A REVIEW OF AVAILABLE INFORMATION ON WORKPLACE PHYSICAL ACTIVITY AND NUTRITION CHALLENGES

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SUMMARY

This review examined the evidence surrounding workplace nutrition and physical activity challenge events and the extent of these challenges in Australia, and internationally. A search of the peer-reviewed literature, grey literature and websites revealed 18 peer-reviewed studies meeting the inclusion criteria, six reports involving evaluations of workplace challenges, and a number of websites supporting challenge events.

Nearly all workplace physical activity, nutrition or weight health promotion programs involving challenge events or competition of some sort, and/or involving incentives, produced positive changes in participants’ physical activity or nutrition behaviours and/or cardiovascular disease risk factors. Some of these were longer-term changes. These types of programs were less successful at reducing BMI, although in four studies weight was reduced, even at longer-term follow-up. There was a decrease in CVD risk factors in all three studies in which they were measured, even in the absence of changes in weight. Measures of physical activity (e.g. steps, number of episodes of walking >10 minutes) were increased in seven studies, and fitness levels increased in four studies. Healthy eating was improved in three of the four studies in which it was targeted; only 4 out of 18 peer-reviewed studies were aimed at nutritional behaviour-change.

Incentives (prizes or rewards) were used to encourage initial and ongoing participation, to increase the degree of participation, and to increase effectiveness (goal attainment and behavioural changes). These incentives were often monetary prizes or gift vouchers, or other tangible rewards or prizes. There is no strong evidence to indicate the relative effectiveness of tangible incentives compared to other program components, although the use of disincentives, e.g. loss of money deposited by individuals at the start of a program, is possibly effective. Incentives are likely effective at increasing participation and therefore extending reach, but it is not known whether this ensures the programs reach those most at risk. The means to increase engagement and retention of those most at risk is unknown.

The effectiveness of team or individual competition as a particular component of workplace health programs is also largely unknown; although most studies involving team competition found that it was considered to be at least a moderate motivational factor and may be more motivating and acceptable to men. It appears to be useful in increasing morale and improving co-workers’ relationships in the workplace. In cycling competitions, the key outcome is getting more people cycling, so participation is critical, rather than distance cycled.

‘Weekly weigh-ins’ were identified as a useful component of workplace challenge events aimed at weight change. Pedometers have achieved mixed results; they need to be good quality, and are more appealing to women than men. Scoreboards placed in workplace common areas may be useful. Websites have the capacity to reach large numbers of people; however the usefulness of websites as a particular component of worksite challenges is uncertain, as is their effectiveness as the medium for ‘overall implementation’. Communication via a number of mediums is likely to be beneficial.

Organisational/managerial support is often cited as essential to program success and incentives for employers could improve worksite participation in challenges. Also the convenience, e.g. time and location, of programs is important, so that challenge events should not be timed during school holidays or at the start of school terms.
Women were more likely to participate in workplace challenges, as were white-collar workers and younger and middle-aged workers. Men have exhibited a preference for ‘exercise’ challenges to increase their physical activity. Several programs were tailored towards blue-collar workers, and these can work well if workers are engaged in the design of program and competition components. Having a range of components for workers to choose from may be advantageous. Shift workers and part-time workers are harder to reach. Little is known about non-participants in workplace challenges.

Participation in regular health checks with detailed individualised feedback – during work time and with risk management advice – can motivate workers to engage in a more extensive, multi-faceted program involving competitions and other components. Incentives may be successfully used to increase participation in the health checks.

Evidence from the grey literature (eight Wellness@Work programs in the UK) indicates that effective challenges often include short-term, one-off events, and that it may be useful to extend them to families and friends.

There is considerable scope for more rigorous evaluation of the reach, participation and effectiveness of workplace challenge events; and it is recommended that any new initiatives incorporate high quality evaluation. Specific implications for the evaluation of future workplace challenges comprise:

- The importance of measuring reach and participation levels, and establishing the characteristics of participants and non-participants as well as factors predicting participation, retention and effectiveness. A mix of qualitative and quantitative research on participation, and reasons for engagement, would be optimal.

- The value of more complex studies comparing the relative reach, effectiveness and costs of workplace challenges and other workplace interventions among employees.

- The value of larger studies comparing the relative responsiveness and adoption of workplace challenges among different types of workplaces.

- The value of assessing the relative contribution of various workplace challenge intervention components for different target groups. In particular, it would be worthwhile to assess the impact of different types of individual and/or team incentives in promoting participation, retention and compliance. A mix of qualitative and quantitative research is likely to generate valuable information for guiding the use of incentives.
1 INTRODUCTION

1.1 CONTEXT

When providing health promotion programs the worksite has been recognised as a potential setting to reach large numbers of the adult population (e.g. Prodaniuk et al 2004). Often the terms workplace and worksite are used interchangeably (Faghri et al 2008).

1.2 PURPOSE

This review was undertaken on behalf of the Heart Foundation NSW. The purpose of the review was to identify information published in the peer-reviewed and grey literature on workplace physical activity and nutrition challenges. Specifically the review sought to examine the following:

- Any evidence of workplace challenges that have been formally evaluated
- Any evidence of the outcomes associated with workplace challenges
- The range of workplace [health] challenges currently available in the Australian market
- Any critiques of this form of activity in the workplace
- Differences in uptake between men and women
- Any other relevant questions.

2 METHODS

The review involved the following steps:

- The literature was scoped to identify appropriate search terms for a systematic review of the published and grey literature, development of definitions, and inclusion and exclusion criteria.

- The local and international published literature was searched using appropriate databases (PubMed, ICIS, Web of Science, ProQuest, Informit, Google Scholar) and the following search terms:

  work [title] OR workplace [title] OR worksite [title] OR employer [title] OR employee [title] AND challenge OR contest OR competition OR reward OR incentive OR prize AND physical activity OR nutrition OR weight OR health OR walking OR cycling OR transport.

- Internet search engines were used to identify Australian and pertinent international grey literature regarding workplace challenges, particularly if they had some form of evaluation results.

- Descriptive data pertinent to the review aims were extracted and tabulated.
Definition of Workplace [Nutrition and Physical Activity] Challenge

In the absence of an established definition for ‘workplace challenge’, the following definition is proposed and used in this review:

A program designed to motivate employees to undertake short-term changes (that may lead to sustained changes) in [nutrition and physical activity] behaviour(s) involving competition against other employees (individuals or teams) and/or involving a tangible, extrinsic incentive

This definition precludes workplace physical activity and nutrition programs involving individual goal-setting components where there was no element of competition against other individuals, and/or there was no external, tangible incentive; as opposed to those in which there was an element of competition and/or prizes or rewards were included.

Inclusion criteria for search of peer-reviewed literature:
- Individual or team-based program or intervention that was based in the workplace (run through the workplace/worksite) AND
- was aimed at employees (or their employers too) AND
- involved the words ‘competition’ or ‘challenge’ or ‘contest’ AND/OR involved the giving of incentives (prizes, awards, rewards) according to weight/physical activity/nutrition/health outcomes or for participation.

Exclusion criteria for search of peer-reviewed literature:
- workplace programs that involved individual goal-setting/achievements but that did not include the words ‘competition’ or ‘challenge’ or ‘contest’ or ‘prizes’ or ‘incentives’ or ‘rewards’.

3 RESULTS
3.1 EXTENT OF THE EVIDENCE

Eighteen studies were identified in the peer-reviewed literature which met the inclusion/exclusion criteria. A large number of studies were excluded on the basis that they were focused on individual goal-setting with respect to lifestyle behaviour change within the workplace.

Four of the peer-reviewed studies were conducted in Australia (one of which has not yet been evaluated), 15 of the studies were conducted in the United States (US), and one study was conducted in Belgium. During the search a number of pertinent systematic reviews, that included relevant information, were identified; information from these reviews is included in the text where appropriate.

Six reports which included the findings from evaluations of workplace challenge events were included in the grey literature: three conducted in Australia, one in the UK, one in the US, and one in Canada.

A number of websites which provided access to challenge events and targeting Australian workplaces were identified through internet searches; these were variable in their content and most supplied no evaluation information.
3.2 EVIDENCE FROM PEER-REVIEWED LITERATURE

The evidence from the peer-reviewed literature is included in two tables (Table 1 and Table 2). Table 2 is a briefer version of Table 1, for more rapid consideration of the components of the programs involving workplace challenges. The various components of the programs involving challenges or competitions are discussed below. Overall, out of the 17 evaluated studies involving a workplace challenge or competition, 16 of the studies included tangible, external incentive(s) (rewards or prizes), for participation and/or behaviour change. Only one study outside of Australia and the US, conducted in Belgium, did not offer any external incentive. Twelve of the studies involved some element of team/group competition; four of these twelve studies involved only team competition; the other eight also involved individual competition. Two of these studies plus one other study involved competition across worksites or workplaces. Four studies involved individual competition only.

The behaviour-change and goal-attainment outcomes for the challenges and competition were mainly related to physical activity, fitness and weight loss. Monitoring using charts or log books (paper-based or online) was common.

3.2.1 Evidence of effectiveness of Workplace Challenges on behavioural and health outcomes

Of the 18 workplace initiatives identified in the literature which involved either challenges or competitions or incentives of some sort, nearly all produced positive changes in participants’ physical activity and/or nutrition behaviours and/or chronic disease risk factors (see Tables 1 and 2). Only one of the seven studies for which BMI was an outcome measure achieved a significant change in BMI (Morgan et al 2011). This was the POWER program, conducted among overweight male shift workers in Newcastle and involved information sessions, a study website with a user-guide and tracking system, telephone helpline, weight loss book, and group-based financial rewards. However, two of the studies involving personal health assessments and feedback achieved significant improvements in percent body fat (Milani et al 2009; Gomel et al 1993), and one of these studies achieved very small improvements in weight status. Five additional studies in which BMI wasn’t measured, but where weight loss was the primary outcome measure, achieved improvements in weight status (Morgan et al 2011, Liskov et al 2010, Jeffery et al 1993, Stunkard et al 1989, Brownell et al 1984); and some of these weight loss successes were significant at longer-term follow-up (Stunkard et al 1989; Brownell et al 1984).

Improvements in metabolic syndrome over 12 months were identified in the one study in which this was measured (Racette et al 2009). In this Worksite Opportunities for Wellness program, the improvements were seen for health risk assessments and individual feedback in the absence of a more comprehensive program involving team competitions, pedometers, and environmental changes; although effect sizes were larger in the more comprehensive program.

Decreases in the prevalence of cardiovascular risk factors were observed for the two studies in which they were measured (Morgan et al 2011, Milani et al 2009), in the absence of changes in weight in the latter case. The intervention components were not discussed fully in the report on the latter program – although it mainly involved onsite health education, referrals and gym membership – with rewards for best health outcomes in group competition and individual rewards for behaviour-change. In the former of these programs, the POWER program, online individualised feedback was received by individuals making diet and exercise entries, in addition to monetary prizes for team competition in weight loss. This intervention also involved a study website and information sessions.

Participants’ physical activity increased in a number of studies:
• Hess et al (2011) – median minutes walked and number of times spent walking >10 minutes
• Morgan et al (2011) – leisure time physical activity
• Merrill et al (2011) – exercise time
• Dishman et al (2010) – number of steps, and minutes in MVPA
• Racette et al (2009) – walking and moderate activity
• Green et al (2007) – increases in PA including exercise metabolic equivalents and sedentarism
• King et al (1988) – number of aerobic bouts, confidence in ability to exercise

Only one study which aimed to increase the number of steps taken was not effective in this aim (De Cocker et al 2008). This study, however, was conducted among healthy, highly educated workers in Belgium. Additionally, only a very small percentage of the participants in the overall study took part in the workplace step competition.

Measures of participants’ fitness were improved in the following studies:

• Morgan et al (2011) – resting heart rate
• Gomel et al (1993) – aerobic capacity
• Robison et al (1992) – VO2 max, treadmill test time, recovery heart rates at 2 and 4 minutes
• King et al (1988) – fitness

Measures of healthy eating/nutrition were outcomes in only four of the 18 peer-reviewed studies. One of these studies (Hess et al 2011) did not achieve improvements in nutritional intake, and an increase in consumption of soft drinks was observed as a result of the program. The other studies achieved some improvements in healthy eating:

• Merrill et al (2011) – increased intake of whole grains and F&V
• Racette al (2009) – increased intake of F&V, reduced intake of saturated fat, fatty meals, fried foods
• Green et al (2007) – prevalence of eating 5 servings F&V

Drawing from those studies which included information on the reach of the challenge across the workplace, the levels of participation appear to be highly variable: many reported participation levels around 15-20% of workforce (for example, Hess et al 2011, Jeffery et al 1993, Stunkard et al 1989); others around 30 % (Green et al 2007, Stein et al 1999); and some much higher, from 56-88% (Lemon et al 2010, Merrill et al 2011, Gomel et al 1993). Participation levels do not necessarily appear to correspond to the use of incentives (see below). A more in-depth examination of the individual studies would be necessary to determine why participation rates were so variable, and whether this was a reflection of the use of different incentives or challenges. However, variability in the content and context of each of the studies and a lack of information in the published articles may limit the ability to answer these questions.

3.2.2 Use of Incentives
Incentives are used to promote initial participation, and/or are included as prizes/rewards for either participation (continued program attendance/duration) or attainment of goals/recommended behaviours (either ongoing or at end of program).

To promote engagement and increase participation in programs incentives have been used in the following ways:

• Screening
- Enrolment
- Compliance (to keep participants involved, particularly at data collection times)
- Degree of participation in various activities
- Achievement of behavioural change/reaching goals
- As prizes for coming ‘top’ in behaviour change/health outcome challenge

The latter three types of incentive can be allocated individually according to a mean level of participation or achievement within a team competition, or for participation or achievement in an individual competition. For non-participants, incentives can also act as motivators for future participation.

Another type of incentive is an ‘employer award’ used to encourage businesses to achieve a certain degree of employee participation in workplace healthy challenges, or to make health-supportive changes. This approach did not fit the inclusion criteria for this review, but is described in Appendix 1 (The Heartbeat Challenge award).

### 3.2.2.1 Types of incentives for behaviour change/goal attainment

The use of different types of incentives is noted below:

- **Monetary prizes**
  - Individuals who increased their average daily steps by the greatest amount over the 10-week period received 1st, 2nd and 3rd monetary prizes (Mackey et al 2010)
  - $40 voucher for those who met 3-month goals and $1000 prize to [ambulance] station who achieved largest percentage of participants meeting their 6-month goals (Gommel et al 1993)
  - Team that achieved the greatest percentage of its weight goal received a pool of money; as did individuals in individual competition who achieved weight loss goals (or half the money if achieved over 75% of goal) (Stunkard et al 1989)
  - Money from a pool ($5 paid by each person at start of intervention) given to winning team
  - Results of Health Risk Assessment converted to positive or negative dollar equivalents which were applied to the total value of the cafeteria benefit plan (Stein et al 2000)
  - Subjects who made progress towards their weight loss goal each week received a refund (from the selected amount deducted from weekly pay packet) (Jeffery et al 1993)

- **Gift vouchers**
  - Team (crew) with highest mean percentage weight loss after one month and at end of program were offered a $50 voucher to spend at local sports store per person (Morgan et al 2011)

- **Vacation days and other job-related perks were given as rewards for best outcomes in group competitions (Milani et al 2009)**

- **Lottery tickets given on weekly basis to individuals making life style changes (Gomel et al 1993)**

- **Lunch and rope jumping entertainment (team prize for number of points; Green et al 2007)**

- **Gift cards, spa day as individual awards for success stories (Green et al 2007)**

Although widely used, several programs did not specify the prizes/rewards (‘chance to win a modest reward’ Merrill et al 2011; ‘group and individual prizes were given to winners’ Lemon et al 2010; ‘individual awards were created for milestones in behaviour change’ Milani et al 2009).

### 3.2.2.2 Types of incentives for participation

Examples of incentives use to promote completion of the intervention components and/or assessments include:
• Individual participation reinforced with small incentive items such as books or pedometers (Merrill et al 2011). Participation in future interventions was reinforced by announcing the winners of the intervention rewards.
• $20 gift card for completing each assessment (Lemon et al 2010)
• Kitchen gadgets and exercise gear given as weekly rewards for participation in intervention activities (Racette et al 2009)
• Gift cards, spa day etc. as prizes for completing evaluations (Green et al 2007)
• Incentives (not indicated) for participation in a cardiovascular screening program, and also to participate in a number of structured CVD risk-reduction sessions of an onsite CHAP ‘cardiovascular health awareness program’ (Pescatello et al 2001)

In the literature review of policy and environmental interventions to promote physical activity and nutrition for cardiovascular health, Matson-Koffman et al (2005) found no evidence for economic incentives alone in the workplace being used to increase physical activity. The systematic review by Robroek et al (2009) showed that wellness programs incorporating incentives within multifaceted interventions achieve higher participation levels, particularly if they focused on more than physical activity alone.

Supplementary evidence from the US shows that the use of financial incentives linked to health plan premiums increases participation rates in health risk assessments from around 30% to 90+% (Taitel et al 2008, Seaverson et al 2009, O’Donnell 2010) and can lead to attainment of health goals. O’Donnell (2010) considered that the optimal application of financial incentives should be to use them to motivate employees to participate in programs, where they can gain skills to change health behaviours and connect with intrinsic motivators to help them maintain lifestyle changes in the long-term.

3.2.2.3 Incentives for Employers
Incentives have been used to engage employers. For example, in the 3W program ‘Work, Weight and Wellness’ in 31 hotels in Oahu, Hawaii, hotels were given a bonus of incentives up to $1500 if they achieved recruitment targets (using a coordinator within each hotel paid for their time) (Williams et al 2007).

3.2.2.4 Effectiveness of Incentives
Although many of the programs used incentives to encourage participation and retention, and to reward goal attainment/behaviour change, few of the studies were able to specifically identify the effectiveness of the incentive component. However, some information on the effectiveness of incentives can be gleaned from the following studies:

• In the ‘Step Ahead’ study by Lemon et al (2010), the group with the highest rate of weight gain prevention also showed the highest levels of participation in the intervention workshops and displays, but this study couldn’t identify the usefulness of incentives.
• In the workplace wellness program described by Liskov et al (2010), the cash incentive prize was one of the top three essential components of the weight loss program.
• Racette et al (2009) considered that the participation rewards did enhance participation and promote attendance.
• Larger economic incentives were suggested by Green et al (2007) as being important; but this study provided no evidence to back up this statement.
• In the study by Pescatello et al (2001), hospital employees who participated in the incentive screen program (plus individualised feedback on results) for four years sustained improvements
in their cardiovascular health profile, regardless of follow-up participation in structured or unstructured health education and behavioural support programs, especially if they participated in less-structured follow-up programs (e.g. in their own homes). Possibly the workers weren’t able to fit the structured program into their busy lives. CVD risk reductions were seen in the presence of mild weight gain.

- Stein et al (2000) indicated that financial incentives (used in conjunction with health checks) were not effective beyond the first year – although they may be most useful to motivate employees in the “action” stage of change.

- No effects of incentives were observed for attendance at health promotion classes, smoking cessation or weight loss in the study by Jeffery et al (1993); however the incentives were very small (mug, cookbook). Incentives did increase enrolments in subsequent offerings of the weight program though.

- In the challenges among Sydney ambulance workers, incentives did not confer additional effect sizes above those observed with behavioural counselling, plus risk factor assessment plus education and log-book keeping (Gomel et al 1993). Behavioural counselling was found to be important.

- In the program designed to increase individual adherence to exercise and fitness among various worksites in a university in the US, an incentive to have an individual contract and to not lose the $40 deposit was considered to work well in achieving results (Robison et al 1992).

### 3.2.3 Team Competition

#### 3.2.3.1 Australian Studies

All three of the Australian studies included in the peer-reviewed literature involved team competition. In Liverpool a team or individual competition, **TEAM Challenge**, was effective in increasing the number of steps/time spent walking among (mainly female) hospital employees (Hess et al 2011). Among overweight male shift workers in an Aluminium plant in Newcastle, team competition in the **POWER** (Preventing Obesity Without Eating like a Rabbit) program achieved significant improvements in weight, waist circumference, BMI, blood pressure, resting heart rate, and physical activity (Morgan et al 2011). In an earlier study, individual and team competition among Sydney ambulance workers (Gomel 1993) achieved short-term improvements in body fat and aerobic capacity, and short-term and long-term smoking cessation, but BMI increased over the duration of the program.

In the TEAM Challenge, of the 91.5% of participants who signed up as a team, 24.5% reported that they did not find the team sign-up motivating; however 33% of participants indicated that encouragement from colleagues was important to them (Hess et al 2011). In the POWER study, the relative effects of each intervention component, including the use of teams and team incentives, were not discernable (Morgan et al 2011). Aspects of the individual or team competition, other than the use of incentives (see above), were not examined in the study among Sydney ambulance stations (Gomel et al 1993).

#### 3.2.3.2 United States studies

In the 12-15 week team competition described by Brownell et al (1984), all five components of the program were rated as beneficial by at least 50% of participants, including team support (86%), lobby scoreboard and competition (87%), and the weekly weigh-in (97%). Managers also rated these three components as important parts of the program. The behavioural treatment manual involved in some parts of the intervention were viewed as not as important as team competition. Sixty-two per cent of participants rated the program as more successful than previous attempts to lose weight. Stunkard et al (1989) compared the effect of individual competition, team competition and ‘pure
cooperation’ (whole worksite) among male and female workers (banks, manufacturing firms, community college) in a 12-week weight loss program involving weekly weigh-ins. They found that team competition was more effective among men. Among women there was no difference in effectiveness between team competition and whole of worksite competition. Team competition was found to be important in promoting high morale and improving relationships with co-workers. In the *Active for Life Program* in hospitals, Green et al (2007) noted that team members were more likely to drop out of the competition if team captains were unable to complete their tasks. Being team captain was identified as a fairly onerous task in terms of collection of team points, although this was done on paper initially and was subsequently changed to electronic data entry. Co-worker support was believed by the researchers to be an important component of the *Worksite Opportunities for Wellness* (WOW) program (Racette et al 2009).

### 3.2.4 Other Components of Challenge Programs

#### 3.2.4.1 Weekly weigh-ins

Weekly weigh-ins has been reported in several of the studies where BMI/weight was an outcome, as an important aspect of the competition/program (Brownell et al 1984, Stunkard et al 1989, Liskov et al 2010). Liskov et al (2010) considered that weigh-ins were an essential part of the program to improve retention; and Stunkard et al (1989) reported unpublished data supporting effectiveness of a weight loss maintenance competition as dependent on the continued use of weigh-ins. Weigh-ins are part of the Bustagut program currently being rolled out as part of the Queensland Healthy Workers Initiative (Table 4). Monthly weigh-ins was a successful component of the community-wide Pawtucket Heart Health Program in the US (Lasater et al 2002). This program had been successfully implemented in worksites as the ‘Lighten Up’ program, although the published articles (Nelson et al 1987) did not meet our inclusion criteria for review (as not conducted in workplaces).

#### 3.2.4.2 Pedometers, step count tallies

Seven of the evaluated peer-reviewed workplace challenges involved participants receiving a pedometer. A pedometer has been identified in a number of studies as a highly motivating factor (e.g. Green et al 2007, Hess et al 2011). Extrinsic motivating factors such as the pedometer and step count website were identified as useful by 45% of participants in the TEAM challenge study in Liverpool (Hess et al 2011). However, other activities were not identified as useful or successful, such as the weekly organised walks within this study – possibly because of the nature of the workplace with shift workers in hospitals. As well as pedometers, setting a personal goal and making a commitment at sign-up were important motivating factors in the Active for Life Program (Green et al 2007).

Supplementary evidence from an evaluation of the community-based 10,000 steps study (cf. also section 3.3), indicated that physical activity promotion using the 10,000 steps message, walking and pedometers may not appeal to men; time-based recommendations were more appealing to the 39 men involved in a focus group study (Burton et al 2008). The quantitative study showed that men were less likely than women to have used a pedometer. These findings are consistent with other studies cited in the article, in which men were significantly less likely to own or wear a pedometer than women.

’Sscoreboards’ in the workplace were used in a number of the challenges to motivate team and/or individual competition, but the effectiveness of use of the scoreboards is largely unknown, although it was indicated as motivating in the study by Brownell et al (1984).
3.2.4.3 Intrinsic motivational factors

It is not clear how much intrinsic factors affect participation in and effectiveness of workplace health challenge programs. In the local TEAM Challenge study by Hess et al (2011), the primary motivating factors for taking part in the program were reported as: ‘to have a healthier lifestyle’, ‘to lose weight’ and ‘to do something fun with colleagues’. A dose-relationship in goal-setting as a factor affecting outcomes was identified in the study by Dishman et al (2010). Incentives can act to motivate people to participate in programs and learn skills to make longer-term behaviour changes (O’Donnell 2010).

3.2.4.4 Organisational/Management Support

Merrill et al (2011) cite studies which have shown that management support of Wellness programs can play a key role in determining employees’ participation and generating health and wellness as a cultural norm. Individual papers identified in this review support this finding. The individual challenge in Stanford University (King et al 1988) showed that supervisory support was essential for success. The team challenge program for weight loss in banks and the manufacturing industry described by Brownell et al (1984) showed that 85% of employees and 100% of managers who participated felt that involvement of top management was important to a program’s success. Not all employers are supportive of workplace health programs. For example, in the study by Jeffery et al (1993), 72% of employers invited to support a workplace challenge declined to participate – although in this study they only had a 50% chance of receiving a free program, which may have deterred participation, indicating that receipt of a free program is important to employers.

Green et al (2007) indicated that in the Active for Life program more pivotal use of organisational and departmental leaders, including more ‘site leaders’, would have improved outcomes and participation rates.

3.2.4.5 Convenience and Tailoring

In the WOW program in two medical centres in the US, the convenience of the program and the inclusion of free- and reduced- cost activities that were engaging, were identified by the researchers as important aspects of the program (Racette et al 2009). In the Stanford University worksite program, the exercise activities to increase fitness and reduce weight were specifically geared towards blue-collar workers, with input from the workers at the start of the study to identify the format of the program (King et al 1988). Going on vacation, seasonal issues and having a busy home or work schedule have been identified as barriers to continued participation (Green et al 2007, De Cocker et al 2008).

Supplementary evidence from general workplace programs indicate that a convenient time, convenient location and employer-paid time off during the workday promoted interest in programs (Kruger et al 2007).

In other studies not involving challenges, barriers to participation in worksite wellness programs have been indicated as insufficient incentives, inconvenient location and time limitations (during and before/after work) (Person et al 2010; Kruger et al 2007).

3.2.4.6 Duration of Challenge

Twelve weeks was considered to be too long for the TEAM challenge for number of steps and period walking among hospital workers in Liverpool (Hess et al 2011). Many of the other programs described in the peer-reviewed literature were similar or much longer than this in duration; although they also often had quite different outcome measures that wouldn’t be obtained in a short time period. Issues with duration were not identified in any of the other studies included in this review.
3.2.4.7 Socio-demographic effects on participation

The disproportionate participation by females that is often observed in worksite wellness programs and workplace challenges is often reflective of the sex distribution at worksites, especially as many have been conducted in health centres and hospitals where the workforce is predominantly female (e.g. Racette et al 2009). However, this is not always the case. In one of the US studies, women were found to be significantly more likely than men to complete baseline assessment (78% vs. 48%), and to complete the assessment and the wellness program (67% vs. 30%) (Merrill et al 2011), yet they made up only 29% of the workforce. Reviews have indicated that female employees are more likely to participate in health promotion programs than male employees (Mumery et al 2006; Robroek et al 2009).

Merrill et al (2011) also identified younger persons as being more likely to participate in the case of an engineering company. Stein et al (2000) found that women aged 35-54, working full-time and in managerial grades in the hospital were more likely to participate in the program. Men were found to participate more in exercise programs and screening tests, whereas women were more likely to participate in education programs (Stein et al 2000).

A systematic review of nutrition and physical activity-based worksite health promotion programs (excluding those focused on a single health risk assessment (HRA)) found that participation levels ranged from 10% to 64%, with a median of 33% (95% CI: 25% to 42%), and most studies reported higher participation among women (16/22 studies) (Robroek et al 2009).

Generally, professionals are more likely than blue-collar workers to participate in physical activity, nutrition, weight loss and smoking cessation programs; as evident from review articles and more general systematic reviews of workplace health programs (Jeffery et al 1993, Stunkard et al 1989, Robroek et al 2009). Higher participation occurs among white-collar workers, workers with secure contracts, fulltime employees and employees in smaller companies. Shift-workers and part-time workers show lower participation levels (Bull et al 2008, Liskov et al 2010, Lemon et al 2010).

3.3 SUMMARY OF GREY LITERATURE

Most of the grey literature initially identified was comprised of promotional material or guides for conducting workplace health challenges and competitions. Six evaluation reports were identified (Table 3):

- A case studies report summarising information from 30 case studies of 10,000 Steps program across Australia, many of which were conducted in workplaces (2007)
- An evaluation of the CTC Challenge for Change Workplace Cycle Challenge in Adelaide and Sydney (and the UK) (January 2012)
- A summary of the evaluation of 11 ‘Well@Work’ projects in the United Kingdom (Bull et al 2008)
- An evaluation of the Canadian Stairway to Health workplace wellness initiative (initiative was April 2004-2005).

3.3.1 Step and Stair use Challenges

The two reports describing pedometer/step challenges in Australia indicated high levels of engagement and satisfaction by participants, with many aiming to continue using their pedometers and maintain their increased activity levels post-Challenge. Some of the lessons learned included:
• Provision of paper-based and online options for registration and evaluation forms
• Email correspondence with all participants
• Include some short-term challenges
• Avoid school holidays or start of term
• Target the relatively inactive to focus on personal bests
• Involve the broader community
• Include newsletters with diet tips
• Include two challenges per year (rather than only one)
• Team champions/leaders require support
• Use good quality pedometers
• Cost of pedometers a barrier to some
• 10,000 steps easily attained by some

In the Canadian Stairway to Health initiative, the 10,000 steps individual challenge was seen as too competitive – of the 10% who completed evaluation forms, they were all active, achieving 10,000 steps at baseline. The CN Tower Climb and Mt Everest climb were slightly more successful at engaging participants, with stairwell use increasing over the team challenges and events – suggesting that the team competition was more motivating than individual competition.

3.3.2 Cycling Challenges
The CTC Workplace Cycle Challenge is a large program in the UK which has been recently extended to Australia. The evaluation results from Adelaide and Sydney show that the Challenge is very successful in encouraging non-cyclists to cycle and occasional cyclists to cycle more, and to use this as the mode of transport for work. Effectiveness extends beyond the period of the Challenge, with more workers cycling, and more people cycling more often at least 3 months post-Challenge.

The evaluation results showed that a Challenge which rewards the level of participation, rather than the distance they cycle, is far more successful in encouraging the key target audience of non-cyclists and occasional cyclists. A participation-focused Challenge fosters was considered to create a real sense of team work and a cycling culture in the workplace (occasional and non-cyclists encouraged by regular cyclists). A cycling challenge focused on trips/distance appeals strongly to existing regular riders, but may actually discourage new or occasional riders from taking part.

3.3.3 Intrinsic Motivators
Evaluation of the HealthierFeds Challenge in the US showed that the top motivators for maintaining or increasing participants’ activity post-Challenge was a desire to improve overall health, a desire to improve energy levels and/or alleviate stress, and a desire to lose weight. Only 25% noted that they were motivated by a desire to maintain or increase their physical activity through the Challenge, and just 10% thought they would be motivated by another program similar to the Challenge. These data are difficult to interpret, as there are no baseline data, and it is not clear whether the Challenge could have led to the more intrinsic motivating factors. Clearly the competition itself only motivates for the duration of the Challenge; but it provides participants the opportunity to connect with intrinsic motivators, and/or learn skills to change behaviours and maintain lifestyle changes in the longer-term (O’Donnell 2010).

3.3.4 Wellness@Work multi-faceted initiatives involving competition/challenge
The British report examined 11 Well@Work projects conducted in workplaces in the UK where each of the projects involved some sort of challenge or competition initiatives. Similarly, the StairWay to Health workplace wellness initiative in Canada was a multi-risk factor strategy, involving behaviour-
change motivating activities involving challenges (steps, stair use, fruits and vegetables consumption, tobacco cessation).

These programs showed that:

- Executive buy-in was considered essential for success; it was important that figureheads participate (UK and Canada)
- Workplace champions and team leaders were also important to ‘make it happen’ – although they needed support (UK and Canada)
- It was considered important to engaged employees in selecting activities (although not clear if this involved selection of challenge activities) (UK)
- A greater focus on diet and nutrition was indicated by participants – particularly more affordable healthy options available in canteens; although the physical activities were indicated as most popular and ‘easiest to sell’ (UK)
- Challenges conducted during the work day were appreciated; team competitions provided peer support and encouragement (UK)
- The ‘points’ system for the fruit and vegetables consumption challenge in the Canadian initiative was considered ‘unfair’ and this challenge attracted far fewer, and different (used stairs less), participants than the physical activity challenges (Canada)
- Shift and part-time workers were hard to reach (UK)
- Extension of the program to families and friends was suggested as important (UK)
- One-off activities were viewed as appealing to those who couldn’t commit to longer-term challenges (UK)
- Challenges by age-group were suggested (Canada)
- Use of multiple communication challenges suggested to reach all potential participants (UK)
- Building in employee incentives (ongoing) was recognised as necessary for the future (Canada)

The low participation rate in the challenge events in the Canadian initiative occurred despite the incentives for behaviour change being underpinned by environmental and organisational changes.

In the wellness programs in the UK, health checks conducted during work time and by independent health professionals were liked best by participants – and were viewed as motivational.

3.4 SUMMARY OF WEBSITES

3.4.1 Description of programs

A search of the web found 14 websites with health challenges suitable for, or promoted to Australian workplaces. Most private corporate health providers indicate they provide or run challenges on their websites; however some have only limited or no information on the nature of these challenges. Only the corporate health providers that had extensive detail and easily accessed information on workplace challenges were included in Table 4. Six of the 10 websites were pedometer-based walking challenges; most require funds to participate or require fundraising for charity for participation. The exceptions are those funded through government (10,000 steps Australia; Rockhampton) or not-for-profit organizations (Diabetes Western Australia, Kidney Health Australia).

Websites varied hugely in their design and composition. All portals require registration by the workplace and in many, registration of individuals can only be done through a “team leader”. Some websites provided information on amount of money raised and this was done in a competition
format (Dry July, Oxfam Trailwalker, Global Corporate Challenge). Others provided information on the number of steps undertaken by each team. Every website for pedometer-based challenges provided facilities to log steps and some had the ability to track progress through ‘virtual’ tracks. This latter option appears to be a popular option for workplace challenges. Many of the websites also provide links to health information, discussions boards and places where sponsors can leave words of encouragement.

3.4.2 Evaluation
There were no evaluation data or reports on any of the website programs. There were testimonials from participants on some websites and the Quitober website supplied the number of people quitting, but not the total number participating. One website stated that their research had shown that linking pedometer challenges to fundraising increased step counts by 25% (http://activity4charity.co.uk/?q=node/8); however, this evidence was not found in a report or published document.

3.4.3 Incentives and rewards for participation
There were three main types of incentive: fundraising, financial prizes or virtual reward for achievement.

There are also awards for participation. In 2010 the Ride 2 Work Day in Australia, included a National Workplace Challenge which provided an award to businesses for outstanding participation (largest number of participants; Telstra in 2010) as well as those with the largest percentage of riders in their organisational size category. Prizes were cycling-related products, as well as the trophies, and were allocated to workplaces according to their size. Feedback from participating workplaces highlighted the National Workplace Challenge as an increasingly coveted award with organisations working hard to retain their award from previous years.

3.4.4 Program Providers
Seven of the 10 websites/challenges were run by private organizations, one by an industrial organization (funded by QLD government) and two by not-for-profit organizations (Diabetes Western Australia and Kidney Health Australia).

3.4.5 Overseas and Hosting Websites
There are a number of pedometer challenge websites run by government agencies in countries such as UK, USA and Canada (Table 5). The websites for some of the largest of these programs are listed below. There are also a number of for-fee private hosting websites. This includes Walking with Attitude, Walker Tracker and Steps Out.

3.4.6 Other workplace/corporate physical activity challenge events
There are several challenges which require high level of physical fitness that are also popular with workplaces. These were not included in Table 1, however these websites may be useful for examining the design and content as they are used by workplaces. These include the Sydney Corporate Cup (http://www.corporatecup.coolrunning.com.au/), a 6-event running series around the botanic gardens in which workplaces compete against other workplaces; but this challenge is aimed at existing runners. The Oxfam Trailwalker, although open to anyone, has a high number of workplaces participating as teams; however this is purely for fundraising purposes (i.e. increased walking/health benefits aren’t outcomes as such) and is a one-off event.
The article by Mummery et al (1996) describes the use of a website for dissemination of the 10,000 steps program throughout Queensland and across Australia, and presents data on the subsequent adoption and implementation of the program in the community and in workplaces.

Active workplaces web pages provide access to a series of team-based, pedometer-driven workplace challenges; available in interactive web- or paper-based format.

Between January 2004 and March 2006, 95 different workplaces have implemented a workplace challenge with in excess of 50,000 employees participating. The majority of these (70/95) used the online materials and format for their projects. Workplaces ranged from 3 to 17,000 employees (median size 200). The largest adopters of the workplace challenge were federal and state government departments (41.8%) and private corporations (37.4%). One-third of the workplaces adopted the program in multiple locations, with almost 20% adopting it at the state- or nation-wide levels. Fifty-three percent of organisations adopted the program at a single site.

The article describes the success of application of the website beyond the initial intervention. Data showed that women are more likely than men to register for the program, as was shown in the ‘Canada-on-the-Move’ website.

Note there are a small number of challenge events identified on Heart Foundation Australia website including: Workplace challenge – Walk to Broome; Climb to the Top; The City of Perth Great Bike Ride.

4 DISCUSSION

Nearly all workplace physical activity, nutrition or weight health promotion programs involving challenge events or competition of some sort, and/or involving incentives, produced positive changes in participants’ physical activity or nutrition behaviours and/or cardiovascular disease risk factors. Most focussed on physical activity and weight loss; with few on dietary changes as an outcome. Some of these comprised longer-term changes.

Overall, workplace challenges appear to be feasible and acceptable as behaviour change programs, and effective for those who select to participate. The relative benefit of workplace challenge programs, and the population reach and impact, are not known, and at this stage there is insufficient information to assess these overall impacts. Most evaluations compared measures of challenge participants’ behaviours pre- and post- the challenge. This approach to evaluation study design means that it is not possible to compare the effectiveness of challenges to other workplace health programs and activities, or other community-based programs. Similarly, the relative costs of implementing workplace challenges are unknown.

The lack of comparative information on workplace challenges may suggest an explanation for the relative low frequency of workplace challenges, or challenges in general, focussed on nutrition. It may be the case that other forms of intervention, such as canteen changes, education sessions and cooking classes, are considered more appropriate for promoting nutrition. Alternatively, it is possible that eating behaviours are less frequently included as part of workplace challenges as they involve multiple outcomes that are not easily measured objectively or compared across individuals.
A key consideration not routinely discussed in research reports on workplace challenges and competitions is the extent to which the intervention has potential, or actual, population reach and impact. Drawing from those studies which included information on the reach of the challenge across the workplace, the levels of participation appear to be highly variable. Thus, while challenge results for participants may be positive, these results have inherent self-selection bias – those who participated may be more motivated or ready to make changes than non-participants. Overall, however, there has not been specific investigation of self-selection bias and characteristics of non-participants. It is possible that workplace challenges attract people who are already active or interested in health; and the extent to which they engage people less active or with poorer health is unclear. The cycling challenges do provide some clarity on this, as they explicitly seek to increase participation in cycling. Information about the characteristics of participants is also important for interpreting any information about outcomes and sustained risk factor changes resulting from workplace challenges. Overall, information on participation and reach is essential in assessing the effectiveness of any challenge in engaging participants at the population level, or in achieving population level changes in chronic disease risk factors.

Information about participation at the employer/workplace level is also important. Most studies are conducted within a workplace or set of self-selected workplaces; thus the relative likelihood of different types of workplaces becoming engaged in workplace challenges, or the relative effects of workplace challenges for different types of workplaces, are largely unknown. The Wellness@Work report suggests that challenges are not more effective than other workplace approaches, such as health checks; however, detailed information on participant characteristics, costs and outcomes, is required to make such comparisons. The POWER study is one of the few examples of workplace challenges conducted in a blue collar workplace setting; however, the process of engaging this particular workplace was not reported; and the relative responsiveness of this workplace is unknown. Given findings that blue collar workplaces are less likely to engage in workplace programs generally, it is useful to check if they are more responsive to challenges and competitions, and/or incentives.

There is some degree of consistency in the component activities frequently used in challenges; although the relative contribution of these components is not precisely known. Many components, such as incentives or team competition, are intended to support optimal engagement and participation amongst employees. Overall, incentives for participation appear to be effective. However, it is possible that the relative importance of different components may vary according to workplace, target group and other organisational arrangements.

5 CONCLUSION AND IMPLICATIONS

Challenges and competitions appear to be feasible and appropriate forms of workplace health programs. Similar to other workplace health programs, they are effective in influencing behaviours amongst participants in the short-term and may contribute to longer-term changes. The extent to which the available information can be extrapolated to non-participants, or the reach of challenges increased to provide population-level impact, is unknown. The relative effectiveness of workplace challenges compared to other workplace interventions or within multi-component programs is not well established, although in some circumstances the use of incentives and competition may enhance participation.

The findings of this review have a number of implications for the evaluation of future workplace challenges:
• The importance of measuring reach and participation levels, and establishing the characteristics of participants and non-participants and factors predicting participation, retention and effectiveness. A mix of qualitative and quantitative research on participation, and reasons for engagement would be optimal.

• The value of more complex studies comparing the relative reach and effectiveness of workplace challenges and other workplace interventions amongst employees.

• The value of larger studies comparing the relative responsiveness and adoption of workplace challenges amongst different types of workplaces.

• The value of assessing the relative contribution of various intervention components for different target groups. In particular, it would be worthwhile to assess the impact of different types of individual and/or team incentives in promoting participation, retention and compliance. A mix of qualitative and quantitative research is likely to generate valuable information for guiding the use of incentives.
### Table 1: Summary of peer-reviewed articles on workplace challenges

#### Australian Studies

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Description of program</th>
<th>Competition /Incentive</th>
<th>Outcome measures</th>
<th>Impact Evaluation</th>
<th>Process Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hess et al (2011) (Hess, Borg et al. 2011)</td>
<td><strong>Name:</strong> TEAM challenge (Take steps, Eat well, And Measure up) <strong>Design:</strong> pre and post-test <strong>Setting:</strong> Hospital (Liverpool) <strong>Duration:</strong> 12 week <strong>Components:</strong> Participants wore pedometer for 12 week and entered daily steps on the 10,000 steps website. Recorded daily consumption of fruit, vegetable, water and eating (healthy) breakfast in healthy eating log. Also weekly walks led by health promotion staff, posters, healthy messages on display, emails, prompts to use stairs</td>
<td>Team based approach to provide peer support and encourage motivation to participate At the end prizes were awarded to teams who took the most steps and ate the healthiest</td>
<td><strong>Primary outcome:</strong> Physical activity (past week minutes walking, number of times past week walking for at least 10min) <strong>Secondary outcomes:</strong> BMI, smoking status, self-rated health, PA at work, fruit and vegetable intake, soft drink, breakfast cereal consumption.</td>
<td><strong>Participants:</strong> 399 (14% of total FTE staff) Female 92.8%, mean age:39.1 years <strong>Retention rate:</strong> 264 (66.2%) completed follow-up survey <strong>PA:</strong> participants significantly increased their PA in several ways:  - Median no. times spend walking 10 minutes or more/week increased from 5X to 7X  - Median minutes walked increased from 125 to 200  - Median minutes doing vigorous PA increased from 30 to 85  - An increase in 16.8% of participants reaching more than 150min/week of PA <strong>Nutrition:</strong> daily fruit consumption increased by 24%, vegetable intake by 22.7% (although participants consuming adequate vegetables remained low), more people reported consuming breakfast 7 days/week and more reported drinking more than 1 litre of water/day <strong>Nb. Soft drink consumption</strong> increased from 49% to 58.3%</td>
<td>Main reasons participants elected to join the Challenge were: ‘to have a healthier lifestyle’ (32.9%), ‘to lose weight’ (22.4%), and ‘to do something fun with my colleagues’ (20.6%) To get fit, to eat more healthily and free goodie pack were not major incentives The ‘pedometer and 10,000 steps website’ (45.1%) and ‘encouragement from colleagues’ (32.6%) were the two main motivating factors for keeping people going during the Challenge 78% of participants used the website at least weekly to log their steps, and 53% of participants found this a very useful or useful process; 57.1% of participants found the healthy food logbook useful or very useful – completion of logbooks was found to be ‘difficult’ by many participants Feedback about usefulness of information emails/info on healthier food choices was mixed Weekly organized walks weren’t successful Stair prompts/footsteps were useful (stair use reported to be increased) Pedometer use/step counting was high and useful Of the 91.5% of participants who signed up as a team, 25.4% did not find the team-sign up motivating</td>
</tr>
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</table>
Morgan et al (2011) (Morgan, Collins et al. 2011)  
**Name:** Workplace POWER (Preventing Obesity without Eating like a Rabbit).  
**Design:** Prospective, two-armed randomized controlled trial  
**Setting:** Tomago Aluminum, Newcastle (overweight male shift workers)  
**Duration:** 3 months program  
**Components:** information sessions, study website with tracking systems, resources (weight loss book, website user guide, pedometer, telephone 'helpline'), and group-based financial incentives. Control group: 14-week wait-list  
**Team based approach:** crews (teams, n=15) were offered $AU50 gift voucher per person to spend at local sporting equipment store for the crew with the highest mean percentage weight loss after 1 month and at the conclusion of the program  
Those making diet & exercise diary entries online received individualized feedback via email  
**Primary outcome:** Body weight  
**Secondary outcomes:** BMI, WC, BP and resting HR  
Self-reported measures: leisure time PA, beverage intake, alcohol intake, dietary attitudes and others  
**Assessment:** baseline and 14-week follow up  
**Participants:** 15 crews (127 participants) were recruited. 110 overweight and obese men completed baseline survey and were randomized to intervention (n=65) and control (n=45)  
**Retention rate:** 81% of sample completed follow-up assessment  
**Weight:** There was a significant treatment effect for change in weight at 14-week follow up with a mean difference between groups of 4.3 Kg. There was also a significant difference in percentage weight loss between groups (-3.7% vs. +0.4%)  
Significant treatment effects were found for waist circumference (WC), body mass index (BMI), systolic blood pressure (BP), resting heart rate and physical activity  
Favourable changes in terms of balancing food intake with activity level and eating breakfast  
Based on Bandura’s Social cognitive theory  
Based on previous successful internet-weight loss program for men 'SHED-IT’ – but modified to work for shift workers  
Significant correlations between weight change and number of days of dietary entries and number of weekly weight entries but not between weight and weekly exercise entries  
Some concern over lack of website use – further research required to determine optimal intervention dose and medium, particularly in relation to online support  
Difficult to determine the relative effects of each intervention component, e.g. focus on competition between crews and monetary incentives unknown  
Dietary changes modest (other studies shown men find it hard to increase veg intake; shift workers have particular challenges with diet)

Mackey et al (2011) (Mackey, Bohle et al. 2011)  
**Name:** N/A  
**Design:** Randomized trial  
**Setting:** Australian University (employees aged 45 years and over)  
**Duration:** 10 weeks  
**Components:** pedometer-based walking program.  
**Weeks 2-5:** ‘adoption phase’. Meeting in groups, discussion with trained facilitator and  
Participants who increased their average daily steps by the greatest percentage from baseline over the 10-weeks intervention period received 1st, 2nd, 3rd monetary prizes  
**Primary outcome:** Step count (pedometer)  
**Secondary outcomes:** Physical health status (blood pressure, waist circumference and % body fat), mental  
**Current trial, no results available yet**
<table>
<thead>
<tr>
<th>Competition among individuals at each ambulance station, and among stations (teams)</th>
<th>health, physical activity and work ability.</th>
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</thead>
<tbody>
<tr>
<td>Prizes/Incentives used in intervention (4) only:</td>
<td>Assessment: pre-post intervention</td>
</tr>
<tr>
<td>• Lottery tickets were given to individuals making lifestyle changes (from specified list) on weekly basis</td>
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<tr>
<td>• $40 voucher for those who met 3-month goals</td>
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<tr>
<td>• $1000 prize for the station that achieve the largest percentage of participants meeting their 6 months goals</td>
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| Gomel et al (1993) (Gomel, Oldenburg et al. 1993) | Name: N/A Design: Efficacy trial of 4 worksite health promotion programs Setting: Sydney Ambulance stations (28 stations randomly selected) Duration: study recruitment conducted in 5 waves over an 18-month period Interventions: Stations were assigned to each of the four conditions: (1) Health risk assessment (2) Risk factor education: advice of lifestyle changes to reduce CVD risk factors (3) Behavioural counselling: Intervention (2) plus when risk factor present offered up to 6 lifestyle counseling sessions over 10-week period after baseline + lifestyle manual (4) Behavioural counselling + Incentives: intervention (2) plus: life style manual, goal setting + follow-up counseling session, incentives for making | Competition among individuals at each ambulance station, and among stations (teams) Prizes/Incentives used in intervention (4) only: |
|---|---|
| | • Lottery tickets were given to individuals making lifestyle changes (from specified list) on weekly basis |
| | • $40 voucher for those who met 3-month goals |
| | • $1000 prize for the station that achieve the largest percentage of participants meeting their 6 months goals |

| Primary outcome: BMI Secondary outcomes: % body fat, blood pressure, cholesterol level, smoking status, aerobic capacity Assessment: baseline, 3, 6 and 12 months | Participants: 431 (88% participation rate) Retention rate: 94%, 86% and 84% completed 3, 6 and 12 months assessments BMI: increased overall over the 4 assessment occasions. Greater increase for interventions (1) and (2) although at 12-month follow-up % increase in BMI higher in (1) and (2). (3) and (4) showed decrease in BMI at 3 months. % body fat: interventions (3) and (4) achieved larger reductions in body fat in short term. No differences at 12 months. Mean blood pressure: intervention (3) achieved larger short- and long-term reductions than intervention (4) Cholesterol: no significant changes Aerobic capacity: increased significantly for all groups but not maintained by 12 months; no differences across intervention type Smoking: A larger proportion of those in behavioural interventions (3) and (4) quit smoking by 3 months. Cessation rates were also higher for these two groups at 6 and 12 months. Overall, the interventions involving behavioural counseling achieved better | Not clear whether the better outcomes in the behavioural counseling intervention (3) versus the behavioural counseling plus incentives intervention (4) was due to a negative effect of the incentives (which seems unlikely) or the fact that those in intervention (3) had slightly longer counseling time (average 2 hours 20 minutes compared to 2 hours) and more frequent counseling contact Certainly the incentives didn’t confer additional effect sizes above those observed with behavioural counseling, risk factor assessment and log-book keeping alone Reduced effect size between behavioural counseling interventions versus risk factor assessment and education attributed to low participation among risk factor education ambulance stations (resistance to participate) and contamination across ambulance stations |
lifestyle changes conducive to CVD risk factor reduction and for achieving 3 and 6 months targets

health outcomes than the health risk assessment or education interventions; but intervention (4) less successful than intervention (3).

<table>
<thead>
<tr>
<th>International studies: United States</th>
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<tbody>
<tr>
<td>Author (year)</td>
<td>Description of program</td>
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<tr>
<td>Merrill et al (2011) (Merrill, Anderson et al. 2011)</td>
<td>Name: N/A Design: cohort Setting: integrated engineering, science and operations company (midsize = 472 fulltime employees) Duration: 12 months Components: wellness program (provided by separate company) comprising six behaviour-change campaigns (healthy food choices/ PA/ sleep/ weight/ stress). Each campaign ranged in duration from 3-8 weeks (participants were given weekly task to complete - 30 weeks in total) Individual participation was reinforced with small incentive items such as books or pedometers Completion of the interventions was reinforced by chance to win a modest reward. Participation in future interventions was reinforced by announcing the winners of intervention rewards. BMI, nutrition, PA, health status, life satisfaction, sleep quality, smoking, seat belt use Assessment: Self-reported personal health assessment (Kahn, Ramsey et al.) at baseline and 12 months</td>
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<td>Lemon et al (2010) (Lemon, Zapka et al. 2010)</td>
<td>Name: Step Ahead Design: Cluster randomized Setting: 6 hospitals Duration: 12 months Components: Ecologic intervention to promote organizational and social norms related to healthy eating and PA in the worksite. Included interventions at hospital level (leadership, culture, supportive environment), interpersonal- Incentives were used to promote participation in health assessments and also to promote change in behaviour Example of challenge: Virtual walk around the Mediterranean Sea Groups/individuals Primary outcome BMI at 12 and 24 months Secondary outcomes: Employee perception of organizational commitment to employee health was measured, Participants: baseline response rate of 56% (n=806), intervention (n=386), control (n=420). 81% female. Age: 18-40 (35.2%), 41-50 (33.4%) and over 50 (31.4%) 24-months retention rate: 648 /806 (80%) of all enrolled completed 24-months assessment. Lost to follow-up was mainly due to changing employment No impact on change in BMI One of 7 worksite projects nationwide to test the effectiveness of ecologically-based interventions at preventing and reducing overweight and obesity – funded by the National Heart, Lung and Blood Institute The group with highest rate of weight-gain prevention was the one that had high levels of participation in intervention workshops and displays. Frequent readers of cafeteria signs,</td>
</tr>
</tbody>
</table>
**Liskov et al. (2010)**  
**Name:** worksite wellness program  
**Design:** cohort  
**Setting:** Hospital  
**Duration:** two-phase 8 week  
**Components:** Team weight loss competition. Counselling on healthy eating and PA provided. Phase One required weekly weight checks; phase two promoted self-monitoring and required only a final weight check.

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Description</th>
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<tbody>
<tr>
<td>Submitted time or total of steps taken weekly for 6 weeks. These were converted into miles.</td>
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<tr>
<td><strong>Group and individual prizes</strong> were given to winners</td>
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<tr>
<td>Employees received $20 gift card for completing each assessment</td>
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<tr>
<td><strong>participation in Step Ahead activities</strong></td>
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<tr>
<td><strong>Assessment:</strong> baseline, 12-months follow up and 24-months follow up</td>
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<tr>
<td><strong>Weight loss at end of phase one and phase two</strong></td>
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<tr>
<td>Follow-up survey</td>
<td></td>
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<tr>
<td><strong>43 teams (n=248). Follow-up survey with 68 respondents (27% response rate)</strong></td>
<td></td>
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<tr>
<td><strong>Phase One:</strong> 2.5% mean weight loss with an attrition rate of 2.4%</td>
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<tr>
<td><strong>Phase Two:</strong> additional 1.4% mean weight loss in the 17 teams that weighed in (63% attrition rate)</td>
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</tr>
<tr>
<td>Weekly weigh-ins, cash incentive prize, team support rated as most helpful – as cash incentives and team support rated as most helpful, weekly weigh ins deemed essential to improve program retention</td>
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<tr>
<td>Considerations for large medical institutions offering such programs were considered by the authors to include: accommodating employees who work evening shifts, politics regarding a fee for prize money and RD staffing</td>
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</table>

**Dishman et al. (2009) AND Dishman et al. (2010)**  
**Name:** Move to Improve  
**Design:** group randomized, controlled trial  
**Setting:** 16 geographically diverse worksites (divisional offices, subsidiaries, call and distribution centres)  
**Duration:** 12 weeks  
**Components:** Adapted from  

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<tr>
<th>Time Frame</th>
<th>Description</th>
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<tbody>
<tr>
<td>To facilitate participation and goal attainment, employees were divided into teams (Team size about 5–20 members). Team captains were responsible for</td>
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<tr>
<td><strong>Primary outcome:</strong> PA, measures of goal-related physical activity (measured using pedometer steps and daily logs of accumulated minutes of MVPA)</td>
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<tr>
<td><strong>Participants:</strong> At baseline, 849 employees at the intervention sites and 390 employees at the control sites completed the primary outcome measure of physical activity at baseline.</td>
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<tr>
<td><strong>Retention rate:</strong> 197 intervention participants (23.2%) and 138 control participants (35.6%) were lost to follow-up and 55 joined soon</td>
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<tr>
<td>Participants who set higher physical activity goals and sustained higher levels of self-efficacy, commitment and intention about attaining their goals had greater increases in daily pedometer steps and the weekly accumulation of minutes of MVPA</td>
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<tr>
<td>Results show a dose relation of increased PA with changes in goal setting.</td>
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</table>

Cites research indicating recent (2004) calls for monetary compensation and reduced health insurance rates as motivators.
et al. 2010) the Director’s 50th Anniversary Physical Activity Challenge implemented at the CDC (Hammond, Leonard et al. 2000).

**Organizational action:** (1) Senior and middle management endorsement and encouragement (2) Joint employee-management steering committees established (3) Group and organizational goals and incentives for each worksite established (4) Environmental prompts (encouraging PA and its health benefits, emphasizing the target goals for minutes and steps, and illustrating opportunities to be active) posted throughout the worksite where high employee traffic and changed bi-weekly.

**Personal and team goal-setting:** The personal goals involved graduated increases in the accumulation of 10-minute blocks of exercise and pedometer steps per week.

All participants received an incentive (e.g. t-shirt, lunch cooler), plus a pedometer and instructions as part of goal setting. Intervention participants received a participant handbook that detailed the components, benefits and incentives, motivating participants to set goals and earn points for their team, while serving as liaisons between participants and site coordinators. Posters that recorded and compared team goal attainment were displayed in break rooms and were updated every 2 weeks by the site coordinator.

**Incentives:** Participants received a lunch bag if they completed the bi-weekly goal-setting and assessments through the 6-week mid-point; received a program t-shirt if they completed all 12 wks. Each team member that had 75% of its members reach the goal attainment target received a “winning logo” t-shirt. Team captains received another incentive if their teams met this goal. Site coordinators received incentives based on site satisfaction, self-efficacy, commitment and intention, consistent with goal-setting theory.

**Secondary outcomes:** Perceived management support, employee involvement

**Assessment:** baseline, mid-point, and endpoint

Among intervention participants, large increases in MVPA occurred during the first 2 weeks of the intervention and exceeded 300 minutes per week after Week 6. Pedometer steps increased throughout the intervention, exceeding 9000 steps per day after Week 5.

The proportion of participants that met the Healthy People 2010 recommendation for regular participation in either moderate or vigorous physical activity remained near 25% at control sites during the study but increased to 51% at intervention sites.
### Racette et al (2009)

**Name:** Worksite Opportunities for Wellness (WOW)
**Design:** Cohort-randomized trial
**Setting:** Two medical centres
**Components:** Program compared assessment + intervention with assessments only for 1 year.
Included nutrition and PA components, such as pedometer, weekly healthy snack cart, on-site group exercise program, on-site weight watchers, lunchtime seminar, and monthly newsletters, walking maps, team competitions, participation cards and participation rewards

<table>
<thead>
<tr>
<th>Participant responsibilities and timing of the intervention. It also contained examples for use of the pedometers and daily logs of 10-minute blocks of MVPA</th>
<th>Participation and one site received a recognition plaque and a free catered lunch for employees having the highest participation</th>
<th>Incentives aimed to promote individual healthy behaviours that promote weight control and reduce risk factors for CVD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary outcome:</strong></td>
<td><strong>Secondary outcomes:</strong></td>
<td><strong>Retention rate:</strong></td>
</tr>
<tr>
<td>BMI</td>
<td>WC, body composition, resting HR, BP, fasting lipids and glucose, cardiovascular (CV) fitness</td>
<td>123 (81.5%) completed 2 assessments and were included for analysis (only 2% drop-out among employed)</td>
</tr>
<tr>
<td><strong>Assessment:</strong></td>
<td><strong>Participants:</strong> 151 (134 women, 17 men; reflective of workers profile). Mean age 45.9 years (range: 25-64 years). At baseline, 81% were classified as obese or overweight. 72% had high BP and 75% had at least 1 lipid value outside the desirable range</td>
<td>Metabolic syndrome was presented in 38% of subjects in the intervention group, this reduced to 25% at 1-year follow up</td>
</tr>
<tr>
<td>baseline and 1 year follow up</td>
<td><strong>Interventions</strong> included kitchen gadgets and exercise gear which were given upon completion of each 20-punch participation card</td>
<td>After intervention, fruit and vegetable consumption increased, intake of saturated fat, fatty meals and fried foods decreased, and PA increased due to more walking and participation in other moderate activities</td>
</tr>
<tr>
<td>Improvements occurred in CVD risk factors after 1 year even in the absence of dramatic weight loss. Despite remaining overweight or obese, many subjects made behavioural changes that contribute to clinically health improvements</td>
<td>Many of the improvements were achieved with worksite health assessments and personalized health reports (individual feedback and advice) in the absence of an intervention (although effects were increased with addition of the comprehensive intervention)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Study highlights:</strong> the value of making lifestyle modifications even in the absence of weight loss</td>
<td>Elements <strong>believed by the study authors</strong> to enhance participation and promote attendance were: the program’s convenience, the inclusion of free- and reduced-cost activities that were engaging, the provision of participation rewards, and social support provided by coworkers</td>
</tr>
<tr>
<td></td>
<td><strong>Elements believed by the study authors</strong> to enhance participation and promote attendance were: the program’s convenience, the inclusion of free- and reduced-cost activities that were engaging, the provision of participation rewards, and social support provided by coworkers</td>
<td></td>
</tr>
<tr>
<td>Green et al (2007) (Green, Cheadle et al. 2007)</td>
<td>Name: Active for life program</td>
<td>Design: cohort</td>
</tr>
<tr>
<td>Duration: 6 months</td>
<td>Components: Program consisted of onsite health education, referrals to group smoking cessation program, stress management, lipid clinic physician referral for hypertension and diabetes mellitus (DM) management, treatment for drug and alcohol addiction, and membership for local health and fitness centers – using staff from Cardiac Rehabilitation and Exercise Training (CRET) services</td>
<td>Individual awards were created for milestones in behaviour change</td>
</tr>
</tbody>
</table>
### HealthPlus Health Quotient Program

<table>
<thead>
<tr>
<th>Name:</th>
<th>Stein et al. (2000) (Stein, Karel et al. 1999; Stein, Shakour et al. 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design:</td>
<td>Cohort</td>
</tr>
<tr>
<td>Setting:</td>
<td>Butterworth Hospital</td>
</tr>
<tr>
<td>Duration:</td>
<td>4 years</td>
</tr>
<tr>
<td>Components:</td>
<td>Annual health risk appraisal (HRA) focusing on eight domains amenable to lifestyle modification (smoking, alcohol use, motor vehicle safety, diet, physical activity and fitness, body fat, serum cholesterol and blood pressure)</td>
</tr>
<tr>
<td>Description:</td>
<td>The hospital initiated a series of health promotion activities to support employees in achieving lifestyle modification (from one hour lectures to 8-week, 16-week or 1-year programs involving evenings and weekend events). No competition, but incentive for behaviour change. The hospital also initiated a series of health promotion activities to support employees in achieving lifestyle modification (from one hour lectures to 8-week, 16-week or 1-year programs involving evenings and weekend events). No competition, but incentive for behaviour change.</td>
</tr>
<tr>
<td>Health status:</td>
<td>Fewer than 30% of employees enrolled in at least one health promotion activity each year. 80% were women. Participation was associated with reduced illness-related absenteeism and although inconsistently, with medical claims paid and short-term disability. Health promotion participants improved their subsequent-year health risk more than did non-participants. Participation in targeted program was proportional to levels of body fat, cholesterol and blood pressure. Participation in activity-related health promotion was proportional to prior-year activity or fitness scores.</td>
</tr>
<tr>
<td>Participants:</td>
<td>2421-2868 employees were eligible for inclusion in data analysis in any year. 80% were women. Fewer than 30% of employees enrolled in at least one health promotion activity each year. 80% were women. Participation was associated with reduced illness-related absenteeism and although inconsistently, with medical claims paid and short-term disability. Health promotion participants improved their subsequent-year health risk more than did non-participants. Participation in targeted program was proportional to levels of body fat, cholesterol and blood pressure. Participation in activity-related health promotion was proportional to prior-year activity or fitness scores. Men reported higher participation in exercise and screening tests and women in educational programs. Cites Priester (1992) as questioning the appropriateness of financial or other incentives or disincentives to health promotion. After the first year of the program, financial disincentives did not seem to affect participation in HP activities. Authors indicate that their data suggest that the impact of incentive/disincentive programs on health status and medical claims is likely to be small, providing further evidence against their widespread use — although they indicate that such strategies may be more effective in one work department or area in larger organizational and more departmental leaders facilities and benefits.</td>
</tr>
<tr>
<td>Suggestion:</td>
<td>No evidence of this being important. Authors suggest that future programs may use larger economic incentives — but no evidence of this being important. Suggestion that enrolment might have been increased by having more site captains, one in each work department or area in larger facilities and benefits.</td>
</tr>
</tbody>
</table>

### Program aimed to benefit both employees and employers by providing incentive to employees to improve their own health and therefore reducing medical claims and absenteeism.

#### Benefits:
- Annual health risk appraisal (HRA)
- Educational programs
- Health-promoting activities (e.g., lectures, to 8-week, 16-week or 1-year programs involving evenings and weekend events)
- Incentives or disincentives to health promotion

#### Incentives:
- Health Quotient points
- Cafeteria benefit plan
- Financial incentives or disincentives to health promotion

#### Disincentives:
- No competition, but incentive for behaviour change.

#### Enrolment:
- Suggestion that enrolment might have been increased by having more site captains, one in each work department or area in larger facilities and benefits.

#### Future Programs:
- Suggestion that future programs may use larger economic incentives. No evidence of this being important.
<table>
<thead>
<tr>
<th>Study</th>
<th>Name</th>
<th>Design</th>
<th>Setting</th>
<th>Duration</th>
<th>Components</th>
<th>Assessment</th>
<th>Participants</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hammond et al (1996) (Hammond, Leonard et al. 2000)</td>
<td>Director’s Physical activity Challenge</td>
<td>pre-post</td>
<td>CDC</td>
<td>50 days</td>
<td>N/A</td>
<td>pre and post</td>
<td>3740 out of 5822 (64%) joined the challenge. Pre and post data was only available for 1192 (20.5%)</td>
<td>useful to motivate participation in health promotion among employees as the “action” stage of the Change model</td>
</tr>
<tr>
<td>Jeffery et al (1993) (Jeffery, Forster et al. 1993)</td>
<td>Healthy Worker Project (HWP)</td>
<td>Large scale randomized trial focused on obesity and smoking</td>
<td>32 sites included (27% response rate): 12 public, 20 private sector (insurance, primary health care, education, financial services, manufacturing, electronic assembly, research and development, mail distribution, government operations)</td>
<td>2 years</td>
<td>200 employees at each site were given baseline survey. In addition a new sample of 200 employees was selected at follow-up for a cross-sectional comparison. Combination of on-site classes (interventions for smoking cessation and weight loss), and an incentive system organized through payroll deduction. Classes run in 4 rounds. Each round: biweekly classes for 11 weeks</td>
<td>BMI, weight loss, diet and exercise habits, smoking, expired air carbon monoxide</td>
<td>worksites average 600 employees each. Mean age of 38. Slightly over half were women, less than 20% were blue collar workers. 10% were overweight or obese. 25% were current smokers. 270 employees participated in smoking classes and 2041 in weight loss programs. Only 12% of smokers participated in smoking classes and 16% all of employees (36% of the obese) participated in the weight loss classes. Women were more likely to participate than men. Professionals were 1.6 as likely as blue-collar workers to participate in the weight loss program; professionals were 2.6 as likely as blue-collar workers to participate in the smoking program. Across the 2-year period, 43% of smokers quit and the average per-person weight loss was 4.8 lb. Short-term smoking cessation and mean weight losses were higher in first rounds. Little change observed in BMI over the 2 years for both study and control groups.</td>
<td>Rates of participation associated with change in BMI. 72% of employers approached to participate (although only 50% chance of being offered free programs) declined. Presence of quit smoking program stimulated some employees to quit on their own even though they did not enroll in classes. Suggestion that weight loss program attractive to those most interested in losing weight, therefore may have given those already losing weight anyway a new option for weight control; but may have not increased interest in weight loss above that already existing.</td>
</tr>
<tr>
<td>Name: Healthy Worker Project (HWP)</td>
<td>Design: randomized trial</td>
<td>Setting: Many: included private and public sector, blue-collar and white-collar workers</td>
<td>Duration: 6 months</td>
<td>Components: This study was conducted in the context of a large worksite health promotion project called the Healthy Worker Project (HWP) (described in previous intervention). Aimed to compare worksite health promotion programs for weight loss and smoking cessation with and without tangible incentives for attendance and outcomes. Incentives were used during one six-month round of intervention classes in the 8 incentive sites, but not in the 8 no-incentive sites. Employees had to attend class to be eligible to receive an incentive, but were not required to have achieved any specific behavior changes. Participants told at the first session that attendance prizes would be given periodically at the sessions. Incentives: (1) coffee mug given to one randomly-selected participant at the first class session (2) pens distributed to all class participants at Session 2 (3) a water mug given to one participant in each weight class at Session 5 (4) a smoker’s survival kit given to one smoker in each smoking class at Session 5 (5) a Cookbook given to one participant in each weight loss class at Session 9, and (6) T-shirt given to one participant in each class at Session 11. Primary outcome: Average number of sessions attended per participating employee; 2. Secondary outcomes: % of employees who quit smoking in the smoking program, average weight loss per employee in the weight program, sign-up rate for the intervention programs in the next intervention round. Participants: n/a. No effects of incentives were observed for attendance at health promotion classes, smoking cessation or weight loss. Enrollment rates for subsequent offerings of the weight program, however, were higher in the incentive worksites than in the control group.</td>
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<tr>
<td>Robison et al 1992</td>
<td>Design: RCT</td>
<td>Setting: A university campus</td>
<td>VO2 max, treadmill test time, recovery heart rates</td>
<td>Adherence (verified fulfillment of all four)</td>
<td>The incentive to not lose the $40 and to have signed a ‘contract’ appeared to work well in this study.</td>
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<p>| Name: Healthy Worker Project (HWP) | Design: randomized trial | Setting: Many: included private and public sector, blue-collar and white-collar workers | Duration: 6 months | Components: This study was conducted in the context of a large worksite health promotion project called the Healthy Worker Project (HWP) (described in previous intervention). Aimed to compare worksite health promotion programs for weight loss and smoking cessation with and without tangible incentives for attendance and outcomes. Incentives were used during one six-month round of intervention classes in the 8 incentive sites, but not in the 8 no-incentive sites. Employees had to attend class to be eligible to receive an incentive, but were not required to have achieved any specific behavior changes. Participants told at the first session that attendance prizes would be given periodically at the sessions. Incentives: (1) coffee mug given to one randomly-selected participant at the first class session (2) pens distributed to all class participants at Session 2 (3) a water mug given to one participant in each weight class at Session 5 (4) a smoker’s survival kit given to one smoker in each smoking class at Session 5 (5) a Cookbook given to one participant in each weight loss class at Session 9, and (6) T-shirt given to one participant in each class at Session 11. Primary outcome: Average number of sessions attended per participating employee; 2. Secondary outcomes: % of employees who quit smoking in the smoking program, average weight loss per employee in the weight program, sign-up rate for the intervention programs in the next intervention round. Participants: n/a. No effects of incentives were observed for attendance at health promotion classes, smoking cessation or weight loss. Enrollment rates for subsequent offerings of the weight program, however, were higher in the incentive worksites than in the control group. |
| Robison et al 1992 | Design: RCT | Setting: A university campus | VO2 max, treadmill test time, recovery heart rates | Adherence (verified fulfillment of all four) | The incentive to not lose the $40 and to have signed a ‘contract’ appeared to work well in this study. |</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Duration</th>
<th>Components</th>
<th>Participants</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1, team competition</td>
<td>6 months</td>
<td>minimally-supervised, incentives-based endurance exercise program. Participants contracted to engage in at least 4 bouts of 30 minutes of verified aerobic exercise within a prescribed target heart rate range, per week. Experimental group had ‘response costs’. Comparison group participated in program without the contracts and response cost strategies.</td>
<td>as a result of failure to fulfill the weekly contracts</td>
<td>VO2 max significantly increased by 2.6% and treadmill test time significantly increased 16% in experimental group with no significant changes in comparison group. Recovery heart rates at 2 and 4 minutes post-exercise were significantly lower at 6 months in the experimental group but not the comparison group.</td>
</tr>
<tr>
<td>Study 1,2,3: Percent weight loss Attrition (attendance at fewer than 8 of the 12 weekly weigh-ins)</td>
<td></td>
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</tbody>
</table>

**Stunkard et al (1989)**  
(Stunkard, Cohen et al. 1989)

<table>
<thead>
<tr>
<th>Name</th>
<th>Design</th>
<th>Setting</th>
<th>Duration</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Quasi experimental design</td>
<td>many (see below)</td>
<td>12 weeks</td>
<td>Three studies conducted to evaluate effectiveness of competition as a method of weight loss at the worksite. Study 1 compared: individual competition, team competition and pure cooperation. 12-week program (weekly weight-in). To be eligible subjects had to be at least 5 lbs overweight. Study 2 tested 10 competitions conducted at 15 worksites with different types of employees (banks, manufacturing firms, community college). 12-week program (weekly weight-in).</td>
</tr>
</tbody>
</table>

Cites two papers (Jeffery et al 1985 and Forster et al 1985) where the use of financial incentives implemented through payroll deductions, reduced attrition to 6% in one study and 21% in another. Study 1 showed that individual competition was not effective, particularly in women where cooperation more important. Weight losses achieved in competitions were poorly maintained. Unpublished data supported modest effectiveness of a weight loss maintenance competition (continuing use of weigh-ins).
| Study 3: follow-up studies conducted following 3 of the competitions to evaluate maintenance of weight loss | Pure cooperation – prize was based on percentage of the goal achieved by the entire worksite (pool of money plus an amount from management) | lower than clinical studies (only one worksite greater than 4%). Among those who were more than 10% overweight, weight losses were 6.3 kg (men) and 4.4 kg for women |
| Study 2: competitions between and within worksites |
| Study 3: follow-up assessments |

### Study 3: Health Improvement Program
- **Name:** Stanford University Health Improvement Program
- **Design:** Pre-post test (quasi experimental pilot study)
- **Setting:** Blue-collar workers in Stanford University
- **Duration:** 16 weeks
- **Components:** Pre-test (questionnaire about current PA levels, PA readiness questionnaire, weight, resting BP, step test); plus individual feedback and setting of target heart rate

During consultation they were asked about types of PA and activity-related incentives and methods they found most appealing (used in development of program) 16-week exercise program using nearby worksite ‘parcourse’ (19 different activity stations). 90 minute classes, twice weekly

- **Target heart rate set for each individual**
- **Participants** encouraged to record all exercise sessions (on and offsite) on charts in workplace
- **Enthusiastic member** in each shop was enlisted to remind individuals concerning monitoring on the chart
- **Monthly contests** (publicly displayed charts used for tracking participation) were conducted by shop and regular individual participation in

### Study 3: Health Improvement Program
- **Fitness levels** (resting heart rate, step test) and weight

### Study 3: Health Improvement Program
- **Participants:** Of 94 workers, 38 (40%) sedentary males employed in operations and maintenance shops on university campus agreed to participate pre- and post-intervention assessments. Of the 38, 22 chose to sign up for the exercise class, 16 declined

Exercise class attendees showed significant increases in fitness and decreases in weight relative to non-attendees

They also reported significantly greater confidence concerning their ability to exercise regularly and an increased amount of energy compared to 4 months earlier, compared to non-attendees

Attendees reported twice the number of aerobic exercise bouts as non-attendees across the 4-month period and objective measure showed number of bouts related to heart recovery rate

### Study 3: Health Improvement Program
- **Higher participation rate** than other exercise programs offered in Universities

Clear employee consensus that use of incentives was an appealing factor in such programs

Program factors that appeared to be important:
- specifically geared to blue collar workers
- convenient time and location
- encouragement of supervisory support for program (shop with highest participation rate had supervisor, who in addition to encouraging employees was active participant himself)
- development of staff/employee rapport
- early employee involvement in specific program format, including the manner in which feedback and competition might be used, and the types of incentives to be employed (to enhance feelings of program ‘ownership’)

Participation rate differences only in
immediately after work. Encouraged to exercise on their own or with other group members at least one more time per week

| Name: | N/A |
| Design: | Cohort |
| Setting: | Business/industrial settings (banks, manufacturing). |
| Duration: | 12-15 weeks (see below) |

3 separate **weight loss competitions** held in

1) Three banks. 176 out of 570 employees participated in 12-week program
2) Litton manufacturing firm: 53 out of 225 employees participated in 13-weeks program. Assigned into 3 teams.
3) Koppers manufacturing firm: 48 out of 1200 employees participated in 15-weeks program. Assigned into 3 teams

**Components:** weekly weight-in, team support, lobby scoreboard, prize and competition

**Behavioural treatment manual:** self-monitoring, stimulus control, slow eating, reinforcement, social support, attitude change, nutrition and exercise

<table>
<thead>
<tr>
<th>Team competition: each participant was given a weight loss goal (weight/ideal weight). The team that achieved the greatest percentage of its goal (sum of individuals’ weight goals)</th>
<th>Weight loss Assessment: weekly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prize:</strong> each person paid $5, Pool of money to the winning team</td>
<td><strong>Participants:</strong> 213</td>
</tr>
<tr>
<td>Scoreboards showed weekly progress and acted as incentives</td>
<td><strong>Follow-up participation:</strong> 47% intervention; 52 % control. Dropout rate only 1%</td>
</tr>
</tbody>
</table>

Mean weight loss: 5.5 kg
Mean change in percentage overweight: 9.1
Cost-effectiveness: cost per kg lost $4.87 (first competition), $2.56 and $1.88 (second and third competitions)

**Men were more successful than women in each competition**

6 months follow up: 94 out of 122 participants in the bank competition: mean weight loss 4.7 kg. Average person maintained 80% of weight lost during the program

**Other:** improvements were seen in employees; morale, energy level, health, employee-manager relationships, work performance and absenteeism

| smoking rate (higher among non-attendees post-test); no data on non-participants in pre-test |

All 5 components of the program (weekly weigh-in (96%), team support (86%), lobby scoreboard, prize, and competition (87%)) were rated as beneficial by at least 50% of participants

Managers rated team support, competition and weekly weigh-in as most important parts of the program

62% rated the program as more successful than their previous attempts to lose weight

All managers reported positive outcomes/changes in the workplace and would recommend the program – at 6-month follow-up all managers said they would support holding another competition

85% of employees and 100% of managers felt that the involvement of top management was important to the program’s success (also related to outcomes)

Approach worked well in businesses of between 150 to 1200 employees; and in competitions between and within businesses
<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Description of program</th>
<th>Competition /Incentive</th>
<th>Outcome measures</th>
<th>Impact Evaluation</th>
<th>Process Evaluation</th>
</tr>
</thead>
</table>
| De Cocker et al (2008) (De Cocker, De Bourdeaudhuij et al. 2010) | Name: N/A  
Design: Quasi-experimental  
Setting: Social Services company, Ghent, Belgium  
Duration: 20 weeks  
Components: PA intervention based on ‘10 000 Steps Ghent’: education (e-mails), program feedback (pedometer use and e-mail), motivation (e-mail tips), environmental approaches (staircase use promotion and walking circuit) self-monitoring (pedometer use), goal setting (10 000 steps/day) and social support (worksite step competition) | Worksite step competition was the intervention focus for one month  
Employees formed groups of 2–10 and aimed to achieve as many steps as possible during the following 3 weeks. Steps were recorded using activity logs | Steps per day  
Assessment: pre-post  
Participants’ awareness and opinion about the project strategies | Participants: 298 participants who were mainly well educated, normal BMI, low % of smokers, good health; Drop outs were younger and took fewer steps at baseline  
65 completed awareness and opinions questionnaire at follow-up. **Only 26 participants (8%) took part in the step competition, mainly women**  
Downward trend in overall step counts from baseline (end of summer) to follow-up (winter) (F S 3.3, P S 0.071) but no significant effects on PA in total sample or –at-risk individuals  
Significant smaller decrease in the intervention workplace (2618 steps/day) than comparison (21389 steps/day) (F=8.8, P= 0.004) post-intervention. Intervention effect only in participants already reaching 10 000 steps/day at baseline (intervention participants: 21706 steps/day; comparison participants: 24006 steps/day) (F=5.5, P S 0.023)  
Overall project awareness very high (97%). Intervention strategies judged ‘good to very good’ by 57–95% of the participants. 50% rated worksite step competition as ‘good to very good’  
Proportion of intervention participants reporting that they had changed their PA behavior because of the intervention (31%) and reporting pedometer usage during the intervention (48%) | Seasonal effect on pedometer use |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Type of challenge</th>
<th>Team/individual</th>
<th>Incentives/ rewards</th>
<th>Duration and Participants</th>
<th>Positive outcomes (significant)</th>
<th>Negative outcomes (significant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hess et al 2011 Australia</td>
<td>Pedometer, weekly walks, posters, emails, stair prompts, log of PA and healthy eating</td>
<td>Team</td>
<td>Team prizes for number of steps and healthy eating</td>
<td>12 wks N = 399 92.8% F</td>
<td>Median minutes walked number times spent walking &gt;10 mins BMI, self-rated health, F&amp;V intake</td>
<td>Soft drink consumption increased</td>
</tr>
<tr>
<td>Morgan et al 2011 Australia</td>
<td>Info sessions, study website with tracking system, tangible resources</td>
<td>Team</td>
<td>Team prizes for highest mean percentage weight loss @ 1 month and end of challenge Individuals making online entries (log) received individual feedback</td>
<td>3 mo N = 127 100% overweight males</td>
<td>BMI, weight and waist circumference systolic BP resting heart rate leisure-time PA eating breakfast</td>
<td></td>
</tr>
<tr>
<td>Gomel et al 1993 Australia</td>
<td>Health risk assessment/risk factor education/behavioural counselling (BC)/BC + incentives</td>
<td>Team and individual</td>
<td>Individual and team prizes for lifestyle changes (in incentives intervention)</td>
<td>0 to 10 wk program (3, 6, 12 mo follow-up) N = 431</td>
<td>% body fat aerobic capacity smoking (post-intervention and follow-up)</td>
<td>BMI increased Cholesterol stable</td>
</tr>
<tr>
<td>Merrill et al 2011 US</td>
<td>Wellness program involving 6 behaviour-change campaigns</td>
<td>Individual</td>
<td>Small incentives for participation Rewards for behaviour change</td>
<td>30 wks N = 192 67% F</td>
<td>Exercise Whole grains and F&amp;V Self-reported high BP (probably due to taking medication)</td>
<td>BMI stable</td>
</tr>
<tr>
<td>Lemon et al 2010 US</td>
<td>Ecologic intervention involving numerous strategies and challenges, e.g. Virtual walk around the Mediterranean Sea</td>
<td>Individual and group</td>
<td>Incentives for participation in health assessments and behaviour change outcomes (number of steps or time spent walking)</td>
<td>12 and 24 mo N = 806 81% F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liskov et al 2010 US</td>
<td>Team weight loss with counselling on PA and nutrition; weekly-weigh-ins and self-monitoring</td>
<td>Team</td>
<td>Team monetary reward (funded by participants) at end of each phase for highest percentage weight loss</td>
<td>8 wks N = 248</td>
<td>Small amount of weight loss</td>
<td></td>
</tr>
<tr>
<td>Dishman et al 2010 US</td>
<td>Organizational action including environmental; personal and team goal-setting; pedometers, daily logs; ‘log’ posters</td>
<td>Team and workplace</td>
<td>Incentives for participation in assessments and for goal-attainment (points system) ‘Site’ recognition (2 took part) for highest participation</td>
<td>12 wks N = 151</td>
<td>Daily steps Minutes MVPA</td>
<td></td>
</tr>
<tr>
<td>Racette et al Assessment vs. assessment</td>
<td>Individual</td>
<td>Individual rewards for</td>
<td>12 mo</td>
<td>Metabolic syndrome reduced</td>
<td>No dramatic</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Type of challenge</td>
<td>Team/individual</td>
<td>Incentives/ rewards</td>
<td>Duration and Participants</td>
<td>Positive outcomes (significant)</td>
<td>Negative outcomes (significant)</td>
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<tr>
<td>2009 US</td>
<td>plus intervention (e.g. pedometer, healthy food, on-site exercise program, walking maps, team competitions)</td>
<td>and team</td>
<td>participation in activities</td>
<td>N = 151 (mostly unhealthy, overweight) 88.7% F</td>
<td>Intake F&amp;V Intake of saturated fat, fatty meals and fried foods PA (walking and moderate activity)</td>
<td>weight loss (BMI)</td>
</tr>
<tr>
<td>Milani et al 2009 US</td>
<td>Onsite health education, personalized health reports, referrals, membership local gyms</td>
<td>Individual and group</td>
<td>Group awards for best outcomes Individual awards for behavioural change</td>
<td>12 mo  N = 339 (21 were spouses)</td>
<td>Body fat Diastolic BP HDL cholesterol General health habits, including PA Mental health Lipids, glucose</td>
<td>No change BMI</td>
</tr>
<tr>
<td>Green et al 2007 US</td>
<td>Pedometers, goal-setting, self-monitoring incentives, team competition</td>
<td>Team and individual</td>
<td>Team and individual prizes for PA goal-attainment and eating F&amp;V (points system) Individual rewards for success stories and those completing evaluations</td>
<td>10 wks N = 1167 86% F</td>
<td>PA including exercise metabolic equivalents (10 wks) sedentism (10 wks &amp; 6 mo) % 5 servings F&amp;V daily (10 wks &amp; 6 mo)</td>
<td></td>
</tr>
<tr>
<td>Stein et al 2000 US</td>
<td>Annual health risk appraisal (HRA) plus health promotion activities</td>
<td>Individual</td>
<td>Cafeteria benefit plan for individual HRA change</td>
<td>0 to 1 year N = 2421 – 2868 per year 80% F</td>
<td>Participation in health promotion programs proportional to HRA (health status) and activity scores</td>
<td></td>
</tr>
<tr>
<td>Jeffery et al 1993 US</td>
<td>Biweekly onsite classes (4 rounds, 11 weeks each) and payroll-deduction incentive scheme</td>
<td>Individual</td>
<td>Amounts deducted from payroll refunded if made progress towards weight loss goal /session</td>
<td>2 years N =600 x 32 worksites (n = 2041 in weight loss programs) Just over 50% F</td>
<td>Mean weight loss Exercise habits</td>
<td>Little change in BMI</td>
</tr>
<tr>
<td>Robison et al 1992 US</td>
<td>Minimally-supervised endurance exercise program with contracts and response cost strategies</td>
<td>Individual</td>
<td>Individual ‘response costs’ - $40 lost if contract not fulfilled</td>
<td>6 mo N = 137</td>
<td>VO2 max Treadmill test time Recovery heart rates at 2 and 4 minutes</td>
<td></td>
</tr>
<tr>
<td>Stunkard et al 1989 US</td>
<td>Individual competition, team competition and pure cooperation (worksites)</td>
<td>Team and individual and worksite</td>
<td>Rewards for team achievement in weight loss (out of pool of money), individual weight loss achievement, and whole worksite achievement</td>
<td>12 wks N = 1177 57% F</td>
<td>High weight losses and percent weight losses, some of which were maintained longer-term</td>
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</tr>
<tr>
<td>Reference</td>
<td>Type of challenge</td>
<td>Team/ individual</td>
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<td>Duration and Participants</td>
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<tr>
<td>King et al 1988</td>
<td>Pre-test assessments and individual feedback; target heart rate; exercise program tailored towards wants; chart monitoring</td>
<td>Individual and team (shop)</td>
<td>‘Shop’ (blue-collar workshops) and individual participation chart and prizes</td>
<td>16 wks N = 94 sedentary males</td>
<td>Fitness Weight Confidence in ability to exercise Number of aerobic bouts</td>
<td></td>
</tr>
<tr>
<td>Brownell et al 1984</td>
<td>Weight loss competitions involving weekly weigh-ins, team support, lobby scoreboard, behavioural treatment manual</td>
<td>Team</td>
<td>Prize paid to winning team for weight loss</td>
<td>12-15 wks N = 213</td>
<td>High weight loss, more among men (including at 6 mo FU) Also improvements in employees: morale, energy level, health, employee-manager relationships, work performance and absenteeism</td>
<td></td>
</tr>
<tr>
<td>De Cocker et al 2008</td>
<td>10,000 steps, education emails, pedometer, motivation, environmental, self-monitoring, goal setting, social support (worksit step competition)</td>
<td>Team competition (small component)</td>
<td>None indicated</td>
<td>20 wks N = 298</td>
<td>Decrease in step counts from baseline to follow-up smaller in intervention group</td>
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<tr>
<td>Report</td>
<td>Program</td>
<td>Evaluation</td>
<td>Insights</td>
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<td>Bull F, Adams , Hooper P. (2008) <em>Well@work: promoting health and active workplaces. Final evaluation report</em></td>
<td>This report documents the evaluation of 11 ‘Well@work’ projects conducted in 9 regions of the UK. Most of the projects focused on promoting physical activity. Each of the 11 sites included some challenge or competition initiatives, and overall 7% of the initiatives comprised challenges or competitions, usually pedometer challenges.</td>
<td>Evaluations found that competitions and challenges were popular amongst employees (although less popular than health checks). Across 10 projects, there were 18 pedometer challenges with 371 participants, many of whom were not otherwise participating in activities. Drop-out rates were high, and there was high variation between workplaces in step counts and changes in step counts.</td>
<td>Administering the challenge, in terms of collecting and collating step counts, was somewhat onerous. Health checks conducted during work time and by independent health professionals were liked best by participants – viewed as motivational. • Employee input for ideas of project activities essential • Project action plans were useful to set key milestones – should be flexible and reactive to employee needs/wants • Management buy-in and support from all levels deemed essential • Champions key liaison persons – although workplace champions with little or no experience found developing action plans quite difficult • One-off activities viewed as appealing to those who couldn’t commit to longer-term challenges • Competition and incentives/prizes motivated and encouraged employees; team competitions provided peer support and encouragement; many challenges involved participation during the work day which was well-received by employees • Use of multiple channels of communication recommended to reach all participants/avoid communication problems being a barrier to participation • Physical activities were identified as the most popular and easiest to sell; focused on practical, social and fun nature • Greater focus on diet and nutrition indicated – more changes in the canteen and more “affordable healthy options” • Extension of project activities to friends and family • Shift and part-time workers hard to reach</td>
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<tr>
<td>US Office of Personnel Management <em>Healthier feds Physical Activity Challenge 12 month follow-up survey (2009)</em></td>
<td>This report documents the results of a 12 month follow-up survey, sent to 27,000 eligible challenge participants. The Challenge promoted participation in regular moderate physical activity – over 100 physical activities including</td>
<td>Response rate =28% (n=7,105) 44% of respondents reported increased physical activity levels 12 months post-challenge</td>
<td>When asked whether certain factors motivated them to maintain or increase their levels of physical activity: • 86% of participants were motivated by a desire to improve their overall health; • 74% were motivated by a desire to improve their energy levels and/or alleviate stress and • 69% a desire to lose weight</td>
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<tr>
<td><strong>Greater Shepparton Pedometer Challenge (2008)</strong></td>
<td>172 teams with 944 members from 42 organisations participated. The program included prizes, promotional materials (including team leader packs), and a community twilight walk. Team leaders required to fill out weekly log sheets – 4-week Challenge. External collator.</td>
<td>Evaluation feedback was based on 79 completed surveys (71.2% female pre- and 77.8% female post-). 51% 35-65 and 48% 18-35. These indicate that 79% knew of the challenge through workplace. 58% knew of the website. Respondents reported high levels of engagement and satisfaction – 100% of respondents said they enjoyed participating in the Challenge. 94% said the Challenge motivated them to walk more; there was an increase on the number of people participating in 30 mins or more of walking. 81% said that they were going to continue using their pedometers after the Challenge. Suggested improvements: • Online registration of teams and steps and online evaluation forms • Email correspondence with all participants, not just leader • Pedometer quality increase.</td>
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<td><strong>Adopting and implementing 10,000 steps. Case studies from the Australian community (2007)</strong></td>
<td>This report documents 30 case studies from different locations across Australia. Self-reported feedback from participants is included in individual case study reports – including many businesses – and lessons learned/where to from here information; but there is no aggregated data or evaluation. Some valuable insight into running team challenges involving 10,000 steps contained within the case studies, e.g. include some short-term challenges as interest wanes in longer-term challenges; 10,000 easily attainable by some; team champions/leaders require support; avoid challenge during school holidays or start of school term; target the relatively inactive to focus on personal bests; involve the broader community; cost of pedometer barrier to some; include newsletters with diet tips; include two challenges per year.</td>
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<tr>
<td><strong>CTC Challenge for Change</strong></td>
<td>CTC Charitable Trust together with ‘Challenge for Change’ – a social marketing agency A Workplace Cycle Challenge pits organizations and the individual departments within them against each other to see who can get the most staff to cycle for at least 10 minutes during a 3-week Challenge. Baseline survey and surveys at end of 3-week Challenge and 3 months post-Challenge. This report presents data from Adelaide in 2009, averages of UK Challenges in 2011 and early results from Sydney 2011 Registrants: • 19% (Adelaide) and 41% (Sydney) non-cyclists (30% UK) Results prove that a Challenge which rewards the level of participation rather than the number of times they cycle – is far more successful at encouraging the key target audience of new and occasional riders to cycle – participation-focused challenge fosters a real sense of team work and creates a cycling culture in the workplace (occasional riders encouraged by regular riders). A trips/distance focused Challenge appeals strongly to existing regular riders, but may actually discourage new or occasional riders from taking part.</td>
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period. The organisations and departments that motivate the highest percentage of staff to cycle, in their size category, win a Participation Award. Spot prizes and other incentives are also used to encourage non-cyclists to get back on a bike and give cycling a go. Website for goal-setting, motivation, etc.

<p>| StairWay to Health Initiative Workplace Wellness Initiative by BC Ministry of Health (Initiative was April 2004-April 2005) Canada | Comprehensive multi-risk factor strategy that includes the provision of information and education, behaviour change interventions, environmental and policy supports to enable healthy behaviours and capacity-building within the organization Addressed physical activity, healthy eating, tobacco cessation and stress management Behaviour Change activities included point-of-choice posters to encourage stair use, team events like the <em>Mt Everest and CN Tower Challenge</em>, a <em>10,000 Steps pedometer challenge</em> and library lending program, a <em>fruit and vegetable challenge</em>, healthy food choices at events and a tobacco cessation program called <em>QuitNow</em> | Stairwell use increased over team challenges and events • Approximately 20% of staff participated in the events • Pedometers helped to motivate people to take up or maintain their activity levels • The Hearts@Work screening identified 23 cases where employees should follow-up with their Doctor and lower their chronic disease risk • Helped create a feeling of connection in workplace 22% and 16% of staff participated in CN Tower Climb and Mt Everest climb resp. (only 10% of participants completed the evaluation and completed by those ‘more active’ and ‘enthused’) 10,000 steps a day challenge less successful although evaluation retrospective – all those who completed were achieving 10,000 steps at baseline F&amp;V challenge attracted different participants (used stairs less) | Focuses on getting people to experience what it is like to ride a bike – enjoyment/benefits – positive attitudes Executive buy-in essential for success Internal champions make it happen Resources for project coordination, implementation necessary Incentives for behaviour change (Challenges) were underpinned by environmental and organizational capacity to support behavioural change/challenge activities (vending machines, canteen, music in stairwells and prompts) Building in employee incentives (ongoing) recognized as necessary for future Challenge by age-group suggested 10,000 steps individual challenge seen as too competitive Important that figureheads participate Point system for F&amp;V needed to be ‘fairer’ |</p>
<table>
<thead>
<tr>
<th>Name and weblink</th>
<th>Owner</th>
<th>Brief Description</th>
<th>Behaviours</th>
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<th>Payment</th>
<th>Incentive</th>
<th>Results</th>
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<tbody>
<tr>
<td>Medibank Team Challenge <a href="http://www.teammchallenge.com.au/">www.teammchallenge.com.au</a></td>
<td>Medibank Private</td>
<td>Pedometer-based intervention Automated web-based registration Team-based Participants create animated character on enrolling. Short films show progression. Open Division (9000 step target) or Advanced Division (12,500 step target) Other activities able to be included</td>
<td>Physical activity (Pedometer)</td>
<td>Team</td>
<td>Unclear</td>
<td>Unclear</td>
<td>Not reported</td>
</tr>
<tr>
<td>Shining Light <a href="http://www.shininglight.net.au">http://www.shininglight.net.au</a></td>
<td>Corporate Health Provider</td>
<td>Health &amp; fitness program including three comprehensive individual on-site health &amp; fitness assessments &amp; a health &amp; fitness plan including exercise programs, healthy eating plan, workplace stretching program &amp; daily support from our team of personal trainers &amp; nutritionists. Form a team and compete to achieve the greatest average increase in a range of health and fitness benchmarks.</td>
<td>Physical activity &amp; Diet and?</td>
<td>Team</td>
<td>$99.00 per team member</td>
<td>The winning team will receive a trophy and a share in prizes to the value of $20,000</td>
<td>Not reported</td>
</tr>
<tr>
<td>10,000 steps Australia <a href="http://www.10000steps.org.au">http://www.10000steps.org.au</a></td>
<td>Queensland Health provides funding to CQ University in Rockhampton</td>
<td>CQU's health professionals, academics and graduates coordinate the dissemination of the 10,000 Steps, assisting individuals and health professionals around Australia and the world. Interactive online program allows for virtual teams. Access to health library. Personal log page.</td>
<td>Physical Activity (Pedometer)</td>
<td>Team or individual</td>
<td>Free</td>
<td>Unclear</td>
<td>None available</td>
</tr>
<tr>
<td>10,000 Steps Australia <a href="http://www.10000stepsaustralia.com">http://www.10000stepsaustralia.com</a></td>
<td>Private Provider</td>
<td>Australian arm of the &quot;Walking with Attitude&quot; Pedometer tracking website</td>
<td>Physical Activity (Pedometer)</td>
<td>Team or individual</td>
<td>$45.00 per participant</td>
<td>Virtual Medals</td>
<td>Not reported</td>
</tr>
<tr>
<td>Quitober <a href="http://quitober.com">http://quitober.com</a></td>
<td>?Private Enterprise</td>
<td>Website available – claims to be Australia’s only quit smoking challenge website. Did not run in 2011 due to lack of funds. For workplaces and individuals</td>
<td>Smoking</td>
<td>Team or individual</td>
<td>Free</td>
<td>Cash prizes</td>
<td>11 employers registered in 2010 69 employees registered 39 quit</td>
</tr>
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<td>Name and weblink</td>
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<td>Workplacehealthchallenge.com <a href="http://www.everydayhealthchallenge.com.au/event/workplacehealthchallenge">http://www.everydayhealthchallenge.com.au/event/workplacehealthchallenge</a></td>
<td>Kidney Health Australia and Everyday Hero</td>
<td>Workplace Health Challenge physical health through healthy eating, exercise. Participants are sponsored to lose weight. Funds raised go to charity (Kidney Health Australia)</td>
<td>Physical activity and weight loss</td>
<td>Team</td>
<td>?Nil</td>
<td>Fundraising for charity</td>
<td>Not reported</td>
</tr>
<tr>
<td>Bite4Life <a href="http://www.bite4life.com.au/">http://www.bite4life.com.au/</a></td>
<td>Corporate Fitness Culture (Corporate Health Provider)</td>
<td>Online health and fitness challenge. 8 weeks. Can customize program. Can raise money for a charity. Employees form teams of equal numbers. Reports customers such as NRMA, CBA</td>
<td>Physical activity and/or weight loss</td>
<td>Team or individual</td>
<td>$64.95 per month for individuals. Unclear if same price for workplace teams</td>
<td>Fundraising for charity</td>
<td>Not reported</td>
</tr>
<tr>
<td>Global Corporate Challenge <a href="http://www.gettheworldmoving.com/">http://www.gettheworldmoving.com/</a></td>
<td>?Private company</td>
<td>16 week pedometer challenge targeting physical activity in workplace teams around the world starting on a particular date (24th May 2012)</td>
<td>Physical activity (Pedometer)</td>
<td>Team</td>
<td>Yes</td>
<td>Fundraising for charity</td>
<td># participating only reported</td>
</tr>
<tr>
<td>Get on Track Challenge <a href="http://www.diabeteswa.com.au/News_and_Events/Events/Details/Get_on_Track_Workplace_Challenge_55">http://www.diabeteswa.com.au/News_and_Events/Events/Details/Get_on_Track_Workplace_Challenge_55</a></td>
<td>Diabetes Western Australia</td>
<td>Free team based virtual health pedometer based program. Option of three virtual WA tracks. Every 10 minutes of moderate-intensity physical activity contributes to 1km on the track, whilst bonus km’s can be earned each week for fruit and vegetable consumption. The first team to reach the end wins. Only offered in Western Australia.</td>
<td>Physical activity (pedometer)(primary)and fruit and vegetable intake (supplementary)</td>
<td>Team (2-8 participants)</td>
<td>Free</td>
<td>?Nil</td>
<td>Not reported</td>
</tr>
<tr>
<td>The Walktober Challenge <a href="http://walktober.com.au/home">http://walktober.com.au/home</a></td>
<td>Physical Activity Australia (formerly Kinect Australia) (?Private Organisation)</td>
<td>Walking challenge run in October open to anyone. Participants record time, steps or distance on a website. Appears to be adapted from US website/program: <a href="http://www.walktober.com/">http://www.walktober.com/</a></td>
<td>Physical activity (pedometer)</td>
<td>Team or individual</td>
<td>Free</td>
<td>Leadership boards (km’s) published on website for teams and individuals</td>
<td>Not reported</td>
</tr>
<tr>
<td>Bussta Gut <a href="http://www.blfq.org/content/time-bust-ya-gut">http://www.blfq.org/content/time-bust-ya-gut</a></td>
<td>Builders Labourers Federation and BUSS(Q)</td>
<td>Weight Loss Challenge over 8 months with education seminars and regular ‘weigh-ins’. The Bussta Gut Challenge will form part of the Queensland Workplaces for Wellness</td>
<td>Weight loss</td>
<td>Individual and worksites</td>
<td>Free</td>
<td>$5000 worth of prizes</td>
<td>None available</td>
</tr>
<tr>
<td>Name and weblink</td>
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<tr>
<td>Superannuation Fund. Funded by Queensland Government</td>
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<td>Initiative, which is a joint Commonwealth and State Government initiative under the National Partnership Agreement on Preventive Health. Targets construction workers</td>
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<tr>
<td>Step by Step Workplace Challenge <a href="http://www.cqhealthassess.com.au/step-by-step-workplace-challenge.asp?pmiid=324&amp;s">link</a></td>
<td>CQ Health Assess (a division of CQ Nursing (Nursing Agency))</td>
<td>The goal is to encourage each member of the team to aim to walk 10,000 steps daily. Steps will be recorded and converted into kilometres. We will then calculate how far you have walked 'virtually' on a track around Australia. Compete against yourself and the other participating teams</td>
<td>Physical Activity (Pedometer)</td>
<td>Teams of 7</td>
<td>?Free</td>
<td>Prizes from local businesses (Mackay)</td>
<td>None available</td>
</tr>
<tr>
<td>Dry July <a href="http://www.dryjuly.com/">link</a></td>
<td>unclear</td>
<td>Participants enroll to raise funds by not drinking alcohol during July</td>
<td>Alcohol</td>
<td>Team or individual</td>
<td>Free</td>
<td>Fundraising competitions</td>
<td>None available other than participation</td>
</tr>
<tr>
<td>TravelSmart</td>
<td>Queensland Government (although each company 'owns' the Challenge)</td>
<td>Individuals in terms of 4 collect points for distance and number of times travelled using Active Transport Two week challenge with points collected at end of first week used to motivate in second week</td>
<td>Active Transport</td>
<td>Teams of four</td>
<td>Free</td>
<td>Team motivation and prizes (if workplace chooses)</td>
<td>None – although website by QLD government suggests reduction in weekly car trips attributable to range of TravelSmart activities</td>
</tr>
<tr>
<td>Kiwi Workplace Challenge <a href="http://www.heartnz.org.nz/index.php/Blog/entry/kiwi-workplace-challenge.html">link</a></td>
<td>Heart Children NZ</td>
<td>The Kiwi Workplace Challenge is a fun and entertaining way to raise funds for Heart Children NZ. Working in teams of four, entrants build their own animated characters, and then</td>
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<td>use their real life steps and activity to join rugby legend on virtual tourist adventure. Organisations can enter single or multiple teams, or you can enter a single team of four friends. Every entrant receives a Challenge 'Ignition Kit' containing a high quality pedometer, a Kiwi Challenge cap, shoe bag and cling bag, and will raise money for Heart Children NZ as they complete each of the 12 stages of the challenge. Teams have 10 weeks to complete the event by recording their daily steps and over 40 other activities (such as swimming, golf, gym classes)</td>
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Strides to a healthier worksite: wellness challenge toolkit www.healthysd.gov

A Dynamic incentive campaign: Step-by-Step: walking your way to wellness www.cdc.gov/leanworks/build/behavioural.html (The Wellness Councils of America 2001)
<table>
<thead>
<tr>
<th>Website</th>
<th>URL</th>
<th>Description</th>
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<tbody>
<tr>
<td>York Pedometer Challenge</td>
<td><a href="http://www.york.ca/Services/Public+Health+and+Safety/Workplace+Wellness/Pedometer+Challenge.htm">http://www.york.ca/Services/Public+Health+and+Safety/Workplace+Wellness/Pedometer+Challenge.htm</a></td>
<td>Canadian Municipal websites with resources and instructions for workplaces on how to implement a pedometer challenge</td>
</tr>
<tr>
<td>Quit and Win</td>
<td><a href="http://www.quitandwin.net/index.asp">http://www.quitandwin.net/index.asp</a></td>
<td>Quit smoking competition across multiple countries</td>
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<td>Activity 4 Charity</td>
<td><a href="http://activity4charity.co.uk/?q=node/25">http://activity4charity.co.uk/?q=node/25</a></td>
<td>Online step health challenge (The Challenge). The Challenge consists of a set up period (ideally 2 weeks) followed by a 6 week monitoring and competition period and a final 4 week sponsorship collection period</td>
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<tr>
<td>Walking with Attitude</td>
<td><a href="http://www.walkingwithattitude.com/">http://www.walkingwithattitude.com/</a></td>
<td>Private company – cost per participant, fully hosted website that can be tailored</td>
</tr>
<tr>
<td>Walker Tracker</td>
<td><a href="http://walkertracker.com/corp/programs/">http://walkertracker.com/corp/programs/</a></td>
<td>Custom Portal, data reporting and analysis, incentive program management</td>
</tr>
<tr>
<td>Steps Out</td>
<td><a href="http://stepsout.com/">http://stepsout.com/</a></td>
<td>Hosting website that can be tailored to companies needs</td>
</tr>
</tbody>
</table>
APPENDIX 1 – THE HEARTBEAT CHALLENGE PROGRAMME (PRICE ET AL 2000)

This programme was developed by the National Heart Foundation of New Zealand in 1992. The Heartbeat Challenge programme aimed to develop commitment of workplaces to creating an environment that supports and improves health and empowers individuals to make healthy choices.

To gain a heartbeat Challenge award, workplaces had to achieve at least five criteria in each of three areas: promoting healthy food choices, physical activity and being smoke free.

Self-assessment audits were conducted at the time of registration and once the award was attained. From 1993 to 1997 more than 1200 workplaces had registered and 423 had achieved an award. Price et al (Price, Mackay et al. 2000) evaluated a 2-year auditing process of this program, where 150 workplaces completed the challenge between 1996 -1997. Eighty one per cent of workplaces had 20 staff or more. The largest changes were made in the healthy food section. It took workplaces an average of 7 months to achieve an award (range: 1-16 months).
REFERENCES


