The workplace as a setting for interventions to improve diet and promote physical activity[1]

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Executive summary

With lifestyle behavioral choices contributing to a significant proportion of chronic diseases globally, evidence-based strategies to improve behavioral risk factors such as healthier eating and regular physical activity should be considered in a variety of settings. The workplace offers several advantages in that a substantial number of the working population can be reached and multiple levels of influence on behavior can be targeted. From the individual-level, for example offering low-fat cooking demonstrations, to the organizational-level, for example paving attractive walking trails around the workplace, workplace health promotion (WHP) programs have been shown through several empirical reviews to have beneficial effects on a range of health outcomes.

Several collaborating groups have determined 'best practices" for planning WHP programs, with numerous recommendations overlapping. Linking the WHP activities to organizational objectives, support from top management, and broad-reaching communication programs are important to establish and maintain WHP programs. Incentives, such as gift cards, reduced medical costs, and cash payments encourage employee participation in program activities. Monitoring progress towards program objectives through a built-in evaluation process is needed to ensure that the program can be revised as necessary based on employee feedback. In addition to these practices, there are several guidelines from behavioral science that can guide program activities, such as goal-setting and the motivational stages of change. Importantly, research has shown health behavior decisions are affected by social context in which they are made, such that the social support and social norms surrounding a particular health issue has a substantial impact on how that health behavior is perceived. Finally, building off increasing trends, comprehensive WHP programs integrate health promoting strategies across work organizations including occupational safety and health (OSH), disability management, and employee assistance programs.

1. Rationale for using the workplace as a setting for diet and physical activity promotion

There is increasing evidence that an unhealthy diet and lack of regular physical activity are related to several adverse health outcomes, such as heart disease, diabetes, stroke, and cancer (*1, 2*). For example, a landmark review published in 1997 by the World Cancer Research Fund and the American Institute for Cancer Research reported that healthy diets, regular physical activity, and maintaining a normal weight over time could reduce new cancer cases by approximately 30-40% globally (*3*). Since that time, a second review of these relationships across 17 cancer sites has been completed, which also reported several aspects of diet and physical activity that either directly or indirectly (through their effects on overweight/obesity) has an impact on cancer risk (*4*). For diet, these include limiting red and processed meats, increasing fruits and vegetables, and moderating alcoholic drinks; for physical activity these include increasing physical activity and reducing total body and abdominal fatness (*4*).

Workplace health promotion has generally focused on promoting worker health through reduction of individual risk-related behaviors such as tobacco use, substance use, a sedentary lifestyle, poor nutrition, stressors and reactions to them, reproductive risks, and other preventable health behaviors (*5, 6*). These efforts have the potential to reach a significant proportion of adults who are employed (*7*). More specifically, WHP programs are an effective means of promoting a healthy diet and regular physical activity (*8-10*). Through the workplace, it is possible to influence health behaviors through multiple levels of influence (*11*); through direct efforts such as health education and increasing the availability of healthy foods and opportunities for physical activity; or indirectly through social support and social norms promoting healthy behaviors. It is also feasible to link worksite health promotion efforts with broader efforts in the workplace to support worker health, such as through occupational health and safety initiatives (*12*), disability management programs (*13*) and employee assistance programs (*14*). Worksites may plan programs with worker input, and may set priorities based on their own assessment of needs, and/or emphasizing those behaviors associated with the largest decrements in mortality and morbidity, increases in disability, decreases in work productivity, or potential for cost savings relative to health impact (*1, 15, 16*).

1.1 International initiatives

Globally, the majority (80%) of deaths due to chronic diseases are projected to occur in low- and middle-income countries; in these countries, chronic disease mortality also tends to affect younger individuals compared to higher income countries (*17*). These data underscore the importance of global workplace health promotion and accordingly, the need to adapt the goals of the WHP programs to the local context. For example, WHP planners could consider the availability of health services, literacy levels, and perceptions of 'good health' and 'quality of life' (*18*). Further examples of considerations and implementation efforts of WHP globally are available (see (*17, 18*)).

The workplace has been internationally recognized as an appropriate setting for health promotion. The importance of workplace health promotion was addressed in 1950 and later updated in a 1995 joint International Labor Organization/World Health Organization (WHO) Session on Occupational Health (*19*). Since this time, health promotion in the workplace has been broadly recommended by international bodies through numerous charters and declarations, including the 1986 Ottawa Charter for Health Promotion (*20*), the 1997 Jakarta Declaration on Leading Health Promotion into the 21st Century (*21*), and the 2005 Bangkok Charter for Health Promotion in a Globalized World (*22*). The European Network for Workplace Health Promotion (*23*) has similarly issued a number of statements in support of workplace health promotion, including the Luxemburg Declaration on Workplace Health Promotion in the European Union, the Lisbon Statement on Workplace Health in Small/Medium Sized Enterprises, and the Barcelona Declaration on Developing Good Workplace Health Practice in Europe.

The WHO's 2004 Global Strategy on Diet, Physical Activity and Health, as endorsed by the Fifty-seventh World Health Assembly in resolution WHA57.17, highlights the workplace as an important setting for health promotion in Point 62:

"Workplaces are important settings for health promotion and disease prevention. People need to be given the opportunity to make healthy choices in the workplace in order to reduce their exposure to risk. Further, the cost to employers of morbidity attributed to noncommunicable diseases is increasing rapidly. Workplaces should make possible healthy food choices and support and encourage physical activity".

Moreover, the WHO's Global Plan of Action on Worker's Health 2008-2017, as endorsed by the Sixtieth World Health Assembly in resolution WHA60.26, states in Point 14:

"Health promotion and prevention of noncommunicable diseases should be further stimulated in the workplace, in particular by advocating healthy diet and physical activity among workers, and promoting mental health at work…"

A number of national and regional governments have incorporated these principles into their own state-sponsored initiatives aimed at promoting workplace health programs; Health Canada's Workplace Health System serves as one example targeted to the needs of medium to large sized businesses (*24*) and small businesses (*25*). In the United States of America (USA), the "Healthy People 2010" initiative defines two specific goals for workplace health promotion: to increase the proportion of worksites offering a comprehensive employee health promotion program to their employees, targeting 75% participation by the year 2010; and to increase the proportion of employees who participate in employer-sponsored health promotion programs, again, targeting 75% participation rates by the year 2010 (*26*).

1.2 Prevalence of and participation in workplace health promotion programs

The 2004 National Workplace Health Promotion Survey conducted in the USA among 730 worksites found that many companies provide some type of health promotion programming, for example, 26% provided health education, 30% provided supportive social and physical environments, and 23.5% provided worksite screening (*7*). However, only 7% of employers with 50 or more employees met the more restrictive standard for offering comprehensive programs, defined by the Healthy People 2010 criteria as having five main elements. These include: 1) health education, including a focus on skill development for health behavior change, and information dissemination and awareness building, preferably tailored to employees' interests and needs; 2) supportive social and physical environments, including implementation of policies that promote health and reduce risk of disease; 3) integration of the workplace program into the workplace's organizational structure; 4) linkage to related programs**,** such as employee assistance programs and programs to help employees balance work and family; and 5) workplace screening programs, ideally linked to medical care to ensure follow-up and appropriate treatment as necessary (*27*). Comprehensive programs are more often offered (24.1%) by the nation's largest employers (those with 750+ employees) (*7*). This survey also found that approximately 65% of employers had a full or part-time employee responsible for health promotion and worksite wellness activities, providing a solid foundation for future efforts (*7*).

As noted above, in the USA, the Healthy People 2010 goals also aim to increase the proportion of workers participating in health promotion programs. According to the National Health Interview Survey in 1994, 61% of USA employees aged 18 years and older in 1994 took part in employer sponsored health promotion activities, defined to include one or more elements of a comprehensive workplace health promotion program (*28*).

It is also important to broaden the reach of these programs, since workplace health promotion programs are not equally available to all workers. Using results from the 1994 National Health Interview Survey in the USA, Grosch et al found that nonprofessionals, blacks, and individuals with lower education levels were less likely to work in worksites that offered some type of health promotion programming (*29*). Recent improvements in the availability of health promotion programs have been most likely to benefit workers already having the best access to programs. Data across all surveyed workers from the 1999 and 2005 USA National Compensation Survey indicates that access to employee assistance programs, wellness programs, and fitness centers increased; furthermore improved access to wellness programs was highest for those who worked at companies with 100 or more employees, those earning $15/hour or more, white-collar occupations, and full-time workers (*30*).

Even when programs are available, participation rates are not equivalent across workers. Participants are most likely to be salaried, white-collar employees whose general health is better than average (*31*). Consistent evidence indicates that blue-collar workers are less likely to participate in workplace health promotion programs than are white-collar workers (*26, 32-37*). Low participation may be in part a consequence of ineffective "marketing" of programs to these workers (*26, 38*), as well as structural barriers to participation. For example, supervisors often function as gatekeepers controlling worker access to workplace health promotion activities; they may be reluctant to allow workers to attend programs on work time in order to keep production lines moving, thus presenting the greatest barriers for those workers with the least amount of discretion over their time (*37, 39*). Further barriers may include working over-time, shift work, having a second job, car-pooling to work, long distances between the plant and the employee's home, and responsibilities at home (*40*).

1.3 Frameworks for workplace health promotion interventions: Programs across multiple levels of influence

Following a social ecological model (*41*), WHP programs may be delivered at multiple levels of influence. Starting at the individual and interpersonal levels of influence, workplace health promotion programs aim to help individual workers make health behavior changes. We might consider two approaches taken by these programs. Some intensive interventions are designed particularly for high-risk individual workers, while other workplace-wide programs are designed to reach a breadth of the workforce. Intensive programs are likely to attract workers most interested in health behavior change, thus they are most motivated to change behavior. It is important to keep in mind that because these programs are designed for highly motivated volunteers who are ready to commit to a behavior change program, they may miss important segments of the working population who are not interested in participating in intensive programs. Workplace-wide programs instead generally aim to influence health behaviors among workers at varying stages of readiness for health behavior change. Not surprisingly, these two types of programs differ in their ability to change behaviors. From a public health perspective, the "*impact*" of an intervention is a product of both its *efficacy* in changing behavior and its *reach*, meaning the proportion of the population reached either through their direct participation, or indirectly through diffusion of intervention messages throughout the workplace (*42, 43*).

Moving outward from individual and interpersonal levels, WHP programs also target the workplace environment, for example by increasing the availability of healthy foods in workplace cafeterias or by modifying the built environment to promote physical activity. Studies have examined the effects of cafeteria-based programs, for example through point-of-choice food labeling, as a location for media-based nutrition education, and through increasing the variety of foods and reducing prices (*9*). While these programs hold promise for changing food purchasing patterns at work, it is less clear whether changes extend to dietary patterns outside work (*8, 44, 45*). Further discussion of environmental-level approaches is presented in section 3.4.

2. Evidence base for workplace programs targeting diet and physical activity

2.1 Efficacy of comprehensive workplace health promotion interventions

WHP research has documented the efficacy of programs across a wide array of outcomes, including changes in anthropometric measures, health behaviors, life satisfaction indicators, and measures of morbidity and mortality. In general, results from randomized studies of workplace health promotion have found modest yet promising effect sizes (*11, 31, 46-48*). We examined literature reviews of WHP programs and indicated when at least one of the studies reviews indicated a significant finding; Table 1 summarizes these results for programs targeting physical activity, nutrition/cholesterol, weight control, alcohol use, and cancer risk factors, as well as multi-component programs. We included reviews across this broad range, because eating patterns and physical activity levels play at least a partial role in the etiology of each program target listed in the table, and are increasingly being included in more comprehensive approaches to WHP. The studies included in these reviews represent a range of study designs; although authors place the most weight on the results on randomized controlled studies, other study designs were included. Methodological limitations to the studies included in these reviews include inadequate sample sizes; the use of non-randomized designs; differential attrition across study groups; analysis at the individual level failing to take into account of group randomization; and the use of inadequate measures, including sole reliance on worker self-reports rather than additional objective measures, such as biochemical assessments.

One concern sometimes raised in the interpretation of the results of these studies has been the magnitude of effect sizes, even when statistically significant changes in behavior are found. Some observers continue to apply the standard of clinical significance in assessing the value of the magnitude of the results of these trials. Yet as Rose noted (*49, 50*), small changes in behavior observed across entire populations are likely to have large effects on disease risk. For example, Tosteson and colleagues (*51*) estimated the cost-effectiveness of population-wide strategies to reduce serum cholesterol, and found that community-based interventions to reduce serum cholesterol are cost-effective if serum cholesterol is reduced by only two percent or more (*51*). It is important that the standards used for interpretation of the results of workplace intervention studies be based on the public health significance of the effects.

3. Best practices of workplace interventions

In this section, we present best practice characteristics of WHP programs. Best practices have been conceptualized as recommendations, supported by the scientific literature, that can be replicated (*52*). Green noted that we might conceptualize best practices as a process for planning interventions that will be appropriate for the setting and population (*53*), recognizing that the tested intervention will need to be adapted to fit the context (*54*).

As a starting point, we follow the recommendations compiled by the Committee to Assess Workplace Preventive Health Program Needs for NASA (National Aeronautics and Science Administration) Employees in its report for the USA-based Institute of Medicine of the National Academies (*55*) (see Table 2). Others have made similar recommendations to those outlined here (*9, 52*). For example, a review of WHP programs targeting fruit and vegetable intake identified: recognizing multiple levels of influence, using participatory strategies with workers and management, addressing the social context, targeting multiple versus single behaviors, and using tailored materials (*9*). The characteristics included in the NASA report were based on findings from the Corporate Health Promotion Consortium Benchmarking Study from the American Productivity and Quality Center (APQC) (*56*) as well as a review of the APQC's findings by Goetzel (*57*). We have illustrated the applicability of these best practice characteristics through the use of examples and activities from evidence-based diet and physical activity interventions.

3.1 Link program to business objectives

Programs and policies aimed at chronic disease prevention through the promotion of diet and physical activity at the workplace may be strengthened when they support a company's corporate objectives, both with respect to organizational-wide financial impact, as well as individual-level benefits to the health and well-being of employees. Many businesses have recognized the importance of employee health to achieving core objectives; WHPs may be seen as strategic initiatives to protect human and financial resources. By promoting wellness and risk factor reduction, businesses may avoid unnecessary health costs, enhance productivity, reduce absenteeism and turnover, and encourage their employees through demonstrated commitment to their wellbeing. In fact, in a survey of 365 large U.S. companies, 80% reported that they

believed their wellness program would reduce their health care costs, with the results to be realized over the long-term (*58*).

The following case reports were drawn from summaries of C. Everett Koop National Health Award winners (*59*). The Koop Awards are granted annually by The Health Project and recognize organizations with superior health promotion programs that target behavioral change and cost reduction. The following case study exemplifies some of the ways in which WHP programs might be integrated into a company's core business objectives.

3.1.1 Pfizer Inc. (USA)

The WHP program at Pfizer, Healthy Directions Health and Wellness Program, is a multidimensional initiative designed to help Pfizer attract, develop, and retain its employee population. The program was designed with the expressed purposes of supporting Pfizer's business model by promoting employee participation and responsibility for their health and increasing the health and productivity of employees (*60*). The extent to which Pfizer's health promotion program represents their stated objectives in practice is beyond the scope of this report, however, these types of explicit statements may be an important step to effectively link employee wellness programs to business objectives.

3.2 Management support and communication

Substantial managerial support is often essential to generate the human and financial capital required to initiate and maintain a successful employee wellness program (*9*). Even with respect to primarily employee driven wellness initiatives, strong and consistent support from company leaders may serve to complement a bottom-up approach, helping to ensure legitimacy and program resources. In addition, senior management support and sponsorship at the local level may encourage participation and trust in the program.

Effective communication is also needed to achieve success. First, substantive health messages need to be communicated (*61*) in order to educate employees regarding healthy behaviors such as regular physical activity and healthful diet. Such communications might use techniques ranging from print company newsletters to web-based communication courses, depending on the needs and resources of the target audience. Second, it is important to clearly describe the framework/structure of employee wellness programs and initiatives so that employees will be equipped to use these programs. For instance, one could announce a new

wellness program at a company-wide "launch day" or broadly advertise a lunchtime walking group with posters, email messages, and newsletters. Other communication methods include: websites, pay stub messages, guest speakers, e-learning courses/programs, executive addresses, mission statements, and elevator/stairwell messages.

The third, and perhaps most important, component of effective communication is the mutual exchange of input and collaboration between wellness coordinators and employees at every step of planning, implementing, and evaluating wellness programs (*9*). Engaging employees in this participatory process will not only encourage buy-in, but will help ensure that programs will meet the specific needs of the relevant employee population (*62*). There is a range of participatory strategies available to involve employees, from administering questionnaires to gain insight into employee needs and desires to forming a "wellness committee" that includes employee and management representatives.

Indeed, wellness committees, also termed employee advisory boards, may be a helpful activity to exchange ideas between employees and management as both groups may enter into the WHP program with different goals in mind. For example, employees may be interested in addressing a specific health condition, changing specific health behaviors, or specific health programming activities. The company may have goals regarding achieving a high participation rate, reducing healthcare costs, reducing absenteeism/sick days, and enhancing their corporate image. Committee meetings may also be an opportunity to reinforce how the overall workplace health program will be matched to business objectives. In a study of 22 U.S. blue-collar workplaces, all were able to form an employee advisory board (*63*). Furthermore, the enthusiasm shown by the board affected subsequent participation by employee in the WHP program activities (*63*). Employee advisory boards can also provide guidance regarding which entities should have access to any data collected as well as which entities are sponsoring the program. Clear guidelines in these areas may help maintain participation and trust in the program.

Examples of different pathways to communicating program activities to employees are illustrated by the following two case reports.

3.2.1 Nestle (Switzerland)

This WHP program includes a focus on helping employees make nutritious choices for themselves and their families (*64*). The campaign offers numerous channels to communicate

nutrition information via e-learning courses, in-person courses at company training centers, and print publications. By using multiple channels, Nestle may be better positioned to achieve broader dissemination to employees and their families.

3.2.2. NASA (USA)

NASA's programming on worker health is organized and communicated by a multi-disciplinary committee with representation across NASA centers (*55*). This committee meets quarterly to develop health campaign topics, and uses standardized outreach strategies to communicate with and engage employees. An important component of this effort is the representation of both civil servants and contract workers, thereby assuring representation of a broad base of the worker population.

3.3 Incentives

Incentives provide a mechanism to increase participation in the WHP program as well as build and maintain motivation in the WHP program. There are several types of incentives available, which can be broadly defined as intrinsic (e.g. the participant received a monthly chart of his or her progress in increasing number of steps to 10,000 steps per day) or extrinsic (*65*). Examples of extrinsic incentives, those provided be an outside source, can be built into WHP programs in several ways, ranging from 1) reduced co-pays, lower premiums, and more attractive benefits given by insurance providers for employees performing healthy behaviors, 2) wellness opportunities including sponsored classes such as supermarket tours, health screenings, and walking clubs, and 3) financial incentives to participate in wellness activities (*66*). In a 2005 survey of 365 large U.S. companies, nearly half reported offering any incentive; the most commonly reported incentives were in the form of gift cards, prizes, or merchandise, followed by a rebate of program costs, cash payments, or reduced medical co-pays (*58*). In contrast to incentives offered by the company, it is also important to consider the appeal of the incentive from the standpoint of the participant. In the 2004 U.S. HealthStyles Survey of 2,337 U.S. respondents, participants reported convenient time, convenient location, and paid time off as the most frequently reported appealing incentives to participate in a WHP service (*67*). It may be helpful to survey employees about their preferences for incentives yearly (*65*). The following case report illustrates the use of a graduated incentive program.

3.3.1. Virgin Health Miles (USA)

Virgin HealthMiles Health Rewards Program provides an incentive program to increase individual's participation in healthy lifestyle behaviors, such as physical activity (*68*). For example, participants wear a pedometer to track their daily step count, then upload this information into a web-based program. Upon meeting higher levels of physical activity, participants are able to gain higher levels of incentives, which are in the form of gift cards to numerous different retailers. Employers can also offer kiosks so that participants can measure and track other health indicators such as blood pressure, body fat, and weight.

3.4 Evaluation

The need for 'checking and corrective' action is an essential component of the implementation of a WHP program and should be integrated into the process such that it is built into all program activities and services (*55*). An assessment of overall program effectiveness is needed, for example by examining a company's yearly health risk assessment to determine change in prevalence of risk factors. However, it is also important to include program activity specific evaluations. This monitoring and evaluation process might take on many different forms depending on the stated objectives of the wellness program. Measurements might include several types of outcomes such as 1) process: fidelity to the implementation plan, workers' opinion of the activity, and reach into the intended audience; 2) behavioral: nutritional intake, walking steps; 3) environmental: availability of healthy foods in cafeteria, quality of food served, stairway accessibility; 4) biometric/health: body fat %, hypertension prevalence; or 5) economic: medical expenditures, absenteeism. The overarching purpose of WHP program evaluation is to institutionalize a mechanism for correction action when needed to maintain an alignment between the workers interests and the business objectives of the program. To do this, the evaluation process should be as non-obtrusive as possible and carefully selected with relevant questions. Furthermore, results of the analysis should be effectively communicated back to management and workers.

3.5 Supportive environment

As described in section 1.3 of this report, both social and physical characteristics of the work environment can have an affect on the individual-level diet and physical activity choices. While some of these characteristics are not modifiable targets of the intervention, it is nevertheless helpful for the intervention planners to be aware of the effect of the social and physical environment will have on the individual diet and physical activity choices made by participants (*69*). Examples of the physical environment include adding healthier food options to the cafeteria, availability of nutrition and physical activity opportunities, and point-of-choice prompts for physical activity. Examples of the social environment include demonstrated support from management, the overall corporate culture of wellness, and the social norms around healthy eating and physical activity. The social environment has been conceptualized as the social context; a broad network of factors that influence decisions about health behaviors and through which population characteristics such as socioeconomic status may exert its effects (*69*). It includes individual level factors (e.g. daily stress level), interpersonal factors (e.g. number of social ties), up to societal level factors (e.g. policy). In two interventions (one workplace one in health centers), increasing levels of social norms and social support were two factors of the social context that had a significant influence on positive change in fruit and vegetable intake (*44*).

In a review of studies with environmental components, 13 multi-component intervention studies were identified that included multiple levels of environmental changes targeting dietary behaviors such as increasing healthier food availability at the workplace and calling attention to these new offerings through promotional materials (*8*). Of these 13 studies, all resulted in positive increases of at least some of the targeted dietary behaviors compared to the control group, with the most support for fruit, vegetable, and fat behaviors (*8*).

Although there are relatively fewer intervention examples targeting the environment for physical activity behaviors compared to nutrition behaviors (*8, 70*), several different approaches to create a supportive environment for physical activity can be drawn from the published literature. Environmental interventions targeting physical activity behaviors include on-site fitness facilities and organized exercise classes (*70*). In a WHP program among male security guards in Malaysia, the intervention designers worked with management to alter the physical environment by adding microwave ovens, water coolers, and a scale in employee areas (*71*). In a

quasi-experimental study design, the participants in this intervention had a significant decrease in cholesterol levels compared to participants in the control group (*71*).

Of 10 studies conducted in workplaces targeting physical activity-related environmental changes, the majority resulted in positive increases in physical activity behavior (*70*). However, another review of randomized controlled WHP trials targeting environmental changes indicated inconclusive support for physical activity changes, however, the authors noted environmental-level studies of less methodological quality have shown positive effects on physical activity (8).

3.6 Application of best practice management and behavioral theory

The best practices listed in this section are components derived from several different theories and frameworks used in social and behavioral science.

3.6.1 Goal setting

Goal setting may be is a useful concept for examining how to translate intentions to change behavior into specific actions. The use of goals in interventions has been applied from models such as Goal-Setting Theory (*72*) and from components of Social Cognitive Theory (*73*). Goal setting has been studied extensively under conditions of providing feedback on task performance (*72*); found to be an effective tool in organizational settings (*74*); and has been recommended for dietary interventions (*75*). Thus, goal setting can be a specific individual-level tool that can be incorporated into several WHP program activities. Locke and Latham report from the extensively studied field of goal setting that difficult goals lead individuals to achieve more, however, commitment to the goal, presence of other conflicting goals, and ability to perform the goal are all important aspects that can affect an individual's ability meet the goal (*76*). It is important to set specific, not abstract goals (*76*). One goal setting activity involves having the participant choose the specific goal they would like to work on, as opposed to an assigned goal based solely on an individual's health risk appraisal, thereby allowing the participant to work on a topic that is highly relevant to them (*77*).

3.6.2 Stage of change

Originally developed for individuals undergoing smoking cessation, the Transtheoretical Model has been applied to guide interventions addressing addictive and non-addictive behaviors such as weight control, high-fat diets, and exercise (*78*). There are five stages of change: *precontemplation*—a person has not yet thought about making a behavioral change or has

consciously decided not to change; *contemplation*—one has started to think about making changes in the next six months; *preparation*—an individual has started to take preparatory steps toward changing in the next thirty days; *action*—behavior change has occurred but carried out for less than six months; and *maintenance*—behavior change has been maintained for six months or longer (*79*). This model posits that transitioning through the stages of change is cyclical, not linear, and relapse can occur at any point. In addition, the stages of change are behavior specific, such that an individual may only be thinking about lowering his/her fat intake (contemplation), but has reduced alcohol intake to one drink a day for over six months (maintenance). The stage of change model suggests that individuals may make use of different processes or activities that can directly or indirectly assist them in progressing through the various stages (*79*). For example, an individual in the contemplation stage may reward herself for bringing her lunch to work and avoiding fast food restaurants all week by visiting a salon on the weekend with the money saved. Another process of change, social liberation, is described as the promotion of healthful public policy and social conditions and can be helpful for promoting health behavior change across all stages of change. Because different processes apply to different stages of change, WHP program planners can use these to guide activities targeted to people at various stages of change.

3.6.3 Self-efficacy

The construct of self-efficacy comes from Social Cognitive Theory, which describes behavior as a constant interaction between an individual's personal thoughts, their environment, and the behavior. Self-efficacy is one of the theory's most recognized constructs and is defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances." (*80*).

Twenty years ago, Bandura indicated that research supported the link between self-efficacy and health behaviors (*80*). More recently, self-efficacy has been cited as a commonly identified factor influencing a variety of behavioral changes (*73*) and adult fruit and vegetable consumption (*81*). Self-efficacy was also reported to be a consistently strong predictor of both forming intentions to be physically active and the behavior itself (*82*). Building self-efficacy is often a direct or indirect objective of WHP educational sessions and can be targeted through a number of methods, notably tailored messages, which is described further in section 3.6.5.

3.6.4 Social norms and social support

The social environment has been conceptualized as an influential set of factors for initiating and maintaining lifestyle behaviors, as described in the supportive environment section. Two important factors within the diverse web of social relationships for each individual are social norms and social support. Social norms are usual behaviors or overarching standards inherent in an individual's social network; norms can have a powerful influence on how an individual makes decisions (*83*). Social support is one important purpose served by one's social relationships and can take the form of direct assistance, information, advice, and expressions of concern (*84*). In a WHP program conducted with blue-collar women in the southern U.S., the intervention planners implemented a natural helpers program in which certain individuals were identified, by their fellow colleagues, to act as a resource for other female workers (*85*). These natural helpers received comprehensive bi-monthly training on health topics including weight management and physical activity. These women were then asked to share this information within their social relationships at the workplace; the natural helpers also encouraged the formation of walking groups and offering healthier food choices in vending machines. Although this program was only one part of several intervention components, the overall intervention reported beneficial changes in fruit and vegetable consumption and strength/flexibility exercises.

3.6.5 Tailored programs

One promising avenue for individually focused interventions is the growing area of tailored interventions. Moving away from the one-size-fits-all approach to interventions, "tailoring" is one strategy for increasing the intensity of interventions delivered to at-risk populations. Tailored interventions typically are delivered through print communication (*86-89*) or telephone counseling (*90*). Other increasingly common delivery channels are the Internet or CD-ROMS (*91-93*) and automated voice messaging (*94*). Individually tailored interventions are typically algorithm-based and utilize expert systems or computer-based programs to match a large library of messages to individuals' varying information needs and levels of motivation to change, combining specific statements and graphics into personalized interventions for specific individuals (*95*).

Individual message tailoring characteristics can include demographics such as gender and residence; psychosocial variables such as perceived barriers to change; and behaviors such as leisure time physical activity. Literature reviews comparing tailored messages to non-tailored or

no information generally indicate tailored messages are perceived to be more trustworthy, thoroughly read, remembered, and better able to modify dietary intake compared to non-tailored messages (*96-98*). Tailored messages have also been studied across several different behaviors such as cancer screening and physical activity promotion (*99-101*). Petty and Cacioppo described how information processing, or thoughtful consideration of message content, could stimulate attitude and behavioral change. Particularly relevant to tailored messages, decreasing distraction and increasing relevance are two factors that may affect information processing (*102*). Tailoring in general decreases the level of distraction of information not pertaining to the issue at hand by eliminating extraneous information. For example, in a message promoting physical activity, information motivating someone to start exercising would be distracting to an individual who is already exercising. Combined with the individualized nature of the message, individuals are better able to focus on the most important information. Second, Petty and Cacioppo indicate that the perceived personal relevance of the message may be one of the most important variables facilitating information processing (*102*). This finding has been reinforced by others, for weight loss materials (*103*) and intention to eat less fat and more vegetables (*91*).

Tailoring messages allows researchers and intervention developers to incorporate several best practice behavioral change elements, such as building self-efficacy, encouraging goal-setting, and targeting motivational stage of change levels. For example, in a WHP study in Belgium to promote low-fat diets, de Bourdeaudhuij and colleagues developed a tailored computer-based program that delivered information and advice that ranged from nondirective yet personal ways for those in earlier stages of change and more decisive and supporting ways for those in later stages of change (*92*). In another trial based in a large oil company in Amsterdam, the Netherlands, participants received tailored messages based on several factors, including self-efficacy to eat a low fat diet, such that those with low self-efficacy received information about sources of low-fat foods and specific suggestions on how to cope with different eating situations (*104*). A third study, Tools for Health, as a USA-based intervention conducted among a predominately male sample of unionized construction workers and tested in a randomized controlled trial (*89*). Participants received telephone counseling calls using motivational interviewing techniques (which uses a non-judgmental guide to stimulate to consider making a behavioral change), mailed education materials, and a tailored feedback report. Importantly, the intervention materials integrated key messages about the participants' work environment

including the high demand and low control nature of their work, feelings of support and solidarity they felt by belonging to the union, and potential occupational hazards not related to health behaviors. After six months, participants in the intervention group reported a significantly greater increase of 1.52 servings/day of fruits and vegetables compared to those in the control group. As a whole, these interventions highlight tailoring methodology as able to incorporate several behavior change factors such as self-efficacy and potentially effective in producing behavioral changes in different workplace settings and countries.

3.6.6 Multi-level programs

As described in section 1, the workplace can be a very useful site to implement a health promotion program because the program can be targeted across multiple levels of influence. We will use Healthy Directions-Small Business [HD-SB] Study as an overall example to describe a multi-level program (*105*). This USA-based intervention was designed to influence not only individual and inter-individual levels, but also organizational and environmental levels. We will highlight different intervention applications of goal-setting, stages of change, self-efficacy, incentives, social norms and social support, and tailoring.

HD-SB was an intervention designed for a multi-ethnic population in small manufacturing workplaces in the U.S. For a workplace to be eligible, it needed: a multicultural/multiethnic workforce with at least 25% of workers being first or second generation immigrants or people of color; between 50 to 150 employees; a turnover rate of <20% in the past year; and autonomous decision making power in regards to study participation. The program was based on the social contextual model (*69*), which provided a framework under which social contextual factors, such as social norms, culture, and the physical environment, could be incorporated in the design of intervention activities. Activities were aimed at the individual level and environmental/organizational level and were delivered to each workplace monthly. The health behaviors targeted as primary outcomes were fruit and vegetable intake, physical activity, and multivitamin use; smoking cessation was addressed in both control and intervention conditions. Although participants in the intervention workplaces reported increases in each behavior compared to those in the control workplaces, the difference was only statistically significant for multivitamin use. Importantly, these results were modified depending on other factors. The intervention was more effective for workers as compared to managers in promoting the recommended guidelines for both fruit and vegetable intake and physical activity. These

results point to successful recruitment and intervention strategies with blue-collar workers, who as noted previously, generally have less access to WHP programs.

At the individual level, educational materials introduced at group health education sessions sought to build participants' self-efficacy, by exposing them to information and providing strategies on how to begin changing their current habits (*106*). For instance, participants went on supermarket tours and discussed how to substitute healthier eating practices for their current eating patterns. The concept of substituting healthier food for less healthy foods was also a form of stimulus control, one process of change helpful in transitioning participants across the stages of change. Participants were also provided with guidelines on how to set progressive goals to increase their physical activity level. At events such as health fairs, employees were able to participate in several individualized assessments, such as determining their body fat composition or evaluating their eating patterns. Participants were then provided with individualized feedback based on their personal responses. By providing many opportunities for employees to discuss these topics in a group format, holding workplace-wide events, and providing specific activities to involve the employees' family, the intervention aimed to also have an impact on building social ties between workers. This may have also led to positively changing social norms in the workplace around healthy lifestyle behaviors.

3.7 Pulling best practices together into a comprehensive approach

Increasingly, WHP programs are placing growing attention on comprehensive programming. To review the definition for comprehensive WHP programs from the USA-based Healthy People 2010 initiative, a comprehensive WHP programs should include five elements: 1) health education; 2) supportive social and physical environments; 3) integration of the workplace program into the workplace's organizational structure; 4) linkage to related programs; and 5) workplace screening programs (*27*). The definition for "comprehensive" programs has not been consistent across reviews; for example, Pelletier defined comprehensive programs as "those programs that provide an ongoing, integrated program of health promotion and disease prevention that integrates the particular components (i.e., smoking cessation, stress management, lipid reduction, etc) into a coherent, ongoing program that is consistent with corporate objectives and includes program evaluation."(*107*).

There are numerous opportunities to build integrated, comprehensive health programs across units within work organizations, including through the use of health promotion activities, health risk appraisal assessments, disease case management efforts, and occupational health and safety programs (*55*). It is important to build the program with an employee centric focus, as opposed to strictly focused on the main concerns of the company (*55*). Additionally, linking WHP programs to outreach efforts to workers' families may help to support health behavior changes (*108*).

One important point of integration, particularly for blue collar and service workers, is the integration of WHP with occupational safety and health (OSH) programs. Integration of these efforts to promote and protect worker health is important for several reasons. First, workers' risk of disease is increased by exposures to both occupational hazards and risk-related behaviors (*109, 110*). The effects of these life risks and job risks are not independent of one another (*111*). Take, as an example, participation in physical activity. Working in a stressful work organization, characterized by a low level of control and a high level of demands, influences participation in leisure time physical activity. In one study, this relationship interacted with race, such that White workers who reported high job strain reported less physical activity, while Black workers with job strain reported more physical activity (*112*).

Second, the workers at highest risk for exposure to hazardous working conditions are also those most likely to engage in risk-related health behaviors. Exposure to both job risks and risk-related behaviors are concentrated among those employed in working class occupations (*113-115*). Workers in these occupations are more likely to be injured or become ill due to workplace hazards than are professional employees (*109*). Life risks also are concentrated in working class occupations and workers with lower levels of education. Overweight status is inversely associated with education level (*116-119*) and occupation (*116, 117*). There is also evidence as well that exposure to job hazards and health behaviors are correlated. For example, increased exposure to hazards on the job has been linked by others with unhealthy dietary habits among blue-collar workers (*120, 121*) and with binge drinking (*122*).

Third, integrating workplace health promotion and occupational health and safety may increase program participation and effectiveness for high-risk workers. Workers at highest risk for job exposures may be more likely to participate in integrated OSH/WHP than in workplace health promotion programs alone. There is evidence from the risk communication field that

people place highest priority on those risks that are involuntary, outside personal control, undetectable, and that seem unfair (*123-125*), features that often characterize occupational hazards. Accordingly, workers may perceive management actions to reduce workers' exposures to occupational hazards as of greater importance than personal health behavior changes, and may feel that the benefits of individual health behavior changes are insignificant in the face of exposures to workplace hazards (*69*). Skepticism about management's commitment to improve worker health may reduce workers' interest in participating in health promotion programs at work (*37, 126, 127*). Conversely, employer efforts to create a safe and healthy work environment may foster a climate of trust and thereby enhance workers' receptivity to messages from their employer regarding health behavior change. In a study of blue-collar workers, we found that workers who reported that their employers had made changes to reduce hazardous exposures on the job were significantly more likely to have participated in smoking cessation and nutrition programs than workers not reporting management changes (*36*). Reduction of job risks may be required to both gain credibility and increase this audience's receptivity to health education messages about individual health behaviors (*128, 129*). In addition, programs integrating messages about job risks and risk-related behaviors may increase workers' motivations to make health-behavior changes (*130*).

Finally, integrated OSH/WHP efforts may benefit the broader work organization and environment. A growing literature demonstrates the benefits of workplace health promotion programs in terms of both direct costs (e.g., reduction in health care costs) (*131-133*) and indirect costs (e.g., reductions in costs resulting from lost production as a result of reductions in productivity or increases in work absence) (*132, 134-140*). In addition, research is also indicating the cost effectiveness of OSH interventions to prevent occupational diseases (*141, 142*). Within this growing literature, comprehensive programs integrating employee wellness, disability management, employee assistance, and occupational medicine have been shown to result in long term savings in medical care utilization and expenditures (*131*) and reductions in sickness absence (*143*).

There is increasing evidence supporting the efficacy of integrated OSH/WHP programs in effecting change in health behaviors, particularly for blue-collar workers most likely to be exposed to hazards on the job. One randomized controlled trial found that an integrated OSH/WHP program resulted in significant improvements in smoking cessation rates among blue collar workers, compared to a WHP program only (12). Other trials have demonstrated the

effectiveness of these programs for changes in dietary patterns and physical activity for blue collar workers (*105*), for improvements in program participation rates (*144*), and for reductions in job strain and sickness absence (*143*).

4. Conclusion

In conclusion, the growing evidence for the contributions of WHP programs to worker health outcomes provides a stimulus for further dissemination of these programs across a range of work settings. Programs to promote a healthy diet and increase physical activity can be readily integrated into broad-based workplace programs in support of worker health. In addition, some experts have posited that the overall success of the organization is enhanced through coordination of, rather than, competition for resources (*5*, *14*, *145*, *146*). For example, the World Health Organization's Regional Guidelines for the Development of Healthy Workplaces defines a healthy workplace as one that aims to create a healthy and safe work environment, ensure that workplace health promotion and occupational health and safety are an integral part of management practices, foster work styles and lifestyles conducive to health, ensure total organizational participation, and extend the positive impacts to the surrounding community and environment (*145*). This document further underscores the benefits of such coordinated efforts, including their contributions to a positive and caring image for the company, improvements in staff morale, reduced turnover and absenteeism, and improved productivity (*145*). It is imperative that future research document ways in which comprehensive WHP programs may further the mission of the organization through support for a healthy and productive workers within a healthy work organization.

Table 1. Health risk reduction through various WHP by significant findings[a,b]

		Physical Activity			Nutrition/ Cholesterol	Weight control	Physical activity and/or nutrition		Alcohol	Cancer risk factors	Multi-component programs				
	Significant Findings	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Anthropometrics	Weight loss						■				■		■		
	BMI reduction	■			■	■				■					
	% body fat reduction	■					■			■					
	Blood pressure reduction	■					■				■	■			■
	Cholesterol reduction	■			■		■				■	■	■		■
	Improved glycemic control													■	■
Health promotion behaviors	Physical activity increase	■	■	■			■	■		■	■	■	■		■
	Reduced smoking incidence	■								■	■		■		
	Improved endurance/ fitness		■								■				
	Nutrition choices				■		■	■		■	■				■
	Reduced alcohol								■		■				
	Increased seatbelt use										■		■		
Life satisfaction/ attitudinal	Increased life satisfaction/ well-being	■													
	Increased job satisfaction/ well-being	■		■								■			
	Reduced stress/anxiety/ somatic complaints													■	■
	Nutrition attitude				■					■	■				
	Alcohol attitude								■						
Morbidity/ Mortality	Reduced mortality										■				
	Fewer visits to doctors/ hospitalizations											■		■	■
	Decrease in overall disease risk												■	■	
Organizational outcomes	Fewer accidents										■				
	Reduced absenteeism/ sick days	■		■					■		■	■	■	■	■
	Increased productivity			■					■				■		
	Sickness costs											■			
	Positive return on investment											■	■	■	■

[a] Studies included in each review may overlap.

[b] **Literature review author (reference), number of studies, years**

a. Shephard 1996 (10), 52, 1972-1994
b. Dishman et al 1998 (*148*), 26, 1979-1995
c. Proper et al 2002 (*150*), 8, 1981-1999
d. Glanz et al 1996 (*45*), Nutr=10, Chol=16, 1980-1995
e. Hennrikus et al 1996 (*153*), 43, 1968-1994
f. Matson-Koffman et al 2005 (*70*), 18, 1991-2001
g. Engbers et al 2005 (8), 13, 1987-2002
h. Roman et al 1996 (*147*), 24, 1970-1995
i. Janer et al 2002 (*149*), 45, 1984-2000
j. Heaney et al 1997 (*151*), 47, 1978-1996
k. Pelletier 1996 (*152*), 26, 1992-1995
l. Pelletier 1999 (*154*), 11, 1994-1998
m. Pelletier 2001 (*107*), 12, 1998-2000
n. Pelletier 2005 (*155*), 8, 2000-2004

Table 2. Characteristics of best practice programs with examples of diet and physical activity intervention activities[a,b]

Best practice characteristics	Intervention activities
1. Program plans are linked to organizational business objectives.	Link program objectives to mission statement
2. Top management supports the program.	Form employee advisory board
3. Effective communication programs are implemented.	Distribute program messages broadly, for example employee website, posters, and mailings
4. Effective incentive programs are used.	Types of incentives include: cash payments, reduced medical co-pay, program cost rebates, and non-monetary gifts
5. Evaluation is an integral part of the program and is:	Health risk appraisal; e.g. to monitor risk factors
5.1 Systematic;	Program specific evaluations; e.g. to monitor satisfaction, participation, and outcomes
5.2 Shared with top management;	
5.3 Shared with employees;	
5.4 Valued by top management.	
6. The creation of a supportive environment is strongly pursued.	Healthy food choices in the cafeteria Presence of exercise equipment in office space
7. The program design is based on best practice management and behavioral theory (*56*)	
7.1 Goal setting;	Work with counselor to set goals; monitor periodically
7.2 Stages of readiness to change, the central construct of the Transtheoretical Model of Behavior Change; Define theories (*79*);	Aim intervention activities according to participants' readiness to make changes
7.3 Self-efficacy as a recognized predictor for successful behavior change among employees;	Aim to build confidence, can b e integrated into tailored messages
7.4 Incentives to optimize program participation;	Gift cards, merchandise, and cash frequently used; try to determine what is most valued
7.5 Social norms and social support features;	Utilize social relationships to raise awareness of social norms
7.6 Programs tailored to the needs of individuals;	Individualized print, phone, or Internet messages
7.7 Multi-level program design that addresses awareness, behavior change, and supportive environments.	Program targets individual, inter-personal, and organizational levels of influence

8. Integrated strategies: building programs across work organizations.	Health behaviors and occupational health and safety, behavioral health programs, disease case management, and health risk appraisals

[a] The Committee included descriptive analyses of surveys conducted in the study and a subjective review of interview data, along with information from its own expertise to derive the following characteristics that may be considered as “best practice”.

[b] The Best practices listed in this table are adapted, with permission, from Integrating employee health: A model program for NASA (*55*).

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