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Preventing Noncommunicable Diseases in the Workplace through Diet and Physical Activity

WHO/World Economic Forum Report of a Joint Event

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Contents

Executive Summary

The workplace as a health promotion setting
Workplace health promotion (WHP) programmes, targeting physical inactivity and unhealthy dietary habits, are effective in improving health-related outcomes such as obesity, diabetes and cardiovascular disease risk factors. Enhancing employee productivity, improving corporate image and moderating medical care costs are some of the arguments that might foster senior management to initiate and invest in WHP programmes.

Unhealthy diets and excessive energy intake, physical inactivity and tobacco use are major risk factors for noncommunicable diseases (NCDs). In 2005, an estimated 35 million people died of NCDs such as heart disease, stroke, cancer and diabetes. Around 80% of these deaths occur in low- and middle-income countries that also have to deal with the burden of infectious diseases, maternal and perinatal conditions and nutritional deficiencies.

Key elements of successful programmes
Key elements of successful WHP programmes include: establishing clear goals and objectives, linking programmes to business objectives; strong management support; effective communication with, and involvement of, employees at all levels of development and implementation of the WHP programme; creating supportive environments; adapting the programme to social norms and building social support; considering incentives to foster adherence to the programmes and improving self-efficacy of the participants.

The essential role of a multistakeholder approach
Addressing, comprehensively, the issues of diet and physical activity requires the involvement of a range of stakeholders. A multistakeholder approach to the development and implementation of WHP policies and programmes is key to the success, effectiveness and sustainability of the programmes. Different stakeholders that can play a role in WHP include: international organizations; ministries of health, labour and safety; local and municipal governments; nongovernmental organizations (NGOs); civil society; employers; employees; trades unions; company health insurance funds; the agriculture industry; food producers, catering and food distributors; and the sports industry.

The importance of integrated monitoring and evaluation
Monitoring and evaluation (e.g. process and output evaluation, health risk assessment and health outcomes) are essential components of the

implementation of WHP programmes and need to be integrated into the process. Monitoring and evaluation inform decision-making and document changes to the policy or programme; contribute to building evidence, to providing accountability, and lead to effective WHP programmes so that resources can be adequately rationalized.

Gaps in current knowledge

To strengthen current knowledge, particularly on effectiveness, cost/benefit analysis and the impact on health of WHP programmes, further research is needed. The development of simple and easy-to-use validated instruments for diet and physical activity evaluation is encouraged. There needs to be further exploration of how the evidence-based diet and physical activity interventions are applied in workplaces that are in different geographic locations, and that vary in terms of governmental structure, literacy levels and social norms around different health behaviours. Identifying and publishing case reports and examples of international WHP programmes can also constitute supportive information that will help planners better understand how to develop global programmes.

The information compiled in this report reflects evidence collected from WHP policies in high-income countries, primarily within the European and North American regions. The scarcity of information and case studies from low- and middle-income countries was highlighted as an important gap in the current knowledge that needs to be addressed. Despite the limits of the available evidence, all stakeholders are encouraged to develop and implement WHP policies and programmes tackling unhealthy diets and physical inactivity.

WHO/World Economic Forum report – critical on progressing the prevention of noncommunicable diseases (NCDs)

Addressing diet and physical activity in the workplace has the potential to improve the health status of workers; contribute to a positive and caring image of the company; improve staff morale; reduce staff turnover and absenteeism; enhance productivity; and reduce sick leave, health plan costs and workers' compensation and disability payments. This report – the outcome of an event jointly organized by the World Health Organization (WHO) and the World Economic Forum – summarizes the current evidence available in addressing the different dimensions of the workplace as a key setting for interventions designed to prevent NCDs through diet and physical activity.

1. Introduction

Global burden of NCDs

In 2005, noncommunicable diseases (NCDs) accounted for 60% of all projected deaths worldwide – i.e. an estimated 35 million people died of NCDs (1). Some 80% of the deaths from NCDs occur in low- and middle-income countries.

The five major NCDs are heart disease, stroke, cancer, chronic respiratory diseases and diabetes. There is strong scientific evidence that healthy diet and adequate physical activity (i.e. ≥30 minutes of moderate intensity physical activity, ≥5 days per week) play an important role in the prevention of these diseases. Furthermore, it is estimated that approximately 80% of heart disease, stroke, type 2 diabetes and 40% of cancers can be prevented through inexpensive and cost-effective interventions that address the primary risk factors.

Impact of NCDs

The burden of NCDs has an impact not only on the quality of life of affected individuals and their families, but also on the country's socio-economic structure. WHO estimates that the loss of national income of different countries will be dramatic (Table 1). For example, it is estimated that China will lose around 558 billion international dollars from 2005 to 2015 as result of the burden of NCDs (1).

Taking population ageing and risk factors into account, deaths from noncommunicable diseases are projected to increase by 17% in 2005-2015 while during the same time period, deaths from communicable diseases, maternal or perinatal-related conditions and malnutrition are projected to decrease (1).

Table 1
Projected loss of national income attributable to heart disease, stroke and diabetes, selected countries, 2005-2015 (billions of constant 1998 international dollars) (1)

Country	Estimated income loss in 2005	Estimated income loss in 2015	Accumulated loss in 2005 value
Brazil	2.7	9.3	49.2
Canada	0.5	1.5	8.5
China	18.3	131.8	557.7
India	8.7	54.0	236.6
Nigeria	0.4	1.5	7.6
Pakistan	1.2	6.7	30.7
Russian Federation	11.1	66.4	303.2
United Kingdom	1.6	6.4	32.8
United Republic of Tanzania	0.1	0.5	2.5

[1]An international dollar is a hypothetical currency that is used as a means of translating and comparing costs from one country to the other using a common reference point, the US dollar. An international dollar has the same purchasing power as that of the US dollar in the United States.

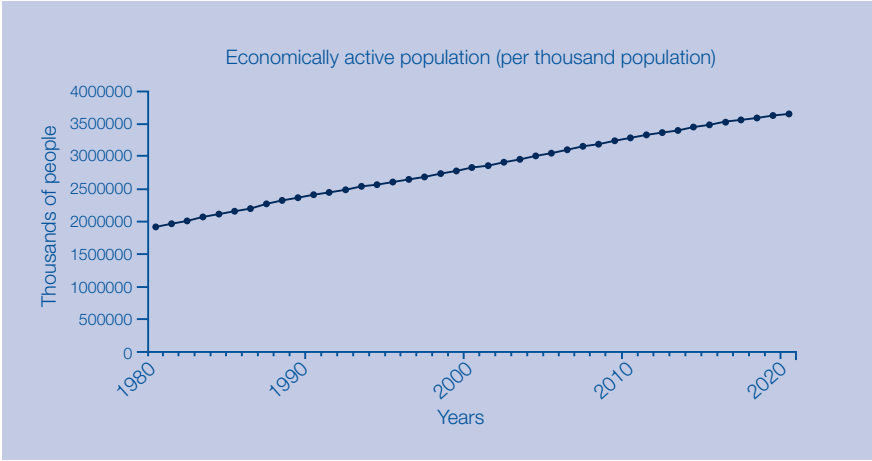
Economically active populations

Through workplace environments, it is possible to influence the health behaviours of large proportions of the population and to conduct repeated multilevel interventions to influence health behaviours (2, 3).

Data on rates of economically active populations indicate that, globally, approximately 65% of the population aged over 15 years is part of the workforce (4). The "economically active population" comprises all people of either sex who supply labour for the production of goods and services during a specified time-referenced period.

Figure 1 shows the global estimates of, and projections for, the economically active population from 1980 to 2020. In 2007, nearly 3.1 billion people were economically active; this figure is estimated to exceed 3.6 billion in 2020 (4).

Figure 1
Global estimates and projections for the economically active population, 1980-2020 (4)



Background

The workplace has been recognized internationally as an appropriate setting for health promotion. The importance of workplace health promotion was addressed in 1950 and later updated in 1995 in a joint International Labour Organization/World Health Organization session on occupational health (5).

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 (6), the 1997 Jakarta Declaration on Leading Health Promotion into the 21st Century (7) and the 2005 Bangkok Charter for Health Promotion in a Globalized World (8).

The European Network for Workplace Health Promotion has similarly issued a number of statements in support of workplace health promotion, including the Luxembourg Declaration on Workplace Health Promotion in the European Union, the Lisbon Statement on Workplace Health in Small and Medium Sized Enterprises and the Barcelona Declaration on Developing Good Workplace Health Practice in Europe (9).

DPAS

In response to the global burden imposed by noncommunicable diseases, WHO developed the Global Strategy on Diet, Physical Activity and Health (DPAS), which was adopted by the 57th World Health Assembly in May 2004 (10). The goal of DPAS is to promote health by guiding the development of an enabling environment for sustainable actions at individual, community, national and global levels which, when taken together, will lead to reduced disease and death rates related to unhealthy diet and physical inactivity.

The workplace environment is clearly identified as an important area of action for health promotion and disease prevention (10, article 62) "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 Workers' Health 2008-2017, as endorsed by the 60th 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 …"

WHO/World Economic Forum Joint Event

Integrated in the implementation of DPAS, WHO and the World Economic Forum selected the promotion of healthy diets and physical activity in the workplace as a theme to initiate an interaction between both institutions with an overall aim of contributing to the prevention of noncommunicable diseases.

WHO and the World Economic Forum thus organized a joint event on preventing NCDs in the workplace, addressing, specifically, healthy diets and physical activity.

The WHO/World Economic Forum Joint Event was held in Dalian, People's Republic of China, on 5-6 September 2007, with the following overall objectives:

- Review current state of knowledge regarding initiatives, policies and programmes designed to prevent NCDs in the workplace, with specific reference to diet and physical activity
- Highlight why the workplace is a suitable environment for the prevention of NCDs, and what evidence-based interventions are available to prevent diseases through the promotion of healthy diets and physical activity
- Delineate the economic benefits and cost-effectiveness of NCDs prevention programmes in the workplace addressing, specifically, healthy diets and physical activity
- Discuss monitoring and evaluation tools of NCDs prevention programmes in the workplace that address healthy diets and physical activity
- Summarize the role of different stakeholders in the development and implementation of NCDs prevention programmes addressing healthy diets and physical activity in the workplace

Those stakeholders participating in the joint event included academics, commercial sector representatives, non-governmental organizations (NGOs) and international organizations involved in the development, implementation and monitoring of diet and physical activity workplace programmes.

Aim of this report

This report is intended as a resource for stakeholders to intervene in the prevention and control of NCDs in the workplace through the promotion of healthy diets and physical activity.

The report summarizes the current evidence and highlights the main points addressed in the background papers prepared for the joint event, as well as covering the key issues and future challenges discussed.

Workplace tobacco cessation programmes

Tobacco use, together with physical inactivity, unhealthy dietary habits and excessive energy intake, are the most important modifiable risk factors for noncommunicable diseases (1).

Workplace tobacco cessation programmes are proving to be effective in reducing smoking prevalence among employees. A comprehensive smoke-free policy in the workplace can have a strong and positive influence on the behaviour of smoking workers and play a key role in the prevention of NCDs. Recognizing the health benefits of smoke-free workplaces, a number of important developments have taken place in recent decades (11). Additionally, the WHO Framework Convention on Tobacco Control gave a global boost to the movement for making non-smoking a societal norm (12).

Despite focusing on diet and physical activity, participants of the WHO/World Economic Forum Joint Event recognize that smoke-free workplaces are fundamental to the success of NCDs prevention and for the health promotion of employees.

2. Rationale for Using the Workplace as a Setting for Diet and Physical Activity Promotion[1]

Primary strengths of the workplace setting

Workplace health promotion (WHP) has generally focused on promoting worker health through the reduction of individual risk-related behaviours such as:

- Tobacco use
- Physical inactivity
- Poor nutrition
- Other health risk behaviours (13, 14)

WHP programmes have the potential to reach a significant proportion of employed adults (15). They are also an effective means of promoting a healthy diet and regular physical activity, and effort should be invested in their use to improve dietary and physical activity habits of the working population (16-18).

It is possible to influence health behaviours in the workplace through multiple levels of influence. These range from direct efforts – such as the provision of health education, increased availability of healthy foods and increased opportunities for physical activity – to indirect efforts, such as fostering social support and social standards, and promoting healthy behaviours (19).

It is also feasible to link workplace health promotion with broader efforts in the workplace to support worker health, such as through:

- Occupational health and safety initiatives (20)
- Disability management programmes (21)
- Employee assistance programmes (22)

Workplaces may plan health promotion programmes with worker input, and may set priorities based on:

- Workers' assessments of needs
- Behaviours associated with the largest decrements in mortality and morbidity, increases in disability, decreases in work productivity
- Potential for cost savings relative to health impact (13, 23, 24)

Importance of senior management

Senior management personnel need to be interested in initiating workplace health promotion for a variety of reasons, including:

- Increasing healthy behaviours
- Reducing medical care and disability costs
- Enhancing employee productivity and improving corporate image (13, 25)

[1] The section "Rationale for Using the Workplace as a Setting for Diet and Physical Activity Promotion" is adapted, with permission, from reference 26.

Importance of senior management

These reasons may well align closely with a company's long- and short-term business objectives. It is critical that the perceived benefits of WHP programmes align with broader business objectives so they may be initially approved and subsequently adhered to (13).

3. Effectiveness and Efficiency of Workplace Health Promotion Interventions Targeting Diet and Physical Activity

Overview of research findings

WHP programmes targeting physical activity and diet are effective in:

- Changing lifestyle behaviours – such as improving physical activity and dietary habits
- Improving health-related outcomes – such as reducing body mass index (BMI), reducing blood pressure and other cardiovascular disease risk factors
- Facilitating organizational-level changes – such as reduced absenteeism

Table 2 summarizes key results of programmes targeting physical activity, nutrition and cholesterol, weight control, alcohol use and cancer risk factors – as well as WHP programmes with multiple targets (26).

Public health significance

The economic outcomes of WHP initiatives are less well established; this is due, in part, to a lack of methodologically sound studies (27, 28).

It is important to note that even small changes in behaviour, observed across entire populations, are likely to show significant effects on disease risk (29, 30). For example, population-wide strategies to reduce serum cholesterol are cost effective in community-based interventions, even if serum cholesterol is reduced by only 2% or more (31).

The standards used for interpretation of the results of workplace intervention studies should be based on the public health significance of the outcomes or effects.

Table 2
Health risk reduction through various workplace health promotion interventions, by significant findings[a,b]

	Significant findings	Physical activity a	b	c	d	Nutrition/ cholesterol e	Weight control f	Physical activity and/or nutrition g	h	Alcohol i	Cancer risk factors j	Multi-component programmes k	l	m	n	o
Anthropometrics	Weight loss							•				•		•		
	BMI reduction	•			•	•	•				•					
	% body fat reduction	•			•			•			•					
	Blood pressure reduction	•			•			•				•	•			•
	Cholesterol reduction	•			•	•		•				•	•	•		•
	Improved glycaemic control														•	•
Health promotion behaviours	Physical activity increase	•	•	•	•			•	•		•	•	•	•		•
	Reduced smoking incidence	•									•	•		•		
	Improved endurance/fitness		•	•								•				
	Nutrition choices					•		•	•		•	•				•
	Reduced alcohol									•		•				
	Increased seatbelt use											•		•		
Life satisfaction/ attitudinal factors	Increased life satisfaction/well-being	•														
	Increased job satisfaction/well-being	•		•									•			
	Reduced stress/ anxiety/somatic complaints														•	•

	Significant findings	Physical activity a	b	c	d	Nutrition/ cholesterol e	Weight control f	Physical activity and/or nutrition g	h	Alcohol i	Cancer risk factors j	Multi-component programmes k	l	m	n	o
	Nutrition attitude					•					•	•				
	Alcohol attitude									•						
Morbidity/ mortality	Reduced mortality											•				
	Fewer visits to doctors or hospitalizations												•		•	•
	Decrease in overall disease risk													•	•	
Organizational outcomes	Fewer accidents											•				
	Reduced absenteeism/ sick days	•		•						•		•	•	•	•	•
	Increased productivity			•						•				•		
	Sickness costs												•			
	Positive return on investment												•	•	•	•

BMI = body mass index

[a] Studies included in each review may overlap

[b] Reference number in reference list below; literature review; number of studies (years)

a. (16) Shephard, 1996, 52 (1972-1994)
b. (32) Dishman et al., 1998, 26 (1979-1995)
c. (27) Proper et al., 2002, 8 (1981-1999)
d. (33) Glanz et al., 1996, Nutr=10, Chol=16 (1980-1995)
e. (34) Proper, 2003, 26 (1980-2000)
f. (35) Hennrikus et al., 1996, 43 (1968-1994)
g. (36) Matson-Koffman et al., 2005, 18 (1991-2001)
h. (18) Engbers et al., 2005, 13 (1987-2002)
i. (37) Roman et al., 1996, 24 (1970-1995)
j. (38) Janer et al., 2002, 45 (1984-2000)
k. (39) Heaney et al., 1997, 47 (1978-1996)
l. (40) Pelletier, 1996, 26 (1992-1995)
m. (41) Pelletier, 1999, 11 (1994-1998)
n. (42) Pelletier, 2001, 12 (1998-2000)
o. (43) Pelletier, 2005, 8 (2000-2004)

A closer look

The following examples highlight the specific effects of WHP programmes across a range of outcomes.

Effects of WHP on behaviour, health and work outcomes

Several important outcomes of physical activity and diet-related workplace interventions were reviewed including level of physical activity or dietary intake, health indicators such as blood pressure or self-reported health status, and work-related factors such as sick leave or job satisfaction. Only studies with a randomized, controlled design were included (44-47).

For WHP initiatives addressing physical activity, several beneficial outcomes were reported including:

- Increase in physical activity levels
- Reduction in relative body fat percentage
- Decrease in musculoskeletal disorders
- Improvement in cardiorespiratory fitness

For WHP initiatives addressing healthy diet, several beneficial outcomes were reported including:

- Improvements in increased intake of fruit and vegetables
- Improvements in reduced intake of unhealthy dietary fat
- Significant reduction in body weight using BMI measurements (48, 49)

Effects of WHP on economic outcomes

In 2003, a comprehensive study focusing on the economic return of workplace health promotion concluded that workplace programmes achieve a 25-30% reduction in medical and absenteeism costs in an average period of about 3.6 years (50).

This study of WHP programmes showed:

1) An average 27% reduction in sick leave absenteeism
2) An average 26% reduction in healthcare costs
3) An average 32% reduction in workers' compensation and disability claim costs
4) An average US$ 5.81-US$ 1.00 savings-to-cost ratio

Generally, the study showed an average reduction in sick leave, health plan costs, and workers' compensation and disability costs of slightly more than 25%.

Case report

A randomized trial that incorporated an economic evaluation showed that a workplace physical activity and diet counselling intervention (costing €430 per participant per year) lowered costs due to sick leave by €125 per participant during the intervention period, leading to a net annual loss of €305 per participant (51). Furthermore, in the year following the intervention, costs due to sick leave were lowered by €635 per participant in the intervention group (compared to control participants), resulting in an annual net saving of €235 per participant.

This same study also determined the average cost required to achieve employee behavioural (energy expenditure) changes, and physiologic (sub-maximal heartrate) changes, (e.g. cost-effectiveness ratios) to be €5.2 per employee for each extra kilocalorie of energy burned per day, and €235 per employee for every one sub-maximal (resting) heart beat per minute decrease (51).

4. Workplace Health Promotion Policies and Programmes

Introduction

The following section discusses key elements to consider when developing and implementing successful policies and programmes to promote healthy diets and physical activity in the workplace. The section contains three subsections:

1) Key elements
2) Multistakeholder involvement
3) Monitoring and evaluation

Key elements

The applicability of the presented key elements is illustrated by the use of examples and activities from evidence-based diet and physical activity interventions (17, 52-54). The following key elements are described in this section:

- Linking programmes to business objectives
- Top management support
- Forming employee advisory boards
- Effective communication
- Supportive environment
- Use of incentives
- Goal setting
- Self-efficacy
- Social environment, social norms and social support
- Tailored programmes
- Building effective programmes across the individual to environment continuum

Linking programmes to business objectives

Programmes and policies aimed at NCDs prevention through the promotion of diet and physical activity in the workplace will be strengthened when they support a company's corporate objectives, with respect both to the organization-wide financial impact, and the individual-level benefits to the health and well-being of employees.

WHP programmes may be seen as strategic initiatives to protect human and financial resources. By promoting health 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 well-being.

Case report

The mission statement of Dow Chemical Company's employee health programme states that "Dow businesses have a competitive advantage through health" (55). This illustrates how a WHP programme might be integrated into a company's core business objectives and may

encourage commitment, and help legitimize health promotion efforts among both managers and employees.

Dow Chemical Company reports that its health promotion programmes focus on all employees, retirees, and family members and provide three main outcomes:
1) Health status improvement
2) Positive net value for the company (e.g. improved cost-effectiveness)
3) High perceived value (e.g. improved recruiting and retention of employees, and employee morale) (55)

Top management support

Substantial managerial support is often essential to generate the human and financial capital required to initiate and maintain a successful employee health or wellness programme (17). Even with respect to primarily employee-driven health initiatives, strong and consistent support from company leaders may serve to complement a “bottom-up” approach, helping to ensure legitimacy and programme resources. Indeed, management support at the local level can be critical to WHP success.

Forming employee advisory boards

"Wellness committees” – also termed employee advisory boards – may be helpful in exchanging ideas between employees and management, as both groups may enter into a WHP programme with different goals in mind. Employee advisory boards can guide the direction of specific intervention activities. Committee meetings may also be an opportunity to reinforce how the overall workplace health programme will be matched to business objectives.

Effective communication

Effective communication is necessary to achieve success.

Substantive health messages need to be communicated in order to educate employees regarding healthy behaviours. Communication methods may include: websites, pay stub messages, guest speakers, e-learning courses or programmes, executive addresses, mission statements, and elevator or stairwell messages.

It is important to describe clearly the framework or structure of employee health or wellness programmes so that employees will be well equipped to use them. For example, announcements of planned wellness programmes at company-wide "launch days" or lunchtime walking groups, broadly advertised with the use of posters, e-mail messages and newsletters – all contribute to effective communication

and can encourage successful engagement of employees in WHP programmes.

The mutual exchange of input and collaboration between programme planners and employees at every step of planning, implementing and evaluating wellness programmes needs to occur (17). Engaging employees in this participatory process will not only encourage involvement, but will help ensure that programmes meet the specific needs of the employee population (56).

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.

Case report

The programming on worker health of USA-based NASA is organized and communicated by a multi-disciplinary committee with representation across NASA centres (52). 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.

Supportive environment

Both social and physical characteristics of the work environment can influence an individual's dietary habits and physical activity choices (57).

Examples of actions that aim to create a supportive physical environment include:

- Adding healthier food options to the workplace cafeteria
- Building physical activity opportunities
- Displaying point-of-purchase strategies both for diet and physical activity, such as placing signs by stairs highlighting benefits of their use compared with taking the elevator
- Providing access to convenient fitness facilities and showers (18, 36, 58)

Case report

In a WHP programme involving male security guards in Malaysia, the intervention designers worked with management to alter the physical environment by adding microwave ovens, water coolers and weighing scales in employee areas (59). The participants in this intervention demonstrated a significant decrease in cholesterol levels compared with participants in the control group (59).

Use of incentives

Incentives provide a mechanism to:

- Build and maintain motivation around WHP programmes
- Increase participation rates in WHP programmes
- Prevent decrease in participation rates

There are several types of incentives available, and these can be broadly defined as either intrinsic or extrinsic. An intrinsic incentive is, for example, when participants receive a monthly chart of their progress showing an increasing number of steps to 10,000 steps per day (60). Examples of extrinsic incentives (i.e. those provided by an outside source) can be built into WHP programmes in several ways:

- Reduced co-pays, lower premiums and more attractive benefits given by insurance providers for employees performing healthy behaviours;
- Wellness opportunities, including sponsored classes such as supermarket tours, health screenings and walking clubs;
- Financial incentives to participate in wellness activities (61)

It is important to consider the appeal of the incentive from the standpoint of the participant (62), and it may be helpful to survey employees annually regarding their preferences (60). For example, convenience of time and location, and paid time-off, may be considered appealing incentives for participation in WHP programmes.

Case report

In a 2005 survey of 365 large USA-based companies, nearly half reported offering an incentive (63). Those most commonly reported were in the form of gift cards, prizes or merchandise, followed by a rebate of programme costs, cash payments or reduced medical co-pays (63).

Goal setting

Goal setting is fundamental in translating intentions to change behaviour into specific actions within a specified time frame (64-67). It is important to set specific, not abstract, goals (68).

One goal-setting activity involves having the participants choose the specific goal they would like to work on, allowing the participants to work on a topic that is highly relevant to them (69). Examples of goals set by participants are provided below. WHP interventions can be

planned and implemented to facilitate the accomplishment of goals such as:

- I will bring my lunch to work at least three days per week
- I will take my blood pressure medication correctly according to my doctor's instructions every day
- I will weigh myself every morning

Self-efficacy

Self-efficacy is defined as: "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (70).

Self-efficacy has been cited as a commonly identified factor influencing a variety of behavioural changes (65) such as fruit and vegetable consumption or increased physical activity (71, 72).

Enhancing 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 are described further in the section below.

Social environment, social norms and social support

The social environment includes different factors ranging from individual (e.g. daily stress) and interpersonal (e.g. number of social ties) levels, to societal levels (e.g. policy) (73, 74).

Case report

Caixa Geral de Depositos (CGD) is an international banking and finance organization based in Lisbon, Portugal, employing just under 20,000 people. The occupational health team at CGD developed a corporate approach to healthy diets consisting of "one-on-one" consultations on nutrition; an enhancement of the quality of food offered in the restaurant; the provision of information; and the greater involvement of occupational health services (75).

The Internet was used to disseminate information on the caloric content of the staff restaurant menu, and a number of key recommendations have been implemented to create a more supportive environment. These include the provision of music, flowers and attractive décor at company restaurants to make them more pleasant; presenting the healthier options in a more attractive way; implementing theme weeks; providing free yoghurt or fruit; and incentivising the purchase of healthy food choices by pricing them more competitively. In addition, a process of continuously raising awareness of the benefits of a healthy diet has been put in place (75).
Results indicate that both men and women who participated in the

"one-on-one" programme were able to reduce their weight – with men showing greater levels of weight loss.

Tailored programmes

Moving away from the one-size-fits-all approach, "tailoring" is one strategy for increasing the effectiveness of lifestyle modification programmes (76-78).

Tailored interventions are typically delivered through:

- Face-to-face counselling
- Print communication
- Telephone counselling
- Internet
- CD-ROMs and automated voice messaging
- Automated voice messaging (76, 78-85)

Individual message-tailoring characteristics can include:

- Demographics such as gender and residence
- Psychosocial variables such as perceived barriers to change
- Behaviours such as leisure-time physical activity (86-92).

Case report

An intervention based in Belgium tested tailored nutrition messages for eating a low-fat diet distributed through the workplace's intranet. This trial aimed to assess the impact of the intervention in a real-life setting that was not tightly controlled; thus the workplaces included varied in size (ranging from <200 to >1000 total eligible employees), percentage of blue-collar workers (0% to 60%) and percentage of eligible male employees (<20% to >90%). After six months, participants in the intervention group reported a significantly greater decrease of total grams of fat and percentage of total calories coming from fat, compared with participants who received no intervention.

Building effective programmes across the individual to environment continuum

The workplace can be a very useful site to implement a health promotion programme because it can be targeted across multiple levels of influence simultaneously, such as physician and health-educator counselling (e.g. the PACE programme) (93, 94) and different environmental and organizational levels (e.g. the FoodSteps programme) (95).

Case report

The Healthy Directions–Small Business (HD–SB) study is used as an overall example to describe a multilevel programme (96). This USA-based intervention was designed to influence not only individual and inter-individual levels, but also organizational levels.
HD–SB was designed for a multiethnic population in small manufacturing workplaces. For a workplace to be eligible, it needed: at

least 25% of workers to be first- or second-generation immigrants or people of colour; between 50 and 150 employees; a turnover rate of <20% in the past year; and autonomous decision-making power as regards study participation.

The programme was based on the social contextual model (57), 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 focused at the individual, environmental and organizational level, and were delivered to each workplace monthly.

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 (98). 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 foods for less healthy foods was also a form of stimulus control with one process of change helping with the transition of 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 relative body fatness 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 employees' families, the intervention also attempted to enhance social ties between workers. This may also have led to positively changing social norms in the workplace around healthy lifestyle behaviours.

Because the study was focused on workers (versus managers), effects of the intervention were compared across occupational status. Both fruit and vegetable intake and physical activity increased in substantial amounts for workers in the intervention, whereas both behaviours decreased for managers. However, the results were only statistically significant for fruit and vegetable intake. These results point to successful recruitment and intervention strategies with blue-collar workers, who generally have less access to WHP programmes (97).

5. Multistakeholder Involvement

Introduction

A multistakeholder approach is key to the success of WHP initiatives. Different stakeholders bring different perspectives, skills, understanding, and resources to the relationship and this must be recognized as a strength. In working together, stakeholders need to utilize these differences in the building of strong and effective interventions (99).

For example, at the local level, trade unions can work in partnership with company managers to create a healthy working environment in which opportunities to exercise and consume a healthy diet are readily available to all staff. At the national level, governments can work with a wide range of stakeholders, e.g. NGOs, private sector organizations and civil society, to bring about improvements in population health.

All stakeholders have something to contribute to WHP and, as has been stated previously, this does not need to be in the form of direct financial aid. The contribution of all stakeholders – whether financial or through knowledge, skills, experience, or otherwise – should be valued and appreciated.

Commitment and "buy in"

To realize the potential of the workplace setting, it is crucial that stakeholders recognize that their commitment needs to be made public, and be sustained: public, because this demonstrates a conviction that action is needed; and sustained, because changing attitudes, beliefs and behaviours takes time (99).

The engagement of stakeholders is facilitated when they "buy in" – i.e. commit to a clear plan of action that has relevant and agreed objectives. Leaders at all levels of WHP development need to consider how to achieve this "buy in". As a starting point, leaders need clear strategies as to whether they relate to health and enterprise development, or whether they may have other motivations for engagement. When these strategies are supported by sound action plans, deliverable goals and clear benefits, engagement of the full range of stakeholders is more likely (99).

Basic principles of collaborative working

The following basic principles of collaborative working need to be in place (99):

- Sharing of power
- Sharing of responsibility
- Authority for change

The successful adoption of these principles requires (99):

- Trust between stakeholders
- Good communication
- An absence of blame when progress becomes difficult

Key stakeholders in WHP programmes

There are several major stakeholders with key roles to play in the development of WHP programmes targeting noncommunicable diseases. Table 3 provides examples of stakeholder groups and describes the rationale for their engagement in the context of WHP and diet and physical activity interventions in particular (99).

Table 3
Examples of stakeholders to be involved in WHP programmes, rationale for their engagement and their potential role

Stakeholder	Rationale for engagement	Potential role
International organizations e.g. UN system agencies	Creating access to sustainable and productive employment, improvement of health, development of healthy communities, equitable treatment of citizens and creation of fair and civil societies	Promote the workplace as a key setting for health, and encourage and enable developments at country level through advocacy, research, capacity building, development of public health policy, development and dissemination of standards and good practice, and investment in pilot programmes
Supranational organizations e.g. EU ASEAN	Employment opportunities and inward investment are facilitated by a labour market that is characterized by high levels of fitness and health	Very similar to the role of international organizations with the additional roles on development of regulatory and statutory frameworks, health service development and the promotion of the workplace as a setting for health
National and local government e.g. Ministries of health, labour and safety; local and municipal governments	Government at all levels has responsibility for disease prevention and health protection at a societal and community level. Employers are accountable to government for the health and safety of their employees, the protection of the environment and as contributors to the finances of the country	Ensure that the policy framework in which organizations operate includes WHP. Create an environment that is proactive in promoting health and well-being and, in particular, create opportunities for employers to participate in health promotion initiatives through national and local health campaigns, accreditation or award schemes and capacity building.

NGOs advocacy and operational	In 2001, Anheir et al., estimated that around 40 000 NGOs were operating internationally. If NGOs working within countries are added to this total then several million NGOs are in existence. The World Bank classifies NGOs in two ways – *"operational"* and *"advocacy"*. Operational NGOs can be international, national or community-based. They are primarily concerned with the design and implementation of development-related projects. Advocacy NGOs defend or promote a specific cause by raising awareness, encouraging acceptance and increasing knowledge through lobbying, press work and activist events. In fulfilling their roles, NGOs are ideally placed to promote good practice in population health, public health and economic development. Therefore many NGOs are already actively involved in the development and implementation of WHP programmes.	Advocacy and developmental: advocacy, in encouraging the acceptance of diet and physical activity as key health goals and the workplace as a setting in which to promote health by other stakeholders; developmental, in establishing and disseminating good practice.
Civil society	A society that seeks the common good of all is one in which the protection and promotion of health, the creation of well-being and the protection of human rights are key facets. This point is underpinned by the Luxembourg Declaration on Workplace Health Promotion, which states that	Holds government and employers to account on issues relating to diet and physical activity and the prevention of lifestyle related diseases; Advocates good practice in terms of the workplace as a setting in which to promote health; Supports policies and

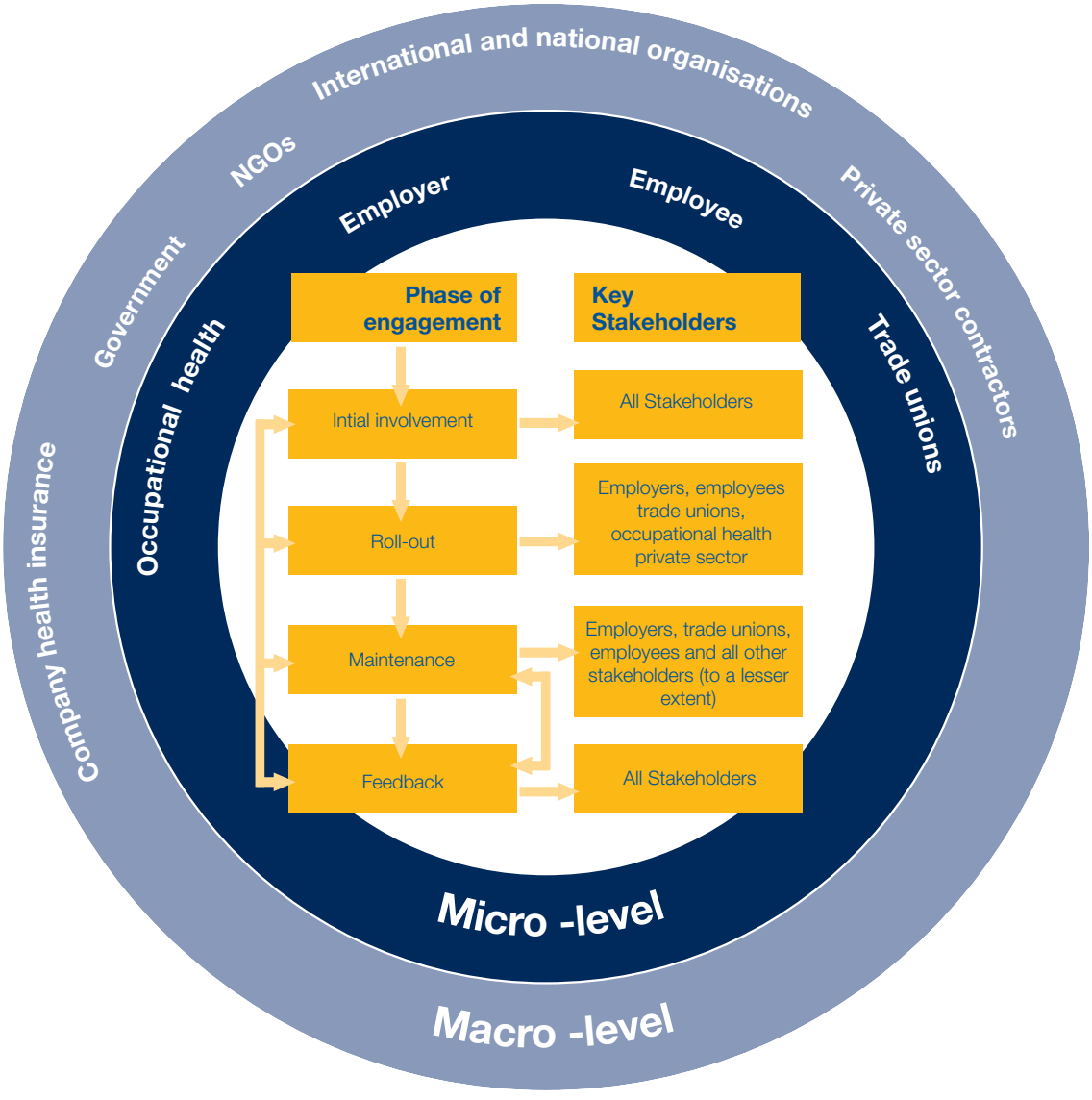
	"WHP is the combined efforts of employers, employees and society to improve the health and well-being of people at work" (9).	programmes to prevent noncommunicable diseases in the workplace
Employers	Need a fit and productive workforce if their organization or business is to remain competitive, viable and able to deliver products and services (100, 101)	Become involved in national or local programmes and projects designed to promote employee health and well-being; Where appropriate raise awareness of employees of the benefits of good nutrition and physical activity and of the benefits of safe food preparation and storage; Create a supportive working environment for the adoption of healthy dietary and physical activity
Employees	Engagement of this group is crucial for WHP to have an impact at an organizational and societal level. Employee "champions" of WHP programmes assist in the implementation of programmes and have a key role sustaining employee engagement.	The key participants in workplace health improvement programmes; Messengers – messages received through WHP are taken into the wider community by this group. They are the enablers of significant public health improvements.
Trade unions	Historically, trade unions have always had an involvement in health. In their early days, unions provided members with support should they become ill. More recently, trade unions have been actively involved in driving up standards of safety within workplaces and often provide training for their members on issues such as health and safety.	Raise awareness among members of the benefits of good nutrition and exercise; Advocates of change – working with employers to bring about improvements in the workplace which are conducive to health e.g. the promotion of good nutrition and exercise

Company health insurance funds	Company health insurance funds collect fees from employees and use this money to pay the healthcare costs of those they insure. Having a client base that is healthy reduces treatment costs. Engagement in the promotion of health through the workplace is being recognized by company health insurance funds as a legitimate role that benefits the employee (better health), the employer (more efficient and productive workforce) and themselves (reduced treatment costs).	Advocacy and funding
Other private sector organizations agriculture/food production/food distribution/ catering industry	The agriculture industry, food producers and food distributors are an integral part of the supply chain from farm to consumer. Through production methods and pricing policies they are able to influence dietary habits directly through the pricing and availability of foods that employers purchase in the workplace environment.	Providers of food, and ingredients for prepared foods, that meet nutritional standards

Model for multistakeholder interaction

The following model (Figure 2) describes four phases during which different stakeholders are primarily involved. The closer the stakeholder is to the centre of the circle, the greater their overall involvement in a workplace health programme. The four phases presented in the model are qualitatively different from each other, pose different challenges and require the involvement of different key stakeholders (99).

Figure 2
Model for stakeholder interaction



Case report

The activities presented by the WA (Western Australia) Healthy Business NGO represent a relevant practice example of a multistakeholder collaboration (102). The stakeholders involved are: The Cancer Council Western Australia, the Heart Foundation of Australia, Diabetes Western Australian (a not-for-profit diabetes advocacy organization) and Healthway (a legislative body with a variety of funding programmes).

The WA Healthy Business NGO began as a pilot project funded by Healthway and included seven workplaces in Western Australia. This NGO targets organizations that have primarily blue-collar employees. The workplaces in the pilot project identified the primary needs for improving workplace health in the areas of physical activity, nutrition, smoking and sun protection. The workplaces were then responsible for developing, implementing and evaluating their intervention programmes. Multiple levels of support for the intervention are available from the pilot project and include capacity building workshops, information and resources, education sessions, health information kits, e-newsletters, availability of a healthy business coordinator and availability of case studies.

6. Monitoring and Evaluation

Introduction

Monitoring and evaluation are systematic processes to assess the progress of ongoing activities as planned, identify the constraints for early corrective action, and measure effectiveness and efficiency of the desired outcome of the programme (103).

Monitoring and evaluation activities will (103):

- Influence decision-making
- Promote and document changes to the policy or programme
- Contribute to the evidence base
- Provide accountability
- Assist in future planning and decision-making processes
- Provide information on health changes due to newly implemented policy or intervention elements
- Lead to effective WHP by gaining insight into successful interventions of WHP policy elements so that health trends can be anticipated
- Contribute to the employee's perception of the commitment of the company to occupational health management and to WHP activities
- Provide data flow which can make cost-benefit analysis achievable

Ideally, a framework for evaluation should be developed in tandem with the policy or programme (103). This allows the goals and objectives to be matched with the appropriate type of evaluation so the adequate indicators are used during the entire monitoring and evaluation process (52, 104).

Setting up a monitoring and evaluation system

Table 4 recommends steps to be taken when setting up a monitoring and evaluation system of WHP policies or programmes *(adapted from 104)*.

Table 4
Steps to be taken when setting up a monitoring and evaluation system of WHP policies or programmes

Steps	Action
1	Ensure that monitoring and evaluation are included in any WHP policy or programme developed and that a budget line is allocated for this purpose.
2	Identify existing monitoring and evaluation activities and ensure that the existing data, if relevant, can be used to enhance the WHP policy or programme being developed and implemented.
3	Identify suitable indicators to use throughout the whole process of developing and implementing the WHP policy or programme.
4	Carry out the evaluation in a consistently repeated manner to possibly revise or better adjust the implementation activities. It is good practice to start with a baseline survey (or use available data), or an initial health risk assessment according to the aim of the WHP programme being developed, carry out activities and then proceed to a new evaluation through survey repetition.
5	If feasible, repeat the evaluation periodically so a monitoring system can be established.

Collection of data at different stages

A comprehensive monitoring and evaluation plan includes data collection at several stages. Table 5 describes different types of information to be collected at different stages *(adapted from 105)*.

Table 5
Types of data to be collected at different stages

Formative	Needs and perceptions of employees and managers are collected to inform the development of programme activities, for example: • Understandability of educational brochures • Appeal of potential incentives

Process	Data on programme implementation are collected that influence the underlying reasons for the extent of a programme's success, for example: • Attendance at programme sessions • Extent programme activity was delivered as intended • Costs
Intermediate	Data on intermediate outcomes are collected, for example: • Knowledge • Awareness • Differences in social support
Health impact	Data on behaviours or health outcomes are collected (often by a yearly health risk assessment) for example: a) Behaviour: • Fruit and vegetable intake • Saturated fat intake • Leisure-time and occupational physical activity • Objective food consumption data and/or product sales data b) Environment examples, which have increasing influence as determinants of behaviour: • Availability of healthy foods and beverages in cafeterias or vending machines • Walking trails • Availability of showers • Existence of a workplace policy on active commuting c) Biological examples, which can include a small set of feasible and less expensive physiological or clinical measures: • Weight, height and body mass index (BMI) • Waist and hip circumference • Blood pressure • Finger stick cholesterol • Fitness and strength tests
Economic and work factor impact	Examples of economic and work factor impact outcome data include: • Cost of different programme activities • Absenteeism • Presenteeism/productivity and job satisfaction
Long-term health impact	Long-term health impact, if possible, in which data on actual disease prevalence are collected, for example: • Cancer cases • Heart disease-related incidents • Diabetes prevalence

Use of the data collected

It is important to delineate a clear strategy for the use of the results of the monitoring and evaluation activities. The appropriate dissemination of the results of health risk assessment, as well as all the results from other monitoring and evaluation activities may contribute to increased awareness among employees of the need to adopt healthier dietary patterns and physical activity habits, and may also stimulate behaviour change. However, employees' personal information, when collected, must be protected from inappropriate disclosure or misuse.

Case report

A surveillance project in an Indian industrial population was established with the following objectives (106, 107):

1) To conduct a baseline survey and continued surveillance of cardiovascular disease (CVD) risk factors and their determinants
2) To impart health education for the prevention of CVD and assess the impact of health education on control of CVD
3) To develop guidelines for detection and management of CVD

The surveillance started with a baseline survey of more than 35,000 employees and their family members in 10 different industries in India (age group 10-69 years) and a detailed risk factor survey of 20,000 randomly-selected individuals.

The baseline survey suggested a high level of CVD risk factors such as (106, 107):

- *Hypertension – 27%*
- *Diabetes – 10.1%*
- *Overweight – 47%*

This was particularly evident in industries located in highly urbanized areas. The surveillance programme largely focused on changing unhealthy behaviours and promoting healthy behaviours related to cardiovascular health, based on existing scientific evidences in the target community. In addition it aimed to provide evidence-based care to those with CVDs and diabetes. The WHP programme addressed physical activity, blood pressure, intake of fruits and vegetables, diabetes, BMI and heart-healthy life, using cognitive theory and the health belief model (106, 107).

Catchy and simple messages in regional languages were disseminated to the target population through different communication strategies. Regular health education classes, film shows, seminars, group discussions and question & answer sessions were conducted independently at each site (106, 107).

All high-risk individuals were referred to a healthcare facility for follow-up. Individual and group counselling sessions on diet, tobacco use and physical activity were also conducted for those with established risk factors (106, 107).

Evaluation at the end of five years found significant reductions in diastolic blood pressure, blood glucose and cholesterol in the intervention group compared with the control group. The awareness of hypertension and adequacy of control was also significantly improved in the intervention population (106, 107).

The surveillance network established by this project is the first of its kind for CVD risk factors in India and can be used as a model for the replication of prevention strategies for CVD and other NCDs in India and other countries. These findings may encourage other companies to set up surveillance activities, especially in countries where the organized workforce comprises a substantial number of individuals (106, 107).

7. Gaps in Current Knowledge

Further research is needed to address the following points:

- Development of a flexible set of best practices that reflects global diversity, different literacy levels and social norms around different health behaviours
- Standardized designs for studies examining the economic outcomes and impact of WHP programmes
- Validated self-report instruments and creation of brief validated tools for diet and physical activity measurement

The scarcity of information and case studies from low- and middle-income countries was highlighted as an important gap in the current knowledge that needs to be addressed. Effort needs to be put into adapting the current evidence to low- and middle-income contexts.

Additionally, it is important to highlight that the lack of results from randomized control trials should not prevent the development and implementation of WHP programmes. Identifying and publishing (through non-traditional means if necessary) case reports and examples of international WHP programmes can also build supportive evidence and can help planners better understand how to develop WHP programmes that fit different workplace contexts.

8. Overall Conclusions

The workplace as a health promotion setting
The workplace has been internationally recognized as an appropriate setting for health promotion. Addressing diet and physical activity in this setting can serve to improve the health status of workers and contribute to a positive and caring image of the company. Other benefits can include improvements in staff morale and productivity, and reductions in staff turnover, absenteeism and sick leave. There can similarly be reductions in health plan costs, workers' compensation and disability costs. The workplace is an advantageous setting, not only because of the significant proportion of time spent at work by the large majority of the population, but also because it offers an opportunity to utilize peer pressure to encourage employees to make desirable alterations to their health habits.

Senior managers may have a variety of reasons for wanting healthier employees. It is therefore important to target the reasons and motivations if senior management are to engage successfully in the implementation of WHP programmes, and for the programmes to be effective and yield results.

Key elements of successful programmes
The development and implementation of WHP programmes should consider the following elements: clear goals and objectives, links with programmes to business objectives, strong management support and effective communication, and supportive environments.

The essential role of a multistakeholder approach
A multistakeholder approach is key to the success of WHP initiatives. Different stakeholders have different roles to play, and the strengths of each should be concerted and explored to facilitate the accomplishment of clear goals and objectives.

The importance of integrated monitoring and evaluation
Monitoring and evaluation are essential for the success of workplace health promotion and need to be incorporated into the implementation of WHP policies and programmes. They facilitate understanding of how far the programme has come, where it is going and how far it is from the planned goals and objectives.

Gaps in current knowledge
Currently, a set of corporate best practices does not exist. This report provides a summarized review of contemporary knowledge on

development and implementation of WHP programmes and can be helpful in guiding activities in this field. However, gathering, developing and disseminating a flexible set of best practices that reflects global diversity, may be useful in several circumstances. New technologies, additional research and collecting information from different sources of relevant evidence should be considered as integral components to this process.

More information and case studies from low- and middle-income countries is needed.

References

1. *Preventing chronic diseases: a vital investment*. Geneva, World Health Organization, 2005.

2. Klesges RC, Cigrant JA. Worksite smoking cessation programs: clinical and methodological issues. In: Hersen M, Eisler RM, Miller RM, eds. *Progress in Behavioral Modification*. Newbury Park, CA, Sage, 1988:37–61.

3. Abrams DB et al. Cancer control at the workplace: the Working Well trial. Preventive Medicine, 1994, 23:1–13.

4. LABORSTA, Geneva, International Labour Organization, 2007 (available at: http://laborsta.ilo.org/, accessed December 2007).

5. *Good practice in occupational health services: a contribution to workplace health*. Copenhagen, WHO Regional Office for Europe, 2002.

6. *Ottawa Charter for Health Promotion*. [First international conference on health promotion, Ottawa]. Geneva, World Health Organization, 1986.

7. *Jakarta Declaration on leading health promotion into the 21st century*. [Fourth international conference on health promotion: new players for a new era – leading health promotion into the 21st century, Jakarta]. Geneva, World Health Organization, 1997.

8. *Bangkok Charter for health promotion in a globalized world*. [Sixth global conference on health promotion, Thailand]. Geneva, World Health Organization, 2005.

9. *The Luxembourg Declaration on workplace health promotion in the European Union*. European Network for Workplace Health Promotion, Luxembourg, 1997.

10. *Global Strategy on Diet, Physical Activity and Health*. Geneva, World Health Organization, 2004.

11. *Legislating for smoke-free workplaces*. Copenhagen, WHO Regional Office for Europe, 2006.

12. *WHO Framework Convention on Tobacco Control*. Geneva, World Health Organization, 2003.

13. O'Donnell MP. Employer's financial perspective on workplace health promotion. In: O'Donnell MP, ed. *Health promotion in the workplace*, Toronto, ON, Delmar Thomson Learning, 2002:23–46.

14. *LaMontagne A. Integrating health promotion and health protection in the workplace*. In: Moodie R, Hulme A, eds. Hands-on health promotion. Melbourne, IP Communications, 2004:285–298.

15. Linnan L et al. Results of the 2004 national worksite health promotion survey. *American Journal of Public Health*. (published November 2007).

16. Shepard RJ. Worksite fitness and exercise programs: a review of methodology and health impact. *American Journal of Health Promotion*, 1996, 10(5):436–452.

17. Sorensen G, Linnan L, Hunt MK. Worksite-based research and initiatives to increase fruit and vegetable consumption. *Preventive Medicine*, 2004, 39(Suppl. 2):S94–S100.

18. Engbers LH et al. Worksite health promotion programs with environmental changes: a systematic review. American Journal of Preventive Medicine, 2005, 29(1):61–70.

19. Stokols D, Pelletier K, Fielding J. The ecology of work and health: research and policy directions for the promotion of employee health. *Health Education Quarterly*, 1996, 23(2):137–158.

20. Sorensen G et al. A comprehensive worksite cancer prevention intervention: behavior change results from a randomized controlled trial (United States). *Cancer Causes and Control*, 2002, 13:493–502.

21. Williams RM, Westmorland M. Perspectives on workplace disability management: a review of the literature. *Work*, 2002, 19(1):87–93.

22. DeJoy D, Southern D. An integrative perspective on worksite health promotion. *Journal of Occupational and Environmental Medicine*, 1993, 35(12):1221–1230.

23. Partnership for Prevention. Healthy workforce 2010. *An essential health promotion sourcebook for employers, large and small*. Washington, DC, Partnership for Prevention, 2001.

24. Harris JS, Fries J. The health effects of health promotion. In: O'Donnell MP, ed. *Health promotion in the workplace*. Toronto, ON, Delmar Thompson Learning, 2002:1–19.

25. Shephard RJ. A critical analysis of work-site fitness programs and their postulated economic benefits. *Medicine and Science in Sports and Exercise*, 1992, 24(3):354–370.

26. Sorensen G, Barbeau E. *Steps to a healthier US workforce: integrating occupational health and safety and worksite health promotion: state of the science*. Washington, DC, National Institute for Occupational Safety and Health, 2004.

27. Proper KI et al. Effectiveness of physical activity programs at worksites with respect to work-related outcomes. *Scandinavian Journal of Work, Environment & Health*, 2002, 28(2):75–84.

28. Proper KI, Van Mechelen W. *Effectiveness and cost-effectiveness of worksite interventions to promote physical activity and healthy diet*. [Technical paper prepared for the WHO/World Economic Forum joint event on preventing noncommunicable diseases in the workplace]. Geneva, World Health Organization, 2007.

29. Rose G. Sick individuals and sick populations. *International Journal of Epidemiology*, 1985, 14(1):32–38.

30. Rose G. T*he strategy of preventive medicine*. New York, NY, Oxford University Press,1992.

31. Tosteson ANA et al. Cost-effectiveness of population-wide educational approaches to reduce serum cholesterol levels. *Circulation*, 1997, 95(1):24–30.

32. Dishman RK et al. Worksite physical activity interventions. *American Journal of Preventive Medicine*, 1998, 15(4):344–361.

33. Glanz K, Sorensen G, Farmer A. The health impact of worksite nutrition and cholesterol intervention programs. *American Journal of Health Promotion*, 1996, 10(6):453–470.

34. Proper KI. The effectiveness of worksite physical activity programs on physical activity, physical fitness and health. *Clinical Journal of Sports Medicine*, 2003, 13(2):106–117.

35. Hennrikus DJ, Jeffery RW. Worksite intervention for weight control: a review of the literature. *American Journal of Health Promotion*, 1996, 10(6):471–498.

36. Matson-Koffman DM et al. A site-specific literature review of policy and environmental interventions that promote physical activity and nutrition for cardiovascular health: what works? *American Journal of Health Promotion*, 2005, 19(3):167–193.

37. Roman PM, Blum TC. Alcohol: a review of the impact of worksite interventions on health and behavioral outcomes. *American Journal of Health Promotion*, 1996, 11(2):136–149.

38. Janer G, Sala M, Kogevinas M. Health promotion trials at worksites and risk factors for cancer. *Scandinavian Journal of Work, Environment & Health*, 2002, 28(3):141–157.

39. Heaney CA, Goetzel RZ. A review of health-related outcomes of multi-component worksite health promotion programs. *American Journal of Health Promotion*, 1997, 11(4):290–307.

40. Pelletier KR. A review and analysis of the health and cost-effective outcome studies of comprehensive health promotion and disease prevention programs at the worksite, 1993–1995 update. *American Journal of Health Promotion*, 1996, 10(5):380–388.

41. Pelletier KR. A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: 1995–1998 update (IV). *American Journal of Health Promotion*, 1999, 13(6):333–345.

42. Pelletier KR. A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: 1998–2000 update. *American Journal of Health Promotion*, 2001, 16(2):107–116.

43. Pelletier KR. A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: 2000–2004 update (VI). *Journal of Occupational and Environmental Medicine*, 2005, 47(10):1051–1058.

44. Proper KI et al. De effectiviteit van interventies ter stimulering van gezonde voeding [The effectiveness of interventions aimed at the promotion of a healthy diet]. *Tijdschrift voor Bedrijfs en Verzekeringsgeneeskunde [Journal of Occupational and Insurance Medicine]*, 2006, 14(6):243–249.

45. Proper KI et al. De effectiviteit van interventies ter stimulering van bewegen [The effectiveness of physical activity interventions]. *Tijdschrift voor Bedrijfs en Verzekeringsgeneeskunde [Journal of Occupational and Insurance Medicine]*, 2006, 14(3):103–108.

46. Van Overbeek K et al. Effectiviteit van interventies op het voorkomen of stoppen van rookgedrag [The effectiveness of interventions aimed at the prevention of smoking or at smoking cessation]. *Tijdschrift voor Bedrijfs en Verzekeringsgeneeskunde [Journal of Occupational and Insurance Medicine]*, 2006, 14(4):149–154

47. Proper KI et al. *Body@Work rapport: towards a lifestyle policy by occupational physicians*, 2005 (available at http://www.bodyatwork.nl/files/rapport_bravo.pdf, accessed December 2007).

48. Stamler R et al. Primary prevention of hypertension by nutritional-hygienic means. *Journal of the American Medical Association*, 1989, 13:1801–1807.

49. Nisbeth O, Klausen K, Andersen LB. Effectiveness of counselling over 1 year on changes in lifestyle and coronary heart disease risk factors. *Patient Education & Counseling*, 2000, 40:121–131.

50. Chapman LS. Meta evaluation of worksite health promotion economic return studies. *The Art of Health Promotion*, 2003, 6(6):1–16.

51. Proper KI et al. Costs, benefits and effectiveness of worksite physical activity counselling from the employer's perspective. *Scandinavian Journal of Work, Environment and Health*, 2004, 30(1):36–46.

52. Institute of Medicine. Implementing integrated health programs. In: *Integrating employee health: a model program for NASA*. Washington, DC, National Academies Press, 2005:102–149

53. Chapman LS. Expert opinions on "best practices" in worksite health promotion (WHP). *American Journal of Health Promotion*, 2004, 18(6):1–6.

54. Quintiliani L, Sorensen G, Sattelmair J. *The workplace as a setting for interventions to improve diet and promote physical activity*. [Technical paper prepared for the WHO/World Economic Forum joint event on preventing noncommunicable diseases in the workplace]. Geneva, World Health Organization, 2007.

55. Employee health programs and services. Midland, MI, The Dow Chemical Company,1995–2007 (available at http://www.dow.com/commitments/responsibility/health.htm, accessed December 2007).

56. Minkler M, Wallerstein NB. Improving health through community organization and community building. In: Glanz K, Rimer BK, Lewis FM, eds. *Health behavior and health education: theory, research, and practice*. San Francisco, CA, Jossey-Bass, 2002:279–311.

57. Sorensen G et al. Reducing social disparities in tobacco use: a social contextual model for reducing tobacco use among blue-collar workers. American Journal of Public Health, 2004, 94:230–239.

58. Sorensen, G. et al. The influence of social context on changes in fruit and vegetable consumption: results of the healthy directions studies. *American Journal of Public Health*, 2007, 97:1216–1227.

59. Moy, F, Sallam AAB, Wong M. The results of a worksite health promotion programme in Kuala Lumpur, Malaysia. *Health Promotion International*, 2006, 21:301–310.

60. Baun WB. Program management of workplace health promotion programs. In: O'Donnell MP, ed. *Health promotion in the workplace*. Toronto, ON, Delmar Thompson Learning, 2002:78–112.

61. Powell DR, Frank E. The future of workplace health promotion. In: O'Donnell MP, ed. *Health promotion in the workplace*. Toronto, ON, Delmar Thompson Learning, 2002:590–602.

62. Kruger J et al. Selected barriers and incentives for worksite health promotion services and policies. *American Journal of Health Promotion*, 2007, 21:439–447.

63. *Wellness Survey*. Deloitte Consulting, The Deloitte Center for Health Solutions, 2005 (available at http://www.deloitte.com/dtt/cda/doc/content/Wellness%20Survey_04v2.pdf, accessed December 2007)

64. Locke EA, Latham GP. *A theory of goal setting and performance*. Englewood Cliffs, NJ, Prentice-Hall, 1990.

65. Baranowski T et al. How individuals, environments, and health behavior interact: social cognitive theory. In: Glanz K, Rimer BK, Lewis FM, eds. *Health behavior and health education: theory, research, and practice*. San Francisco, CA, Jossey-Bass, 2002:165–184.

66. Strecher VJ et al. Goal setting as a strategy for health behavior change. *Health Education Quarterly*, 1995, 22(2):190–200.

67. Cullen KW, Baranowski T, Smith SP. Using goal setting as a strategy for dietary behavior change. *Journal of the American Dietetic Association*, 2001, 101(5):562–566.

68. Locke EA, Latham GP. New directions in goal-setting theory. Current directions in psychological science. *Current directions in psychological science*, 2006, 15(5):265–268.

69. Strecher V et al. Tailored interventions for multiple risk behaviors. *Health Education Research*, 2002, 17(5):619–626.

70. Bandura A. *Social foundations of thought and action: a social cognitive theory*. Englewood Cliffs, NJ, Prentice Hall, 1986.

71. Baranowski T, Cullen KW, Baranowski J. Psychosocial correlates of dietary intake: advancing dietary intervention. *Annual Review of Nutrition*, 1999, 19:17–40.

72. Sherwood NE, Jeffery RW. The behavioral determinants of exercise: implications for physical activity interventions. *Annual Review of Nutrition*, 2000, 20:21–44.

73. Lewis MA, DeVellis BM, Sleath B. Social influence and interpersonal communication in health behavior. In: Glanz K, Rimer BK, Lewis FM, eds. *Health behavior and health education: theory, research, and practice*. San Francisco, CA, Jossey-Bass, 2002:240–264.

74. Heaney CA, Israel BA. Social networks and social support. In: Glanz K, Rimer BK, Lewis FM, eds. *Health behavior and health education: theory, research, and practice*. San Francisco, CA, Jossey-Bass, 2002:185–209.

75. *Healthy Lifestyle and Corporate Culture*. Enterprise for Health, 2006 (available at http://www.enterprise-for-health.org/fileadmin/texte/EfH_Healthy_Lifestyle.pdf, accessed December 2007).

76. De Bourdeaudhuij I, Stevens V, Brug J. Evaluation of an interactive computer-tailored nutrition intervention in a real-life setting. *Annals of Behavioral Medicine*, 2007, 33(1):39–48.

77. Brug J et al. The impact of a computer-tailored nutrition intervention. *Preventive Medicine*, 1996, 25(3):236–242.

78. Sorensen G et al. Tools for health: the efficacy of a tailored intervention targeted for construction laborers. *Cancer Causes and Control*, 2007, 18:51–59.

79. Velicer WF et al. An expert system intervention for smoking cessation. *Addictive Behaviors*, 1993, 18:269–290.

80. King E et al. Promoting mammography use through progressive interventions: is it effective? *American Journal of Public Health*, 1994, 84(1):104–106.

81. Rimer BK et al. Does tailoring matter? The impact of a tailored guide on ratings and short-term smoking-related outcomes for older smokers. *Health Education Research*, 1994, 9(1):69–84.

82. Curry SJ et al. A randomized trial of self-help materials personalized feedback and telephone counseling with nonvolunteer smokers. *Journal of Consulting and Clinical Psychology*, 1995, 63(6):1005–1014.

83. Oenema A, Tan F, Brug J. Short-term efficacy of a web-based computer-tailored nutrition intervention: main effects and mediators. *Annals of Behavioral Medicine*, 2005, 29(1):54–63.

84. King DK et al. Outcomes of a multifaceted physical activity regimen as part of a diabetes self-management intervention. *Annals of Behavioral Medicine*, 2006, 31(2):128–137.

85. Delichatsios HK et al. Randomized trial of a “talking computer” to improve adults’ eating habits. *American Journal of Health Promotion*, 2001, 15(4):215–224.

86. Brug J, Campbell M, van Assema P. The application and impact of computer-generated personalized nutrition education: a review of the literature. *Patient Education and Counseling*, 1999, 36:145–156.

87. Skinner CS et al. How effective is tailored print communication? *Annals of Behavioral Medicine*, 1999, 21(4):290–298.

88. Kroeze W, Werkman A, Brug J. A systematic review of randomized trials on the effectiveness of computer-tailored education of physical activity and dietary behaviors. *Annals of Behavioral Medicine*, 2006, 31(3):205–223.

89. Skinner CS, Strecher VJ, Hospers H. Physicians' recommendations for mammography: do tailored messages make a difference? *American Journal of Pubic Health*, 1994, 84(1):43–49.

90. Kreuter MW, Strecher V. Do tailored behavior change messages enhance the effectiveness of health risk appraisal? Results from a randomized trial. *Health Education Research*, 1996, 11:97–105.

91. Bull FC, Kreuter MW, Scharff DP. Effects of tailored, personalized, and general health messages on physical activity. *Patient Education & Counseling*, 1999, 36:181–192.

92. Petty R, Cacioppo JT. The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, 1986, 19:123–205.

93. Calfas KJ et al. A controlled trial of physician counseling to promote the adoption of physical activity. *Preventive Medicine*, 1996, 25(3):225–233.

94. Proper KI et al. Effect of individual counseling on physical activity fitness and health: a randomized controlled trial in a workplace setting. *American Journal of Preventive Medicine*, 2003, 24(3):218–226.

95. Engbers LH et al. The effects of a controlled worksite environmental intervention on determinants of dietary behavior and self-reported fruit, vegetable and fat intake. *BioMed Central Public Health*, 2006, 6:253.

96. Sorensen G et al. Promoting behaviour change among working-class, multi-ethnic workers: results of the healthy directions–small business study. *American Journal of Public Health*, 2005, 95(8):1389–1395.

97. Stoltzfus E. *Emerging benefits: access to health promotion benefits in the United States, private industry, 1999 and 2005*. Bureau of Labor Statistics, 2006 (available at http://www.bls.gov/opub/cwc/cm20060724ch01.htm, accessed December 2007).

98. Hunt MK et al. Cancer prevention for working-class, multi-ethnic populations through small businesses: the healthy directions study. *Cancer Causes and Control*, 2003, 14(8):749–760.

99. Griffiths J, Hayley M, George E. *Stakeholder involvement*. [Technical paper prepared for the WHO/World Economic Forum joint event on preventing noncommunicable diseases in the workplace]. Geneva, World Health Organization, 2007.

100. Gilmartin S. Wellness programs hit the attraction and retention mark. *Workspan*, 2002, 45:46–48.

101. Arneson H, Ekberg K. Evaluation of empowerment processes in a workplace health promotion intervention based on learning in Sweden. *Health Promotion International*, 2005, 20:351–359.

102. WA Healthy Business, 2007 (available at http://www.healthybusiness.asn.au/, accessed December 2007).

103. Engbers L, Sattelmair J. *Monitoring and evaluation of worksite health promotion programs. Current state of knowledge and implications for practice*. [Technical paper prepared for the WHO/World Economic Forum joint event on preventing noncommunicable diseases in the workplace]. Geneva, World Health Organization, 2007.

104. Global Strategy on Diet, Physical Activity and Health. A framework to monitor and evaluate implementation. Geneva, World Health Organization, 2007.

105. Bauman A et al. Physical activity measurement – a primer for health promotion. *Promotion & Education*, 2006, 13(2):92–103

106. Reddy KS et al. *Methods for establishing a surveillance system for cardiovascular diseases in Indian industrial populations*. Bulletin of the World Health Organization, 2006, 84:461–469

107. KS Reddy et al. Educational status and cardiovascular risk profile in Indians. *Proceedings of the National Academy of Sciences of the United States of America*, 2007, 104(41):16263–16268

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Annex 2: Key Resources

See reference list for information on how to obtain these resources.

- Preventing chronic diseases: a vital investment
  http://www.who.int/chp/chronic_disease_report/contents/en/index.html

- National Institute for Occupational Safety and Health, Work Life Initiative
  http://www.cdc.gov/niosh/programs/worklife/

- Integrating employee health; a model program for NASA
  http://www.iom.edu/CMS/3788/18021/26995.aspx

- Improving health, an employer toolkit
  http://www.iom.edu/CMS/3788/18021/26995/35482.aspx

- The Bangkok Charter for health promotion in a globalized world
  http://www.who.int/healthpromotion/conferences/6gchp/bangkok_charter/en/index.html

- Regional guidelines for the development of healthy workplaces. Shanghai, World Health Organization, Western Pacific Regional Office, November 1999

- NASA occupational health: a healthier NASA
  http://ohp.nasa.gov/

- Workplace health system: corporate health model booklet
  http://www.hc-sc.gc.ca/ewh-semt/pubs/occup-travail/work-travail/model-modele/index_e.html

- Workplace health system: small business health model
  http://www.hc-sc.gc.ca/ewh-semt/pubs/occup-travail/work-travail/small-petite/index_e.html

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