to address behaviour change for the appropriate patients in their care, the many personal, environmental and societal factors that contribute to unhealthy lifestyles make it a difficult task. Moreover, contextual factors that would support changed behaviour often lie outside the capacity of the primary care provider to influence. It is well recognised, in the area of alcohol consumption for example, that a variety of approaches targeting consumption (for example, pricing and availability interventions) in conjunction with personal approaches for high risk individuals are necessary to manage the overall level of social harm (Babor et al., 2010). Similarly it is widely accepted that population wide measures including increases in price are necessary to reduce the overall burden of smoking-related disease (Wakefield et al., 2008). It is hardly surprising that so many studies have found that their considerable efforts at changing behaviour failed to make a difference in measureable health outcomes. Nevertheless, the studies reviewed above demonstrate how primary care providers can best use their time and resources rather than working in a vacuum or believing that behaviour change is too hard to tackle.

The most critical factor to recognise is that the motivation to change must come from the patient themselves. Health professionals may be the catalyst for change in that they start individuals thinking about their behaviour, motivate them to change and may provide them with tools and other strategies to support them, but ultimately the provider can only do a certain amount, and it is up to the individual to make the (often considerable) effort to change. The current emphasis on motivational approaches recognises this, and methods have moved away from telling people what to do, to approaches that

emphasise seeing the patient's point of view and helping them resolve their ambivalence about changing. Motivational interviewing adapted for time-limited primary care consultations and brief advice methods have come closer in their approaches and the differences now appear to be largely semantic. Both have shown positive results across a number of studies and have been well received by patients. Tailoring the approach to the individual person and their circumstances is also recognised as being valuable and one that fits well with the motivational approach. Moreover, there is widespread recognition that this approach is likely to be valuable in improving compliance and self-management in patients with diabetes, COPD and other chronic conditions, as well as those undergoing rehabilitation in cardiac and musculoskeletal conditions.

Motivating people to attempt change is just the beginning. To achieve real and sustained change additional follow-up and support is required, but evidence is limited as to the intensity and duration of the support required. Studies have reported mixed results, with some finding that extra sessions of contact were effective, and others that they made no difference. The heterogeneity of the participant groups, the many confounding factors, as well as the numerous difficulties in conducting rigorously designed studies in primary care populations all mediate against obtaining reliable evidence on this point. It is likely, too, that individuals will differ widely in the amount of support they need once they have decided to change, just as they will be at different stages of readiness to change when first approached. Family influences and the wider social context make changing particularly difficult for some individuals if by changing they feel excluded from participating in activities that they formerly enjoyed. In a study of addressing healthier nutrition and other aspects of diabetes management in native Hawaiians (Beckham et al., 2008), the entire family was visited at home and involved in changing their nutritional behaviour.

Technological support is being used more and more and appears to be particularly useful as an adjunct, though not a replacement, for face-to-face time with a key health professional with whom the individual has a good rapport. The use of electronic screening and assessment tools for patients attending routine appointments in their primary care practice, with the results automatically sent through to the GP potentially allows better targeting of patients who need intervention, and avoids asking those patients who do not need it. The screening and assessment is also likely to start the patient thinking about their behaviour, avoid their being surprised and defensive if asked by the GP "out of the blue". The eCHAT tool developed in Auckland (Goodyear-Smith et al., 2013) which also asked patients to nominate an area where they would like help goes a step further in preparing the ground for the GP to intervene. Technological support seems to be particularly successful with younger people who are comfortable with electronic applications, particularly if it is designed to give personal feedback based on individual information provided in assessment and screening. The earlier studies by Kypri et al in New Zealand university students (Kypri et al., 2012, Kypri et al., 2003) showed some promising results from low intensity interventions. The most recent one, however (Kypri et al., 2014), was unable to show any significant benefit, with the reason for this being unclear.

There is reasonable evidence to show that approaching patients who have risky lifestyle behaviours when they attend general practice is effective in getting them to think about attempting change, particularly if the patient already has a positive rapport with a GP or practice nurse. There is some, though limited, evidence that changes may be sustained over the following year. Evidence of change in health outcomes is as yet very limited. Behaviour is complex and difficult to measure reliably in studies that largely rely on self-report, and most studies have been of relatively short duration. However, this does not necessarily mean that intervening in behaviour is not worthwhile. It is important to realise that even small improvements in reducing risk behaviour (for example in relation to risky drinking) are likely to contribute to overall declining levels in the wider population and incremental societal change.

Training GPs and primary care nurses in motivational methods can be done in a relatively short time using the adapted methods for time-limited consultations. In spite of this, overcoming the reluctance of primary care professionals to invest this time has been a barrier in a number of studies and uptake has generally been low; those that have been more successful have provided financial and logistic support to the practices involved during the training. Implementing behaviour change counselling in primary care also requires changing the way the practice works and involves considerable time and resources, which has proved to be an additional barrier. It is easy to see why primary care practitioners may be unenthusiastic about behaviour change given the high level of acute demand they deal with, the long term support required from them and the many contextual factors outside their control.

There are a number of limitations to the evidence provided in this overview. The majority of studies in the international literature have taken place outside New Zealand and so may not be generalizable to the local context. Additionally, the studies themselves are widely different in their design and therefore hard to compare. There are well recognised difficulties in measuring behaviour change over the short term, ethical difficulties in recruiting control groups for comparison, and unmeasurable differences in the way individual clinicians deliver an intervention and the way individual patients react to it.

To sum up, helping people address unhealthy behaviour is an important and worthwhile role for primary care. Primary care practitioners can be a catalyst for inspiring people to think about the effect their behaviour is having on their health and take action to change. A range of useful approaches and strategies are available which are supported by evidence of effectiveness. However, the finding by Cohen et al 10 years ago (2005) that integrating behaviour change tools into the primary care setting requires time, effort, and expertise, and that even simple interventions require practice change still appear to still be valid. Primary care practices are likely to need support from the wider health sector and their professional organisations to keep them motivated and confident that they can make a difference to their patients as well as practical support with the necessary resources. Primary care practitioners can make a difference but ultimately there is only so much they can do on their own. Social and environmental change in normalising the new behaviour is likely to give a greater chance of improving health outcomes in the long term, and these are largely outside the influence of primary care.

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