

# Chapter 15

## Workplace Approaches to Obesity Prevention

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### Introduction

Worksites are extremely important settings for obesity prevention initiatives. Given the large proportion of each day that most adults spend in work settings, and the potentially significant influences of workplace policies and culture on personal weight-related health behaviors, workplaces can play a vital role in promoting more active lifestyles and healthier eating practices that will assist in controlling the obesity epidemic (Peterson & Wilson, 2002). In fact, diffusion of healthy eating and active living practices in socioeconomically and ethnically diverse populations is more likely to occur at work than in any other setting (Sorensen, Barbeau, Stoddard, Hunt, Kaphingst, & Wallace, 2005). In addition, in that many employed individuals are parents, there are many potential synergistic interactions between worksite policies and programs and obesity prevention initiatives in home settings. For example, flexible work hours and telecommuting may decrease automobile commuting time, permitting additional discretionary time for active family leisure activities and food acquisition and preparation for family meals. Perhaps most compelling from an economic perspective, the obesity epidemic has a substantive impact on employers in terms of rising health care costs and productivity losses. Certain industries have additional impetus to invest in the development of effective obesity prevention models, as rising obesity levels in the general public beyond their employee population affect their profitability, e.g., airlines and managed care organizations.

Employers show increasing evidence of receptivity to and utilization of structural approaches to obesity prevention that is, approaches that alter the worksite environment rather than the more traditional approaches that focus solely on individuals (Zernike, 2003). For example, in a recent survey, 75% of business leaders said they would support making healthy foods available at worksite cafeterias, in vending machines and at company meetings (Backman, Carman, & Aldana, 2004). However, studies to formally evaluate such strategies that endeavor to change the organizational fabric of the workplace, particularly those incorporating physical activity into organizational routine, are still relatively few in number.

The purpose of this chapter is to synthesize current thinking on workplace obesity prevention and control interventions, including promising strategies

from organizational and policy reports appearing outside of refereed scientific publications. We will highlight the strengths and weaknesses of current approaches and their evaluation, as well as gaps in our knowledge base. We will then identify future directions in policy and programmatic interventions, with an emphasis on those aimed at preventing weight gain rather than those focusing on weight loss (Hill, Thompson, & Wyatt, 2005).

## **Rationale**

### **Workforce Characteristics**

Obesity prevalence rates and corresponding trends vary substantially across occupational groups, though they are rising in all occupational groups—the average annual change increased from +0.6% between 1986 and 1996 to +1.0% between 1997 and 2002 (Caban, Lee, Fleming, Gomez-Marin, LeBlanc, & Pitman, 2005). The highest rates in men have been found among public administrators and officials, motor vehicle operators, and police and fire fighters, while among women, rates were highest in motor vehicle operators, and health service and other protective service personnel (Caban et al., 2005). Consistent with national population averages, obesity rates are higher for female workers than for males within most occupations, and black women workers have the highest obesity prevalence of any ethnicity-gender group (Caban et al., 2005).

The armed services present a special case—the obesity epidemic has reduced the pool of available recruits, and a high percentage of the individuals exceeding military weight-for-height standards at the time of entry into the service leave the military before completing their term of enlistment (Institute of Medicine (U.S.), 2004). People of ethnic minority and lower socioeconomic status are overrepresented in the military, and its structure provides an excellent opportunity for environmental and policy-related interventions.

### **Economic Consequences**

The societal costs of obesity are covered in Chapter 4. The economic consequences of obesity and sedentary lifestyle for employers, business and government are staggering, both in health care costs incurred and in lost productivity, and are estimated to rival those of tobacco (Colditz & Mariani, 2000; Finkelstein E.A., Fiebelkorn, & Wang, 2003; Sturm, 2002; Thompson, Edelsberg, Kinsey, & Oster, 1998). Medical expenditures for obese adults are 36% higher than for normal weight adults (Sturm, 2002). A recent analysis has evaluated the high cost of obesity in the workplace, including an assessment of both increased medical expenditures and the value associated with increased absenteeism (Finkelstein E. A., Fiebelkorn, & Wang, 2004; Wang, McDonald, Champagne, & Edington, 2004). Wang et al. (Wang et al., 2004) demonstrated a \$250 savings in health care costs for physically active vs. sedentary employees overall, and \$450 in savings among active vs. sedentary obese workers. Expenditures related to overweight, obesity and low levels of physical activity based on NHIS prevalence data were estimated to be 27% of the total costs of health care for the United States (Anderson, Martinson, Crain, Pronk, Whitebird, O'Connor, & Fine, 2005). Disability rates

among U.S. residents 30–50 years of age have also increased dramatically during the past two decades, largely linked to increased obesity rates (Lakdawalla, Bhattacharya, & Goldman, 2004). Short-term disability claims attributed to obesity have increased by a factor of 10 during the past decade, costing employers more than \$8700 per employee per annum (UnumProvident Corporation, 2006). In fact, Medicare data suggest that obese 70 year olds will spend 40% more time disabled than their normal weight counterparts (Lakdawalla, Goldman, & Shang, 2005).

### **Limitations of Individually-focused Approaches**

Worksite interventions have rarely reached their full potential for employee health improvement. Most have disproportionately engaged younger, more highly educated, non-Hispanic whites in large private corporate settings (Dishman, Oldenburg, O’Neal, & Shephard, 1998; Emmons K. M., Linnan, Abrams, & Lovell, 1996; Goetzel, Ozminkowski, Bruno, Rutter, Isaac, & Wang, 2002; Ozminkowski, Ling, Goetzel, Bruno, Rutter, Isaac, & Wang, 2002). In reviews of the more rigorously constructed studies (involving acceptable levels of study retention, recruitment across job categories/statuses, long-term follow-up), observed effect sizes have been small at best (Dishman et al., 1998; Shephard, 1992) probably because the voluntary nature of these interventions engages primarily the more motivated and fit, usually only 5–15% of the workforce (Glanz & Kristal, 2002). The focus of these interventions has mostly been on individual-level change. Even when the social environment is targeted, e.g., cultivating social support for physical activity by establishing walking groups or conducting exercise classes, it is usually during non-paid employee discretionary time.

As scientific understanding of behavior change has evolved, particularly in culturally diverse organizational settings, there has been a growing preference for environmental modification (“push”) strategies that engage most or all staff, including those at early stages in the behavior change continuum, rather than relying exclusively on strategies primarily engaging motivated or high risk volunteers “ready to change” or already lean/fit (“pull”). Workplace obesity prevention and control intervention studies targeting environmental and policy change represent a relatively new and burgeoning area of inquiry. In a recent review, Matson-Koffman and colleagues (Matson-Koffman, Brownstein, Neiner, & Greaney, 2005) found 10 such studies published before 1990, but 23 published since. Only 12 of the 33 included a focus on physical activity. Two older studies targeting organizational practice/policy change and resulting environmental influences demonstrated more favorable outcomes than most worksite interventions (Blair, Piserchia, Wilbur, & Crowder, 1986; Linenger, Chesson, & Nice, 1991).

### **Definitions and Conceptual Framework**

As companies are increasingly interested in the application of worksite health promotion programs for their employees, it is also becoming increasingly important to describe issues and factors that are central to an effective program design and implementation approach. First of all, when considering implementation of worksite-based programs designed to address obesity, it is

important to recognize that not all worksites are alike. Large, self-insured corporations may have strong incentives to address the obesity issue, as those companies bear the financial risk related to the excess cost and health burden of unhealthy weight. For example, the Institute on the Cost and Health Effects of Obesity was established by the National Business Group on Health with the explicit goal of addressing obesity at the worksite. This coalition of 175 large employers provides health care benefits to approximately 40 million people. Yet, most people in the United States are employed by much smaller companies. The vast majority of these smaller companies are not self-insured (hence do not assume the financial risk for the health care insurance of their covered workers) and therefore the incentives for the small employer group to address obesity at the worksite will be different—likely much more related to an attempt to boost productivity (Hemp, 2004; Pronk N. P., Martinson, Kessler, Beck, Simon, & Wang, 2004; Riedel, Lynch, Baase, Hymel, & Peterson, 2001). Besides company size, other differences between worksites include such factors as single- or multiple-locations, on-site or remote-programming options, a workforce that is mobile (sales travel, service workers in rural areas, metro transit workers, etc.) as opposed to relatively stationary (administrators, teachers, etc.), union or non-union representation among employees, and the diversity and mix of the employee population in terms of gender, race and ethnicity, education, income and other sociodemographic characteristics. All of these factors are elements of a thorough description of the company profile and are important to understand and take into account when considering the implementation of programs.

Other factors to consider are related to the internal company processes for program implementation. These factors address such issues as the recognition of the company culture in addressing obesity, the inclusion of employees in designing and implementing the program (for example through the creation of employee advisory committees), the level at which programs are implemented (for example, company-wide policies that affect all employees, stage of readiness-to-change specific program options for those who want to participate, on-site fitness center access for those who work at company headquarters versus fitness club fee waivers for those who do not work at the headquarter location, programs entirely paid for by the company versus options that are partially subsidized or entirely paid for by the employee, etc.), and issues dealing with the protection of employee privacy. The employee privacy issue is particularly important and guidelines outlined by the Health Insurance Portability and Accountability Act (HIPAA) should be followed. Safeguards must be put in place to protect individual employee data, and the employees themselves need to be fully informed about the use of their information as they become active participants in these programs.

Adapting the logic frameworks used by the Task Force on Community Preventive Services to assess research evidence on a range of public health interventions in communities, workplaces and schools (“Recommendations to increase physical activity in communities”, 2002) we can categorize obesity interventions according to the determinants of health addressed—informational, behavioral/social and environmental (see Table 15.1). These categories correspond closely to the levels of impact—awareness, behavior change and supportive environments—described by O’Donnell, 1986 (O’Donnell, 1986). Combining this with the two topical areas of obesity interventions, physical

**Table 15.1** Examples of workplace obesity intervention approaches categorized by topical focus and determinants addressed.

<b>Determinants addressed</b>	<b>Topical focus</b>			
	Physical activity only	Nutrition only	Combined (i.e. nutrition + physical activity)	Indirect (i.e. other than nutrition and physical activity)
<b>Information</b>	*Didactic instruction on the benefits of physical activity	*Didactic instruction on good nutritional practices	*Health Risk (see left)	Appraisal (HRA)
<b>Behavior management skills and social support</b>	*Walking groups *Weight management & monitoring support groups	*Meal planning classes *Weight management & monitoring support groups	(see left)	*Counseling following HRA
<b>Physical and organizational environmental</b>	*Physical activity breaks on paid time *Restricted elevator access	*Healthier foods in vending machines *Healthier refreshments at work functions	(see left)	*Workplace health committees

activity and nutrition, we have a useful way of differentiating various types of workplace interventions used to address obesity.

A number of behavior change theories are embedded in the worksite wellness literature. Social marketing principles, communications theory, stages of change models and many others have been applied to this setting. We have chosen to highlight two, social cognitive and diffusion of innovations theories, as most relevant to environmental and policy intervention in diverse worker populations.

### **Social Cognitive Theory (SCT)**

As noted in Chapter 17, SCT posits, among other assertions, that learning occurs through observation and imitation of role models, individuals perceived as worthy of emulation (Bandura, 1986). A key premise of the theory is that certain sociodemographic similarities exist between individuals and their role model choices, e.g., ethnic, SES and gender congruence. Another central construct is self-efficacy or self-perceived ability to accomplish certain desired outcomes. Observation of sociodemographically similar others carrying out a desired behavior has been shown to increase the self-efficacy of the observer. Application of these concepts to interventions with adult populations using such tools as culturally targeted videos has been effective in other areas of health promotion (Yancey, Tanjasiri, Klein, & Tunder, 1995; Yancey & Walden, 1994). Worksites are ideal settings because they permit a ready means of delivering targeted messages and a “micro-environment” or community, both physically and socioculturally, that may be more malleable by one or a few leaders and permit more rapid change than does the broader societal milieu. Experiential learning (“enactive mastery” in SCT) such as recognizing and tasting healthier foods, sampling moderate intensity aerobic dance with a

group of co-workers, and participating in a walking meeting, as well as the aforementioned social/cultural norm change via leadership and role modeling (“vicarious experience” in SCT) by sociodemographically similar and/or high status individuals within the hierarchy are also critical elements of effective weight-related lifestyle intervention supported by SCT.

### **Diffusion of Innovations; Organizational Institutionalization**

Most worksite wellness interventions have been individually-targeted, using organizations mainly as staging venues for intervention delivery, rather than directed at organizational systems themselves. Consequently, critical process features of these strategies and innovations have not been evaluated from an organizational dynamics perspective, e.g., institutionalization and diffusion processes (Glasgow, Vogt, & Boles, 1999; Rogers, 2003; Steckler & Goodman, 1989; Steckler, Goodman, McLeroy, Davis, & Koch, 1992). As outlined in Chapter 12, the diffusion of health behavior change innovations has been described as having five phases (Oldenburg, Sallis, French, & Owen, 1999). The first phase is *innovation development* in which the program is developed and evaluated. The second phase is *dissemination* in which it is communicated widely so the effective program is available for adoption. The third phase is *adoption*, which can be defined as purchasing materials or participating in training. The fourth phase is *implementation* in which users put the program into practice, and fidelity to the procedures used in the original research phase needs to be considered. The final phase is *maintenance*, or the sustained use of the innovation by adopters. In this phase, both the quantity (e.g., proportion of people in a given sector using the program regularly) and quality of implementation (e.g., adherence to the program) need to be considered.

A key implication of diffusion of innovations theory is that mediated information sources (media-driven vs. interpersonal communications) are most important in the early stages of organizational adoption, e.g., awareness and interest building (Glanz & Kristal, 2002; Rogers, 2003). For example, an Australian study utilized telemarketing to facilitate adoption of health promotion initiatives via provision of tool kits, pamphlets and other mediated informational resources and services (Daly, Licata, Gillham, & Wiggers, 2005). Investigators found significant increases in uptake after four years for seven of the eight initiatives selected (only one—alcohol control, however, was even tangentially related to obesity control). Interpersonal communication rises in importance during the active evaluation and trial phases. Thus, consistent with SCT, early implementation activities should create an environment conducive to change and promulgate strategies through successful examples.

Organizational change theory is central to the optimal design of these interventions. Critical features of an innovation can accelerate or hinder the diffusion process (Rogers, 2003) as reflected in the formative evaluation data presented in Box 15.1. From a diffusion process perspective, organizational wellness change strategies with “face validity” have relative advantage (potential health and productivity benefits) compared to current practice. They can generally be implemented on a limited basis (trialability). Furthermore, as more research is conducted, results become known and visible to increasing numbers of work units or organizations (observability)

**Box 15.1.** Nutrition program dissemination in worksite cafeterias in the Netherlands

A study was undertaken to identify factors facilitating or deterring planned dissemination of a multi-level nutrition intervention (education, labeling, and food supply modification) to increase fruit and vegetable consumption and reduce fat intake in point-of-choice settings, including worksite cafeterias. Twelve key informant interviews were conducted with representatives from companies selected to include those with majority white collar and majority blue collar workforces. Catering or food service managers were queried to assess characteristics of their organizations and these decision makers' attitudes toward nutrition education in general and toward specific program attributes. Unobtrusiveness, minimal time and effort demands on cafeteria personnel and staff consumers, competitive pricing of healthy foods and avoidance of introducing delays in food purchasing at the counter were among the most frequently cited program requirements. Relative advantages mentioned included positive influence on corporate image, increased customer satisfaction and improvements in employee well-being. Potential difficulties included program cost, decreased sales of profitable unhealthy products, the limited shelf life of low-fat products, waste (left-over stock if demand does not match supply), and concerns about restriction of choice and unwanted peer pressure to eat more healthfully (Steenhuis, Van Assema, & Glanz, 2001).

(Yancey, Miles, & Jordan, 1999). Overall, these strategies have the potential to encompass features that favorably influence the speed and extent of the diffusion process.

Social norm change in workplaces may build a foundation for similar changes in the other settings in which these workers study, worship, live, create, advocate and play. Modification of the culture, physical environment and staff behavior within health and social services organizations may also, secondarily, influence client behavior, through changes in priorities in their providers' decision-making, and through physical (e.g., vending machine selections) and social (conformity with social norms, e.g., if others are taking the stairs) environmental changes making healthy choices more available, affordable, accessible and unavoidable. In turn, because these staff members belong to other organizations with similar sociodemographic compositions, these changes may ripple throughout the community. This "spill-over" is even more likely in this area of health promotion, nutrition and physical activity, in which all individuals participate and in which nearly all are touched, either personally or socially, by the highly prevalent obesity epidemic. Many workers, especially those in the human services sector, are not only decision-makers, gatekeepers, role models and change agents for their clients and patients, but also within their own families and social circles. Their organizational missions may produce even greater personal investment in and commitment to creating lasting change. Local government workplaces in urban areas are especially ripe for intervention

because they have large (often the largest employers in a community), stable and ethnically diverse workforces, and internal opportunities, infrastructure and resources for changing organizational practices and institutionalizing those changes.

### **Methodological Issues**

Recent studies have increasingly begun to intervene at the organizational level and in more ethnically, socio-economically diverse worksites (Golaszewski & Fisher, 2002; Hunt, Stoddard, Barbeau, Goldman, Wallace, Gutheil, & Sorensen, 2003; Sorensen, Hunt, & Morris, 1990). Methodological quality continues to be an issue, as few studies employ rigorous, randomized controlled designs or recruit truly representative samples of employees. Effect sizes in the most rigorous are generally quite small (Glanz & Kristal, 2002; Marcus, Williams, Dubbert, Sallis, King, Yancey, Franklin, Buchner, Daniels, & Claytor, 2006). As in earlier efforts, nutritional intervention is more common and more fully integrated into workplace routine than is physical activity. This is of particular concern to effective obesity intervention, since physical activity-related programmatic and policy changes generally engender less opposition and resistance than food restriction and regulation (Maibach, 2003). In addition, while the role of nutrition in weight control is well-established, the essential role of physical activity in the prevention of weight gain is increasingly evident but operationally underdeveloped (Donnelly, 2005; Hill & Wyatt, 2005; Jeffery & Utter, 2003; Kimm, Glynn, Obarzanek, Kriska, Daniels, Barton, & Liu, 2005; Mummery, Schofield, Steele, Eakin, & Brown, 2005; Sternfeld, Wang, Quesenberry, Abrams, Everson-Rose, Greendale, Matthews, Torrens, & Sowers, 2004) and is given particular emphasis in this chapter. In fact, the increasing prevalence of overweight may reflect the fact that the majority of the population fails to achieve some threshold level of regular physical activity below which it is difficult for most people to achieve energy balance at a desirable body weight (Hill et al., 2005). Clearly, modest, incremental improvements in both physical activity and eating patterns, sustained over time, will be necessary to stem this epidemic.

Many employers, particularly in the private commercial and public sectors, have begun to implement policies providing economic incentives to employees for healthy weight-related lifestyle adoption/maintenance. Such policies include insurance premium discounts, free/discounted on-site preventive health care services such as nutrition counseling, subsidies for fitness activities and club memberships, disease management benefits, and wellness program reimbursements. However, evaluation studies are rarely conducted, and negligibly few of these reports reach the peer-reviewed literature. Essentially, studies of primary obesity prevention through worksite-based environmental change are lacking (Katz, O'Connell, Yeh, Nawaz, Njike, Anderson, Cory, & Dietz, 2005). At any rate, economic incentives alone, as earlier underscored, are unlikely to result in sustainable behavior change (Yancey, Lewis, Guinyard, Sloane, Nascimento, Galloway-Gilliam, Diamant, & McCarthy, 2006). Thus, insights will be gleaned from the existing literature examining various weight-related lifestyle outcomes.

## Insights from Environmental and Policy Initiatives and Research

### Overall Evidence Base for System-level Obesity Prevention and Control in the Workplace

#### *Physical Activity*

The notion that synergy will occur when “supply” (physical environmental access and facilitation) meets “demand” (individual motivation and skills/interests; sociocultural environmental instigation and support) is implicit in multi-level change models. The importance of sociocultural environmental “demand creation” in physical activity promotion, however, has been even less appreciated than that of physical environmental change (Emmons K.M., 2000; Giles-Corti & Donovan, 2002; McKeever, Faddis, Koroloff, & Henn, 2004; Peltomaki, Johansson, Ahrens, Sala, Wesseling, Brenes, Font, Husman, Janer, Kallas-Tarpila, Kogevinas, Loponen, Sole, Tempel, Vasama-Neuvonen, & Partanen, 2003; Stahl, Rutten, Nutbeam, Bauman, Kannas, Abel, Luschen, Rodriguez, Vinck, & van der Zee, 2001) and the workplace is a primary venue for promulgation of sociocultural norm changes supporting adoption and maintenance of active lifestyles (Linnan, LaMontagne, Stoddard, Emmons, & Sorensen, 2005; Sorensen, Linnan, & Hunt, 2004). The work of Fox and colleagues (Fox, Rejeski, & Gauvin, 2000) suggests the importance of supportive group dynamics on PA enjoyment and probability of future participation. Several investigators have shown that visible commitment of organizational leaders on-site, e.g., as manifested in role modeling by participation in group physical activities, is associated with increasing and institutionalizing PA among employees in government agencies and community-based organizations (Crawford, Gosliner, Strode, Samuels, Burnett, Craypo, & Yancey, 2004; Englberger, 1999; Hammond, Leonard, & Fridinger, 2000; Yancey, Jordan, Bradford, Voas, Eller, Buzzard, Welch, & McCarthy, 2003; Yancey, Lewis, Sloane, Guinyard, Diamant, Nascimento, & McCarthy, 2004a; Yancey et al., 1999).

The more favorable physical activity outcomes have occurred in studies targeting organizational practices and policies, and sociocultural and physical environmental characteristics. Comprehensive approaches melding individual-level approaches (counseling, group health education) with physical environmental access (on-site fitness facilities, shower and changing rooms, accessible stairways) have been shown to be more effective in increasing levels of self-reported exercise than single-component interventions (Matson-Koffman et al., 2005). Features associated with effectiveness and/or sustainability in individual-level intervention may be incorporated, i.e. including resistance training and lifestyle PA in addition to aerobic exercise, encouraging peer group leadership, employing incentives, and utilizing exercise prescriptions (Dishman et al., 1998). Health education and health risk appraisal interventions were associated with smaller effect sizes (Dishman et al., 1998). In particular, inexpensive prompts encouraging stair use, combined with physical improvements to stairwells, have been demonstrated to increase physical activity levels (self-reported and observed) at worksites at least in the short term; little long-term follow-up

data, however, are available (Coleman & Gonzalez, 2001; Hammond et al., 2000; Titze, Martin, Seiler, & Marti, 2001).

Emerging models include, for example, demonstration of increased efficacy and sustainability of a peer-led vs. professionally-led PA intervention with factory blue collar workers delivered during regularly-scheduled safety meetings (Elbel, Aldana, Bloswick, & Lyon, 2003), of extended work capacity of convalescent home aides by providing 20-minute exercise sessions three times weekly during paid time (Pohjonen & Ranta, 2001) (in which injury prevention complements health promotion) (Sorensen et al., 2005), and of increased physical activity levels overall with installation of slowed hydraulic or skip-stop elevators and distant parking lots in worksites (expanding the concept of the built environment to include indoor milieus) (Naik, 2005; Nicoll, 2007; Zernike, 2003).

Elbel and colleagues (Elbel et al., 2003) recommended incorporating a performance or skills practice component in the design of workplace lifestyle PA promotion interventions to increase their effectiveness, a component which employer liability concerns had precluded their implementing. Yancey et al. (Yancey, McCarthy, Taylor, Merlo, Gewa, Weber, & Fielding, 2004b) have demonstrated the feasibility of incorporating such an experiential intervention, 10-minute exercise breaks, into the workday among public health department staff in Los Angeles County. More than 90% of workers elected to participate in these breaks during a randomized, controlled trial evaluating these breaks conducted in staff meetings and training seminars. Health-related motivational benefits were apparent in this study, in that *sedentary* intervention participants rated their health or fitness status more realistically (poorly) than did those in control condition meetings with only the usual phone or restroom breaks (Yancey et al., 2004b). Similarly, in a group-randomized, controlled, pre-test/post-test, intervention trial wedding injury prevention and health promotion, employees who assembled computer boards performed a set of 23 flexibility and strength exercises, designed to prevent lower back and carpal tunnel injury, for 10 minutes each day on company time under supervision (Pronk S. J., Pronk, Sisco, Ingalls, & Ochoa, 1995). Daily employee participation rates were 97–100%. After 6 months of program implementation, significant improvements were observed in wrist flexion, wrist extension, low-back flexibility, fatigue, anger, and mood state. Maine sporting goods manufacturer L. L. Bean incorporates three formalized 5-minute mandatory stretch breaks each day led by trained co-workers (California Nutrition Network & California Department of Health Service, 2004). Productivity gains have been shown to offset the time devoted to stretching by 100%; reduced injuries and sick days have also been reported.

### ***Nutrition***

Policy and environmental interventions to promote healthy eating in the workplace are further developed and better studied than those for promoting physical activity, though still much less common than the more clinical or individually-targeted behavioral approaches. Three general types of these intervention strategies have been implemented, influencing: food access (increased nutritional value of available foods, healthy catering policies); nutritional information delivery (food labeling, point-of-choice

information); and economic strategies (incentives, pricing manipulation) (Glanz & Kristal, 2002).

A review by Matson-Koffman and colleagues (Matson-Koffman et al., 2005) revealed that a number of these approaches were effective in improving such dietary behaviors as fruit and vegetable, dairy, fat, fiber, and total energy intake, including: point-of-purchase labeling of healthier food selections in cafeterias and vending machines; food service preparation modification to decrease fat and sodium, and to incorporate more fruits and vegetables; price reduction on healthier foods; expanded healthy food options; coupon distribution; and creating and reinforcing healthy eating-friendly social norms (see Box 15.2 for example). Complementary educational intervention components, e.g., media, have generally increased intervention effectiveness. Support from management is crucial, both for facilitating implementation of these changes, and for building social support for adoption of healthier eating patterns.

Many environmental nutrition interventions involve changes in workplace vending machines and cafeterias. These interventions may be of limited generalizability since many worksites, especially smaller worksites, do not have on-site food sales (see Box 15.3 for example). Cafeterias and mobile food vendors may also be managed by outside contractors over whom the employer has limited power to determine food choices. There are, however other means through which worksites can encourage consumption of healthier foods. For example, price reductions of 10%, 25%, and 50% of low-fat snacks sold in vending machines in worksites in Minnesota produced relative sales increases of 9%, 39%, and 93% of these foods, respectively (French, Jeffery, Story, Breitlow, Baxter, Hannan, & Snyder, 2001). Employers may also partner with local farmers, produce delivery services and farmers' markets to offer fresh produce during lunch breaks or immediately after working hours for employees to purchase in the immediate after-work hours. This could be especially

**Box 15.2.** Larger worksites with on-site food service:  
“Seattle 5 A Day Worksite Program”

Changing the nutrition environment at the workplace was a key component of the Seattle 5 A Day Worksite Program (Beresford, Thompson, Feng, Christianson, McLerran, & Patrick, 2001). The study involved 28 worksites, each with 250 to 2000 workers, with food-serving cafeterias in the Seattle metropolitan area. A range of informational, social support and environmental changes were used to improve nutritional practices of employees at the 14 intervention sites. Worksite cafeteria changes included putting up point-of-purchase displays and signs identifying healthy food choices, and providing incentives for employees eating more fruits and vegetables. These were coupled with activities such as cookbooks for children and healthy food preparation demonstrations to encourage healthier eating practices at home. The study succeeded in increasing the consumption of fresh fruit and vegetables by 0.3 servings per day but the generalizability of this study might be limited by the large size of the worksites and the relatively high educational levels of employees at these sites.

**Box 15.3.** Smaller worksites with limited or no on-site food service: “Treatwell 5-A-Day Study” and “Healthy Directions—Small Business Study.”

Changing the workplace food environment at worksites has been shown to be a part of successful efforts to improve eating patterns even at smaller worksites with limited or no on-site food service. Twenty of the 22 community health centers participating in the Treatwell 5-A-Day Study in Massachusetts had less than 120 employees (Sorensen, Stoddard, Peterson, Cohen, Hunt, Stein, Palombo, & Lederman, 1999). The Healthy Directions—Small Business Study” involved 26 worksites, each with 50 to 150 employees (Sorensen et al., 2005). Complementing individual/interpersonal interventions, both these studies included environmental and organizational changes in the nutrition environment. Without cafeterias, these changes were limited to such approaches as modifying policies governing the types of foods served at meetings and on special occasions, and offering healthier food choices in vending machines. The changes may have been minor, but in conjunction with other strategies, including education and support for healthier eating at home, both interventions succeeded in improving dietary quality at the intervention sites.

advantageous to workers living in neighborhoods with limited availability of fresh produce (Algert, Agrawal, & Lewis, 2006).

### ***Weight Management***

Most worksite weight management involves individual-level behavioral or clinical intervention. Environmental and policy intervention strategies for weight management in the workplace generally fall into two categories: (1) financial incentives for weight loss or maintenance, such as payroll deductions, returns of monetary deposits, and competitions; and (2) comprehensive health promotion intervention (Kaplan, Brinkman-Kaplan, & Framer, 2002). The latter will be discussed in the following section.

Competitions have emerged as among the most promising worksite strategy, though little long-term follow-up data are available. Evidence suggests that team-based competitions—cooperative efforts among employees making changes—are more effective than individuals competing against each other (Kaplan et al., 2002). No evaluation data exist on repeat competitions, i.e. for those who may benefit from additional losses beyond the standard 12-week period. Data on competitions focused on such behavior changes as physical activity also have yet to be published. For example, “pedometer-mediated” step competitions are relatively new, and have generally been evaluated only in the context of comprehensive wellness programs. Competitions have not been shown to be effective for long-term maintenance of weight loss.

Deposits/payroll deductions have mainly been used to improve participation and decrease attrition in behavioral or clinical programs. Even without a formal treatment program, however, incentive participants doubled the

amounts of weight lost and weight losses maintained of control participants (Kaplan et al., 2002).

### ***Combined/Comprehensive Wellness Policy/Programmatic Efforts***

Just as effective weight control strategies at the individual level combine healthy eating and physical activity, so, too, can programs at the organizational level be more effective when they promote multiple aspects of wellness. For example, *Health Works for Women*, one of few studies aimed at rural female blue collar workers, produced long-term increases in fruit and vegetable consumption and participation in stretching and flexibility exercises, along with short-term decreases in dietary fat intake with a lay health worker/tailored media intervention (Campbell, Tessaro, DeVellis, Benedict, Kelsey, Belton, & Sanhueza, 2002). Such comprehensive approaches to wellness promotion, offer several advantages over programs that focus on only one aspect. First, they appeal to a broader cross-section of the workforce. Not all workers are interested in exercise or healthier eating. Some may be more interested in stress reduction. A program to reduce stress offers an excellent opportunity to introduce participants to various exercises that reduce stress and increase physical activity. Second, they offer greater opportunities for building participants' sense of self-efficacy for and interest in practicing health-promoting behaviors (changes that come more easily may bolster resolve to persist with others). Third, some health promoting behaviors are mutually reinforcing on a physiological level—practicing one predisposes one to greater success at the other. This effect can be seen in the observed relation between healthy eating and physical activity, as evidenced by exercisers' greater interest in water-dense foods with lower caloric density and beverages of lesser sweetness, compared to non-exercisers, and the relative appetite suppressant effect of exercise (Passe, Horn, & Murray, 2000; Westerterp-Plantenga, Verwegen, Ijedema, Wijckmans, & Saris, 1997). A particularly promising combined approach is integrating injury prevention/occupational safety with health promotion programming (Seabury, Lakdawalla, & Reville, 2005; Sorensen, Stoddard, LaMontagne, Emmons, Hunt, Youngstrom, McLellan, & Christiani, 2002).

### ***Interface with Obesity Prevention Intervention Outside the Workplace***

Many of the most successful examples of large-scale health promotion campaigns have employed multi-pronged strategies that targeted multiple sectors and industries. These diverse campaigns, ranging from cardiovascular disease prevention in Finland (Puska, Nissinen, Tuomilehto, Salonen, Koskela, McAlister, Kottke, Maccoby, & Farquhar, 1985) and tobacco control in California (Pierce, White, & Gilpin, 2005) to adolescent pregnancy prevention in South Carolina (Vincent, Clearie, & Schluchter, 1987) to physical activity promotion in Brazil (Matsudo, Matsudo, Araujo, Andrade, Andrade, de Oliveira, & Braggion, 2003), all involved activities in a wide variety of settings, including schools, community organizations, faith communities, public health centers, and workplaces. Following on principles from socio-ecological frameworks (Breslow, 2001; Stokols, Grzywacz, McMahan, & Phillips, 2003), it is likely that successful obesity prevention efforts will combine workplace intervention with other community and policy efforts.

Addressing change in sectors normally outside the purview of public health and medicine is particularly important for efforts to promote increased physical activity and healthier eating, since these behaviors are so deeply intertwined in the activities of daily living. Promoting recreational physical activity, e.g., working with public recreations and parks agency efforts to address inequities in distribution and quality of these spaces and facilities, is important. However, widespread, sustained increases in physical activity levels will require changes in how we commute, shop and work. One means of encouraging such changes is through “Smart Growth” urban planning initiatives, which endeavor to decrease the suburban sprawl associated with ease of access for private transportation, and increase mixed use urban development associated with “walkability”/“bikeability” (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003) (see Chapter 8). Likewise, widespread, sustained changes in eating practices will require more than public health messages about what constitutes healthy eating patterns. Changes will need to be made in how foods are marketed and distributed in all of the different settings in which people buy, consume and learn about food (see Chapter 9).

For both the energy intake and expenditure sides of the energy balance equation, workplaces control essential elements of the “mosaic” of complementary and synergistic environmental changes necessary to combat obesity. In addition, workplaces can offer a venue for introducing innovative environmental changes before they are disseminated in the wider community, similar to the role played by schools which have been at the forefront of efforts to limit unhealthy foods and beverages in vending machines and introducing farm-to-school programs to increase the availability and affordability of fresh fruit and vegetables. (And schools are workplaces in themselves.) For example, one important dissemination strategy is tailoring messages to workers as parents, as has been done in other areas of health promotion (e.g., Eastman, Corona, Ryan, Warsofsky, & Schuster, 2005).

#### *Interface with Interventions Targeting other Public Health Issues*

Besides building synergy in multiple sectors towards a single public health goal, obesity prevention and control efforts can also gain momentum by linking with other health and community promotion efforts. For instance, active commuting and stair use also serve to conserve energy and reduce air pollution. Similarly, efforts to increase the availability of retail outlets selling fresh fruits and vegetables or promote accessibility of school facilities for recreation during after school hours may be framed as environmental justice or economic development issues. Local municipalities conducting food safety inspections in restaurants may find ways to join these efforts with those encouraging restaurants to offer more healthy eating options. Joint employer/employee health and safety committees, whose primary mission is injury prevention, can identify and promote opportunities for increasing physical activity in the workforce.

This “piggybacking” of health promotion efforts has several advantages. First, it can make more efficient use of limited resources. Second, when other health promotion efforts are already in place, such as workplace safety programs, obesity control efforts can draw on the institutional support of these programs. Third, this approach can leverage support from other constituencies

as partners in obesity control who would not be among the early adopters of healthy eating/active living innovations. The chief drawback of this approach, particularly in workplaces, is that individuals or groups might see it as an unwanted expansion of or infringement on their current responsibilities. Depending upon site-specific considerations, some of these partnerships may make sense, while others may not.

### **Evidence Base for Workplace Obesity Prevention and Control Intervention in Ethnic Minority and/or Low-income Populations**

Sociocultural and physical environmental interventions that rely less on individual motivation and cultural values prioritizing active leisure pursuits, primarily organizational policy or practice changes incentivizing physical activity, should be implemented and rigorously evaluated in communities of color. Physical environmental intervention is certainly indicated in predominantly African-American and Latino communities and lower income communities, with their few recreational facilities and opportunities (Estabrooks, Lee, & Gyurcsik, 2003; Powell, Slater, & Chaloupka, 2004). Physical structural changes are costly and time-consuming, however, and tend to assume lower priority in low-resource surrounds with so many pressing needs (Kumanyika S. & Grier, 2006; Kumanyika S. K., 2001). In addition, underserved communities experience more substantial cultural and economic barriers to physical activity participation (Galbally, 1997; Kumanyika S., 2002; Yancey, Ory, & Davis, 2006). For instance, among African-American girls and women, arduous hair maintenance is a disincentive to perspire (Katz et al., 2005; Kumanyika S., 2002; Leslie, Yancey, McCarthy, Albert, Wert, Miles, & James, 1999) and the higher levels of perceived exertion associated with their higher rates of obesity may discourage more vigorous activity, e.g., stair-climbing, or longer exercise bouts (Kumanyika, S., 2002; Whitt, DuBose, Ainsworth, & Tudor-Locke, 2004). Perhaps as a result, many environmental interventions, as implemented, have been less effective or ineffective in ethnically or socio-economically marginalized population segments, e.g., the failure of stair prompts to increase stair-climbing among the subset of African Americans in an intervention successful among whites in a suburban Baltimore mall (Andersen, Franckowiak, Snyder, Bartlett, & Fontaine, 1998) or do not include sufficiently large samples of these populations to present sub-group analyses. Thus, immediate attention must be given to the socio-cultural environment to address these barriers (“demand generation”), complementing efforts to change the physical environment (“supply creation”).

Workplace approaches, particularly *push* strategies that make physical activity and healthy food choices hard to avoid (e.g., exercise breaks on non-discretionary time, healthier refreshments served in meetings and at events, walking meetings, vending restrictions, elevator and nearby parking restrictions) are especially promising in ethnic minority and lower-income communities. They increase the likelihood of delivering substantial returns on investment to employers (and to local governments, in which public health agencies develop and implement such efforts, and which bear many of the costs of obesity and sedentariness) by engaging the more sedentary and overweight population segments less successfully reached by traditional worksite programs.

They also obviate such barriers as unsafe and unappealing outdoor surroundings, lack of access to high-quality produce and recreational facilities, and copious perspiration during longer bouts of strenuous exercise. Some, in fact, build upon such cultural assets as the normative nature of movement to music throughout adulthood, cultural salience of many plant-based foods (e.g., collard greens, yams, corn, peppers and various legumes), and collectivist versus individualist values (Day, 2006; Yancey et al., 2006).

The aforementioned strategy, that of incorporating brief structured exercise bouts into organizational routine in churches (Wilcox, Laken, Anderson, Bopp, Bryant, Gethers, Jordan, McClorin, O'Rourke, Parrott, Swinton, & Yancey, In press 2006) public agency worksites (Crawford et al., 2004; Yancey et al., 2004b) community-based organizations (Yancey et al., 2004a) private corporate worksites (Pronk S. J. et al., 1995) and elementary schools (Lloyd, Cook, & Kohl, 2005; Metzler & Williams, 2006; Stewart, Dennison, Kohl, & Doyle, 2004), is exemplary as a case study. Yancey and colleagues (Yancey et al., 2006; Yancey et al., 2004a) have demonstrated substantial organizational receptivity to integrating 10-minute exercise breaks into daily routines (involving staff and clients/members) in community-based health and social services organizations serving Latinos and African Americans in Los Angeles (Yancey et al., 2004b). This approach is culturally salient in communities of color, in which leisure time structural integration of group physical activity is valued (e.g., Englberger, 1999; McKeever et al., 2004) (Englberger, 1999; McKeever et al., 2004), e.g., dancing to music at parties and holiday celebrations is normative behavior, even among middle-aged and older adults, as noted above. Further evidence for the cultural salience of this approach comes from the Mexican Ministry of Health. A similar intervention, consisting of 10- to 15-minute daily mid-day group exercise breaks during work time, was developed and implemented in the foyer of one of the main headquarters buildings among their mostly overweight and obese staff. Significant decreases in systolic blood pressure and waist circumference were observed at one year (Lara, 2004) While most interventions operate psychologically to motivate behavior change, social conformity-influenced exercise participation by sedentary and overweight workers adds physiological synergy to the psychological impetus—enjoyment and enhanced feelings of well-being while engaging in short bouts of physical activity, complemented by a reminder, via more than expected perceived exertion, of being a bit “out of shape.” (Ekkekakis, Hall, VanLanduyt, & Petruzzello, 2000; Yancey et al., 2004b). Evidence also suggests that physical activity initiated in the workplace may generalize (and innovations may diffuse (Rogers, 2003)), from one setting or type to another (Sevick, Dunn, Morrow, Marcus, Chen, & Blair, 2000; Yancey, McCarthy, Harrison, Wong, Siegel, & Leslie, 2006).

## **Obesity Prevention and Control Planning and Evaluation**

### **Assessing Needs and Opportunities**

*Policy Climate for Workplace Obesity Prevention and Control Intervention Public sector.* State and local governments are employers, as well as providers of governance and public service. City and county governments are often the

largest employers in a given locale, with workforces characterized by considerable ethnic and socioeconomic diversity. Los Angeles County, for example, employs more than 80,000 full-time, permanent employees. Fully 70% are people of color, most, women. More than 60% are 40 years of age or older. About half earn less than \$40,000 per year. More than half have 12 or more years of service. Thus, mature age, majority “minority” ethnicity and modest average earnings make this an ideal group for weight-related risk reduction efforts. The average length of service of more than one decade ensures not only adequate exposure time to lifestyle intervention, but also time for the employer to reap the economic benefits of improved health status.

For several reasons, these are critical settings for obesity control/wellness promotion: (a) it is in their organizational self-interest, in this climate of shrinking revenues and expanding costs, because they frequently bear the costs associated with obesity-related disease in their residents, in addition to their own staff; (b) among their staff are a disproportionate number of gate-keepers, opinion leaders, and decision-makers within any community at various levels from grassroots to elected/appointed leadership, particularly among direct providers of human services (Crawford et al., 2004; Sorensen et al., 1990)—in fact, a review of the literature by Dishman and colleagues (Dishman et al., 1998) found greater intervention physical activity outcome effect sizes in public agencies and universities than private corporations; and (c) the logistical structure of the workday is more flexible and accommodating than in many private concerns. The recent distribution of federal obesity control intervention grants by the National Association for Equal Opportunity in Higher Education at historically black colleges and universities reflects growing recognition of the utility of public and university settings for worksite wellness efforts—both staff and students may benefit, the latter with presumably more malleable behaviors and prospects for diffusing strategies as they move into their professional lives because of their relative youth and leadership potential (Walker, 2005).

Many cities and counties have initiated small-scale efforts, although these often lack adequate evaluation (e.g. Yancey et al., 2003). For example, Culver City, CA has initiated an employee-driven program releasing up to 60 minutes per week (20 minutes on each of 3 days/week) of paid time during the workday for wellness activities, primarily walking, and creating signage marking distances around city office buildings to facilitate these activity breaks (personal communication, Culver City Mayor Carol Gross, August 1, 2002).

*Private sector.* The increasing trend in health care costs is such a threat to business profitability and viability that it ranks as the number one rated issue facing American business today. Obesity is a major concern related to this trend as it drove 27% of the medical cost increases between 1987 and 2001 (Thorpe, Florence, Howard, & Joski, 2004). Furthermore, according to the National Business Group on Health, which represents 240 self-insured employers, health-care premiums for families increased by 100% between 2001 and 2006, with obesity accounting for 25% of this increase. (Institute of Medicine (U.S.), 2006) The total obesity-related costs borne by companies across the U.S. is estimated at \$13 billion per year. This amount is the aggregate of obesity related expenses in the areas of health insurance (\$8 billion), paid sick leave (\$2.4 billion), life insurance (\$1.8 billion), and disability insurance

(\$1 billion) (United States. Dept. of Health and Human Services., 2003). Obesity is associated with 39 million lost work days, 239 million restricted activity days, 90 million bed days, and 63 million physician visits (Wolf & Colditz, 1998). In addition, as earlier noted, many industries representing large proportions of the U.S. GNP have further motivation to address obesity rates in the general public, e.g., decreases in fuel efficiency associated with increases in average passenger weights in the airline industry, or the health care industry's increased capital investments in larger wheelchairs, beds and gurneys, along with productivity losses resulting from increased musculoskeletal injury rates among staff lifting and moving heavy patients. Based on such data that directly relate obesity to the bottom line, identification of opportunities for business to influence obesity are actively sought, warranted and justified.

Cost-related outcomes of obesity may be considered indicators of the direct and indirect impact of obesity on employee health and productivity. Hemp (Hemp, 2004) outlined the various components of the total cost of illness for an employer. Six components including medical and pharmacy were considered direct expenditures through medical care-related costs. The remaining four components, worker's compensation, short-term disability, long-term disability, and absenteeism and presenteeism, represented indirect costs considered the result of reductions in productivity. Obesity has been shown to affect all of those components (Finkelstein E., Fiebelkorn, & Wang, 2005; Hertz, Unger, McDonald, Lustik, & Biddulph-Krentar, 2004; Institute of Medicine (U.S.). Committee to Assess Worksite Preventive Health Program Needs for NASA Employees, 2005; Pronk N. P. et al., 2004). Hence, in addition to the direct impact of health care costs on the bottom line, companies must begin to consider the impact of workers' excess weight on their work performance.

The relationships noted between obesity and health care costs, as well as productivity decrements, recognize the influence of obesity on functioning and performance. Indeed, the effects of obesity make a 30 year-old obese worker comparable to a 50 year old normal-weight worker in terms of their medical care expenses (Sturm, 2002) and work limitations (Hertz et al., 2004)—obesity may be equated to 20 years of aging. This affects small, mid-sized, and large companies alike, though the latter are better equipped to intervene.

*Catalyzing change.* In order to generate substantial activity around obesity prevention and management in the private sector, it will be crucial to align the interests of the three key stakeholder groups of these programs, namely the employers, the employee, and the health plans. In the public sector, the service provision role adds the residents of the community as another stakeholder.

The issue of who benefits?—and who pays?—is central to this notion of stakeholder alignment. The employers need to be able to clearly identify how they will benefit if they are to make investments in the application of obesity solutions at the worksite, especially in the context of employee turnover and short-term financial program costs. For private sector employers answerable to boards of directors and/or shareholders, this “bottom line” approach is consistent with most business models. For public sectors employers, however, where productivity is harder to measure directly, public dollars directed to “employee benefits” may be politically sensitive, even if management is convinced that substantial return on investment will result. The employee, who enjoys complete portability of the health benefits of program participation (i.e. they experience and keep the health benefit even if they leave the

organization), needs to recognize a significant benefit that will exceed the readiness-to-participate threshold and hence be sufficiently persuasive to drive meaningful levels of participation—whether this benefit (or incentive) is financial or not does not matter. Finally, the health plans are stakeholders since they may benefit from healthier members if the interventions are effective, thereby lessening their financial risk exposure when the employer is a fully-insured customer. On the other hand, when the employer is a self-insured customer, identified health plan benefits may include a stronger relationship with the employer customer, a more seamless integration of health programming with insurance benefit products (for example, reduced co-pay or premiums for those who participate in the worksite programs), and a closer connection between worksite-based obesity programs and clinical care—obesity tends to be associated with many diseases and disorders that require regular medical care (e.g., diabetes, hypertension, heart disease, and cancers).

An excellent early step in outlining the benefits for each stakeholder and the approach to take for implementation is the initiation and ongoing maintenance of an open dialogue among these groups. Conducting an employee needs assessment, even a brief survey, may provide a starting point in fostering this communication.

### **Program/Policy Elements & Cost Considerations**

Program design elements may vary widely and may be difficult to prioritize since so many have been utilized and so little data evaluating them, alone or in combination, is available. Many approaches quickly become complex as programs need to consider multiple settings, audiences, behaviors, communication media, and meaningful evaluation and reporting for a variety of customers. However, workplace program design elements are certain to include the identification of the intervention components, the channels through which the program will be implemented, the methods by which the program will be marketed and communicated, the reasons why employees will recognize the benefits of participation (could include the incentives), the methods of evaluating the effectiveness of the initiative, and the financial and budget implications. For example, a workplace obesity initiative may, by design, be multi-component so it will be able to address both prevention and management (treatment). The importance of the program and processes for access may be outlined in company newsletters, table-tents in the cafeteria, e-mail reminders, and memos from the CEO. It may have individual-level coaching and counseling programs for physical activity and healthy eating, presented via a website and online options as well as a phone-based option in order to meet employee preferences and learning styles. In addition, it may implement several organizational-level interventions by adopting a physical activity work break policy that allows employees to use company time for two 10-minute walking breaks throughout the course of the day (while prohibiting this for other behaviors such as smoking) and a policy that allows for all the stairwells to be more fully utilized for physical activity by installing point-of-decision prompts promoting stair walking at all elevators. The initiative will be evaluated for its impact on health-related outcomes through the use of annual health risk appraisals, satisfaction-related outcomes through annual employee surveys, and economic impacts through analyses of obesity-related health care utilization in collaboration with

the health plans. This initiative becomes a part of the organizational identity and culture because it is actively supported by the executives of the company and enjoys oversight from an employee advisory committee that is representative of the company's population.

From a program design perspective, focusing on a set of simple rules that directly relate to the realities of implementation in the real-world setting is paramount (Langley, 1996; Wheatley & Kellner-Rogers, 1996). A simple operationally-derived model has been proposed that involves four design steps that effectively combine science and practice, the "4-Ss" of program design (Pronk, 2003). The 4-Ss of program design include size, scope, scalability, and sustainability. Size refers to the degree of impact the program will induce, i.e., effect size. This can be based on a review of all available evidence which subsequently is used in the translation of such evidence into an operationally feasible program solution. Scope refers to the range of program operations and the extent of program activities. Scalability refers to the ability of the program to follow a systematically timed, planned, and graded series of steps that cumulatively account for the increasing reach of a program until a critical mass is attained or the entire target population is engaged. Finally, sustainability refers to the long-term, ongoing support for the program in relation to an accepted value proposition that balances allocated resources (e.g., time, money, people, etc.) against generated revenues or other benefits. Sustainability includes the confirmation of long-term program support through adequate proof of program performance (Pronk, 2003).

The program design steps represented by the 4-Ss include all program marketing, promotions and communications issues. Scalability of programs is directly related to how well a program is marketed and made accessible to employees. Since participation is one of the most important process measures to consider, a variety of strategies should be considered. These strategies include the successful inclusion of union leadership in the program design and planning phases, special outreach to workers of color and lower SES workers, the buy-in of executive leadership, the active support for program implementation of managers, targeted outreach to subgroups identified as key groups to reach based on analyses of available data (for example, groups incurring high health care costs, multiple risk factor groups, among others), and the inclusion of all levels of the company's hierarchy, as well as the ethnic/gender diversity representative(s) of the company in the health promotion or wellness committee (Baun, Horton, Storlie, & Association for Worksite Health Promotion., 1994; Linnan et al., 2005).

### **Approaches to Evaluation**

Evaluation should be an integral part of every worksite health promotion intervention. Appropriate process and outcome assessment will: (1) allow for a data-driven approach to programming; and (2) ensure that continuous (rapid cycle) improvement can take place while generating periodic reporting of program performance (Langley, 1996; Pronk, 2003; Wheatley & Kellner-Rogers, 1996). The evaluation approach needs to recognize that certain aspects of the program are designed to support the individual employee in changing behaviors whereas other aspects are more concerned with the work environment for the employees. Hence, individual (employee)-level as well as

organizational-level metrics should be included in the evaluation. In addition, measures should be utilized that are directly related to the goals and objectives of the program and they should be directly applicable to the overarching business needs that are relevant to program performance. Using this approach, evaluation metrics should capture the influence of the program at the level of the employee and the organization, and hence, include measures that reflect health-, weight-, productivity-, and medical cost-related outcomes (Table 15.2).

**Table 15.2** Individual- and organizational-level evaluation metrics.

Type of Outcome	Employee-centered variables	Organizationally-focused variables
Weight or lifestyle change program participation and climate	Participation as well as the degree of participation (enrollment, engagement, completion, etc.) must be tracked in order to evaluate the attractiveness of the program options, the degree to which marketing efforts have been effective, and the potential to document whether or not a given employee is eligible for program-related incentives	Changes in company policy, company culture, and the physical environment for employees should be tracked and documented, e.g., the implementation of healthy food options in the cafeteria, the willingness of the CEO to participate in company walks or lead exercise breaks, and the opening of a corporate fitness center
Weight loss or weight maintenance	Weight-related outcomes that reflect how well the program impacts on excess weight (prevention of weight gain and/or weight loss) are central to the evaluation efforts	Performance-related outcomes (e.g., productivity or work performance) (Riedel et al., 2001) are directly applicable to the organization's interest. For example, since presenteeism (the decrement in productivity among workers while they are at work) is estimated to represent over 60% of the total cost of illness for employees (Pronk N. P., 2003) performance while-at-work is recognized as an increasingly important variable in the evaluation of worksite programs
Health status, health care utilization, and quality of life	<p>Health behaviors related to weight</p> <p>Health-related outcomes are required to document the impact on overall employee health, including the prevention or management of diseases and disorders. For example, efforts to optimally manage weight may directly influence the management of chronic diseases in a worker afflicted with diabetes and hypertension</p> <p>Other categories of variables to consider for inclusion are medical and pharmacy utilization, and quality of life indicators</p>	Cost-related outcomes (e.g., workers' compensation, health insurance ratings) are also one of the most important organizational-level metrics to be included in the evaluation

Some evaluation may be done by company personnel. However, this poses a dilemma related to the data, as they represent sensitive information about co-workers. The data gathered should be managed in a way that protects and maintains confidentiality, abiding by rules and regulations outlined by the Health Insurance Portability and Accountability Act (HIPAA) and other applicable state laws. Individual-level data should not be shared with the employer in identifiable format.

Evaluation efforts must also consider the associated costs. The more comprehensive the intervention and the higher the investment made, the greater the need for a rigorous and thorough approach to evaluation. More complicated analyses also call for greater resources.

## Guiding Principles

Several important messages can be drawn from this review of workplace approaches to obesity prevention. A summary and synthesis of these messages follows below.

### Summary

- Socio-ecological principles suggest that the workplace is a key component in a multilevel approach to behavior change.
- Workplace obesity prevention and control intervention may assist in creating the social norms and political will to drive development, adoption and enforcement of aggressive obesity control legislation, e.g., taxes on obesity-promoting goods and services, subsidies to permit widespread distribution of affordable and high-quality produce, “Good Samaritan” laws to protect individuals and organizations providing time and space for physical activity from litigation. These approaches may also link to childhood obesity prevention, where the greatest traction currently resides in assuming societal responsibility and taking social action to combat obesity, e.g., as the majority of parents are workers, arguments to policymakers and social marketing messages promoting parental modeling of fit lifestyles, stress management benefits enhancing parenting capacity.
- Increased focus is needed in implementing environmental and policy interventions to promote physical activity, particularly engaging underserved populations, and maximizing evaluation conduct and rigor within resource constraints, e.g., through partnerships between academic institutions and public/private sector—simplified evaluation strategies are within resources and expertise of most programs (Glanz & Kristal, 2002).
- The levers to encourage environmental and policy change may differ between private and public sector employers, and this should inform the marketing and promotion of wellness policies/programs. The public sector has greater mission- and cost-related motivation, as they bear responsibility and costs for staff and residents of the communities they serve. The link to health disparities and social inequity issues may also provide momentum for policy change advocacy efforts, e.g., class action litigation to redress the maldistribution of parks and open space.
- All private industries are worksites, including those targeted in public health advocacy, e.g., food industry, TV/film production and distribution,

automobile industry—this may provide leverage for changes in business practices, since obesity-related health care and productivity costs are markedly affecting the bottom line.

- The level of risk reduction needed to offset program costs is probably modest (estimates range from 8 to 42%), with lesser effect sizes likely needed for programs engaging higher proportions of the total employee population (increasing representation of overweight, lower SES and ethnic minority workers, i.e. those with more “room for improvement”) (Ozminkowski, Goetzel, Santoro, Saenz, Eley, & Gorsky, 2004).

### Future Directions

- Public sector employers should offer wellness incentives to employees, and invest in their evaluation. Cost and productivity data may assist in adoption of models that may be made available to private employers to expand opportunities for their staff. In addition, their considerable purchasing power for various institutional work settings (e.g., schools, prisons, government building cafeterias) may be leveraged to place greater emphasis on nutritional value in the bidding and letting of these contracts (Trust for America’s Health., 2005). This, in turn, may enhance the viability of businesses offering healthy food products, presenting the demand to assist the market economy in supplying a greater variety of healthy products at lower cost.
- Legislative action in this arena should be encouraged, e.g., the Healthy Workforce Act, SB 2558 (O’Donnell, 2005). Since liability for injuries incurred is a barrier commonly cited employers to integrating physical activity into workplace routine, legislative policy change addressing this issue may also be appropriate (Backman et al., 2004). Despite the imperfect science, tobacco control efforts should be emulated, in which policy changes were implemented without foreknowledge of their efficacy with rigorous evaluation to permit “mid-course corrections.” The cost of waiting for better evidence is excessive, especially for underserved communities.
- Typically, work breaks have been reserved for smoking and coffee (health-compromising or -neutral behaviors), and have been aggressively protected by workers and their unions (Taylor, 2005). Converting or expanding these breaks into opportunities for health-promoting behaviors with similar stress reduction and socializing benefits (i.e. the affective enhancement associated with short bouts of moderate intensity movement) (Bixby, Spalding, & Hatfield, 2001; Ekkekakis et al., 2000; Thayer, 1989; VanLanduyt, Ekkekakis, Hall, & Petruzzello, 2000) may be a way to capitalize on the social and physical infrastructure of the workplace. Given their possible framing as an entitlement (garnering union protection and advocacy), there is great potential for dissemination and institutionalization.

### Conclusion

Worksite intervention is central to population-based obesity control. Workplaces provide unparalleled opportunities to engage captive audiences of adults of all ethnic and socioeconomic backgrounds in healthy eating and active living. They also bridge key levels of intervention, i.e. individual (education/information), sociocultural environmental (group experiential

learning and social support, role modeling influencing norms) and physical environmental/organizational systems (healthier vending options, stairwell renovation, distant parking incentives, brief exercise bouts during paid work hours). Furthermore, every sector and industry (including those profiting from the sale of tasty nutrient-poor foods and enticing sedentary entertainment and transportation products) are also employers adversely affected by the epidemic, and potential beneficiaries of improvements in population health and fitness status.

Worksites are particularly important settings at this early juncture in our development of policy and environmental approaches to obesity prevention and control. In these settings, decision-making by a single leader can positively influence the health of many people, at little “cost” to the individual, thereby potentiating demand for fitness-promoting goods and services, e.g., walkable neighborhoods and Farmers’ Markets. Substantial increases in demand—one clinic, religious institution, corporation, health department, small business, or civic organization at a time—may create the political will to drive the passage of aggressive legislation. Such legislative policy change will reflect and advance the profound societal change required to produce dramatic behavioral change. Thus, the workplace can and should play a critical role in building the social change movement necessary to arrest the obesity pandemic.

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