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**COMPARATIVE MODELS FOR ACHIEVING AND EVALUATING  
WORKPLACE-CENTERED WELLNESS**

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**Abstract**

Health and productivity are inextricably linked to employment status. It is therefore reasonable to expect health gains from efforts centered on employer-sponsored programs in the workplace. Although the tools for measuring performance and assessing efficacy and the tactics are now well developed, the overall strategy for workplace-centered wellness remains unsettled. Alternative conceptual models are presented here and evaluated for features compatible with goals and objectives in workplace-centered wellness: prevention science, health promotion, employee assistance, disease/case management, wellness and productivity management, economic development, and population health.

Key words: conceptual models, wellness, prevention science, health promotion, employee assistance, disease/case management, wellness and productivity management, economic development, population health.

Health and productivity are inextricably linked to employment status, especially in the United States. It is therefore reasonable to expect health gains from efforts centered in the workplace to enhance and promote the health status of workers through employer-sponsored programs or interventions. Tools and tactics of increasing sophistication have become available, as represented in this journal, for the planning, implementation, and evaluation of workplace-centered wellness programs. The selection of the most appropriate models for workplace-centered wellness remains unsettled, however. This review will discuss and evaluate various models for their intrinsic utility in guiding employer-sponsored programs and for their projected community-level benefit.

The United States is unique among developed countries in experiencing a characteristic cluster of problems to health and the workplace. The United States relies heavily on employers for the financing of health care but expects them to do so through intermediaries (medical care organizations in their many forms, insurance companies) over which they initially exercised little control except through the plans that were offered. Calculations of indirect cost, although now dated, suggest that for every dollar of direct medical cost paid by the employer, two to three dollars have been paid out in industry in general in indirect costs (including lost production, retraining costs, administrative overhead and benefit costs)<sup>1</sup>. Employers are also becoming increasingly disappointed in the performance of market forces in delivering efficiencies in health care<sup>2</sup> and are beginning to voice a desire to disconnect the link between health insurance and employment<sup>3</sup>.

Employers are also experiencing economic pressures to sustain and exceed recent gains in productivity. One response has been recognition that ill-health of the working population results in substantially lost production, through lost work, reduced productivity among those who come to work, and reduced quality of work in jobs that require close attention and stamina. This concern has drawn attention to the potential gains in productivity available through improving health status and through more intensive management of potentially costly individual cases. As a consequence, employers are becoming more assertive in the management of employee's health.

As the attention of industry has shifted from cost control and loss reduction to



productivity, the tools for measuring performance and assessing efficacy have also changed and have become much more sophisticated. Disease outcomes and the cost of disability are relatively crude measures. More sensitive financial and behavioral indicators have been developed to assess productivity on a micro-level, for evaluation purposes, and to identify opportunities for intervention. These include the Health and Labor Questionnaire, the Work Productivity and Activity Impairment Questionnaire, the Osterhaus productivity technique (based on frequency of presence and absence and developed for migraine studies), the MacArthur Health and Performance Questionnaire, the Work Limitation Questionnaire, and the Stanford Presenteeism Scale, among many others. The measures used to do this include time on task in the workplace, work quality, work quantity (productivity), interpersonal functioning in the workplace and work culture. A comprehensive toolkit is now available for application.

An important aspect of productivity research is the financial gain to the employer of promoting health among employees. Current methodology stresses identifying the “break-even” point at which an investment in wellness covers the cost of operating a program<sup>4</sup>. However, senior managers in industry are oriented more toward comparing alternative rates of return than either to loss reduction or covering costs alone, and return may well be higher by using personnel management pressures to exclude high-risk individuals from the workforce or by making jobs more difficult for the disabled (more difficult now with the requirements of the Americans with Disabilities Act) than by modifying the work or introducing wellness programs. It is highly unlikely that an employer would allow this phenomenon, which is encountered regularly in our experience, to be studied in their organization. Financial measures need to be consistent with managerial practice, not solely to justify programs presumed to have public health benefit.

Not as developed but equally important with respect to social benefit is a measure of the advantages of workplace-centered wellness programs to workers and their families: improve general health and vitality, reduced risk of catastrophic illness, enhanced employment security, productivity in non-employment-related activities, and protected social capacity, by which is meant the ability to play social roles as, for example, a parent, friend, community leader or civic participant.

Although the tools and the tactics are now well developed, the overall strategy for

workplace-centered wellness remains unsettled. Several historical models are presented here and evaluated for their intrinsic compatibility with goals and objectives in promoting workplace-centered wellness.

### **Workplace-Centered Wellness: General Strategies**

There are four basic approaches to workplace-centered wellness: prevention, health promotion, employee assistance, and disease/case management. A mastery of these wellness strategies are fundamentally important for designing interventions.

#### *Prevention Science*

Prevention science rests on two traditional modes of disease prevention that can be characterized epidemiologically. An attempt to change the determinants of risk to the entire population is the public health strategy. An attempt to identify and control determinants conferring unusually high risk in a subset of individuals is the clinical preventive medicine strategy<sup>5</sup>.

Preventive interventions are further classified on “three levels”: primary, secondary, or tertiary, depending, respectively, on whether they prevent the occurrence of disease by reducing exposure or modifying risk factors, detect disease or a marker of risk early enough for successful intervention, or limit available disability once a disease has occurred. These strategies are complementary, not competitive. Primary prevention approaches must be based on sound etiologic research but secondary prevention must also contend with the sensitivity, specificity, and predictive value of available screening tests, which add another level of complexity and uncertainty. Tertiary prevention, which is the prevention of disease progression and disability, is particularly germane to the workplace because it protects the workers’ employment and social and future earnings capacity. Tertiary prevention also fits well with the model of workers’ compensation and disability management.

The preventive medicine approach in the workplace, directly applied, is typically limited to screening for common disorders and risk factors and intervention activities which supplement but do not substitute for personal health care. Prevention is more often incorporated into broader



health promotion programs where the emphasis is on primary prevention to reduce disease incidence in the working population and secondary prevention, the early detection of disease and referral for care. Reducing risk factors for later health problems (such as reducing cholesterol levels of cardiovascular fitness training) is more easily accomplished in an integrated health promotion program. In such programs the peer group influence, constant encouragement and feedback, and support network make compliance easier to achieve than individual interventions. Most worksite wellness programs appropriately provide multiple rather than single risk factor reduction<sup>6</sup>.

### *Health Promotion*

Health promotion moves beyond prevention of disease alone and health maintenance, which seeks to maintain the current status and to avoid future health problems, into health enhancement, seeking actual improvement in functional and health status. The approach of health promotion proposes that individual interventions can be achieved by motivating health-conscious behavior in subjects as groups and by institutional interventions that change the options available for individual behavior. More sophisticated approaches to health education, peer pressure within identity groups such as large companies, and a rewards system create a social climate in which healthful behavior is not only considered responsible but constitutes a social norm.

The strategy of health promotion is a hybrid of the public health and the clinical preventive medicine approaches in strategy but with a more positive (in the sense of proactive rather than prescriptive), health-centered approach in its philosophy. In health promotion programs, one uses broad and relatively unselective interventions such as health education, the media, and the group activities such as fitness programs to motivate individuals to change their personal health-related behaviors. The decision of the individual is facilitated and supported through the creation of persuasive forces that make compliance a social expectation and norm. The result is a movement that allows individuals to make their own relatively educated decisions on healthful living but that allows few means of providing for individual differences. Health promotion programs usually incorporate several health-related activities. (Table 1) They may be based on company grounds or at a community facility. Health promotion programs typically

blend three approaches to employee health: health education, prevention (see above) and fitness. The health education component is concerned with teaching employees the essentials of a healthy lifestyle, such as good health habits, sound nutrition, and the consequences of smoking, alcohol, and drug abuse. Beyond the informative aspect of health education, however, is attention to the psychological principles that motivate people to comply with sound health practices or to take unnecessary risks which jeopardize their health. Simple information transfer is not enough.

Health promotion became an exceedingly powerful movement in the 1980's that reversed the traditional context of prevention-oriented services. Previously, the more healthful behavior may have required extra effort and may have been contrary to social norms. Now, the healthy behavior is the accepted standard and the unhealthful behavior is socially deviant. The health promotion enterprise also set into motion powerful social forces. Concepts about health, physical fitness, and personal responsibility for oneself are continually reinforced by peer pressure. By making the decision as to whether and how to participate in health promotion activities an individual one, however, the health promotion strategy may fall short in three important ways: 1) individual differences may be unrecognized by the participant, 2) great and at times unfair peer pressure falls on those who do not choose to participate, and 3) there is no synergy with the health care system.

Health promotion programs have not had as much success among rural, working-class, and socially isolated subgroups compared to urban, better educated, and more affluent Americans. Self-selection and attrition remain major limitations of worksite health promotion programs with few recent gains reported in program management<sup>6</sup>. One exception is an incentive program based on the employer's contribution to an employee's individual "cafeteria fund" (i.e., the company buys lunch), which demonstrates that simple measures to achieve gains are still possible within the health promotion paradigm<sup>7</sup>.

Evaluation of the impact of worksite health promotion programs suggests that well managed worksite health promotion programs succeed in reducing illness and health care utilization, improving employee morale, and encouraging lifelong good health habits. However, effectiveness is not the only reason for their popularity. Those companies that are more committed to health promotion are larger and more likely to be involved in high technology, in



which case they are usually in competition for desirable employees. The employees drawn to worksite health promotion programs tend to be health-conscious and active already. More women than men participate and women tend to participate in more activities, particularly those that involve interpersonal skills, stress reduction, and weight control.

### *Employee Assistance*

Employee assistance programs (EAPs) identify workers with personal problems, refer them for treatment, support and motivate them to complete treatment, and assist in their rehabilitation. EAP is therefore, by definition, a form of tertiary prevention. The majority of "broad brush" EAP's are really substance abuse and financial counseling programs with a relatively small preventive aspect. Most EAPs are focused on alcohol and drug abuse and mental illness, but many concern themselves with family and adjustment problems, financial mismanagement (particularly credit card overruns), and stress. EAPs are pivotal in the management of mental disorders, which is the second major category of disability in the United States and among the most costly diagnostic category for employer-sponsored health insurance, primarily because of long-term disability and duration of treatment and absence incidents.

An EAP operates primarily by self-referral of patients, who are then referred to local health care or counseling facilities. Some workers are sent to EAP programs by their supervisors as a condition of retaining employment when their job performance has suffered or they have appeared to be impaired. The employer is informed of the progress of the employee's rehabilitation and guarantees return to the same or similar work when recovery is sufficient. Confidential information, such as diagnosis, treatment, and the content of interviews are not shared with management. EAPs usually do not provide direct treatment except for initial counseling. Instead, these programs usually rely on existing community services.

If a worker presents signs of personal problems, anxiety, or substance abuse, that worker may be helped by self-referral to an employer's EAP, if one is available. In the absence of an EAP, the physician can perform the initial evaluation, triage, and, in some cases, begin treatment on an individual basis. Many employers will be cooperative and may assume costs for key or long-term employees if reimbursement under the health plan is not complete. It is not unusual

for the cost of treatment to be shared between the employer and the health plan or a private insurer, depending on local arrangements.

Employee assistance programs are a very mature intervention strategy, with precedents going back decades, established protocols, and a wealth of empirical experience. The literature is summarized in one authoritative source, making this one of the few fields of public health that, uniquely, can be encapsulated in a single handbook<sup>8</sup>.

### *Disease/Case Management*

Employers have become increasingly interested in managing high-cost cases through assistance in scheduling, monitoring compliance, referrals to specialized care, convenient workplace health monitoring (through their occupational health services), education and behavioral medicine, pharmacy-care programs and tertiary prevention (interventions to prevent disabilities and disease progression). This trend, which is growing in strength in the business community, follows the observation that individualized risk factor intervention for high-risk employees results in more favorable outcomes than broad employee health promotion programs alone<sup>6</sup>.

An example of the disease management approach is a program introduced by Lucent Technologies. Employees were screened for cardiovascular risk factors and qualified high-risk employees were then supported through exercise/fitness programs, educational programs, dietary change and individualized on-site counseling in the workplace. The program achieved a high level of employee satisfaction, identified 2.4% of the employees as having diabetes, and resulted in 17% of the employees beginning cardiovascular medication<sup>9</sup>. On the other hand, in one employer-sponsored cardiovascular risk reduction program, employees who were followed up with structured programs after screening did not do as well as those who chose informal means of health risk management<sup>10</sup>. Thus, there is much that remains to be defined and clarified in the disease/case management approach.

The principal conditions which major employers considered to be priorities (over 40% deemed highly important) to manage in order to meet health and productivity goals are those that incur the greatest costs: back pain, musculoskeletal disorders, depression and other mental



disorders, repetitive strain injury, cardiovascular risk factors (hypertension, obesity and diabetes), substance abuse, smoking-related problems, and influenza. However, employers rated their performance in meeting priority conditions as most deficient for arthritis, obesity, diabetes, headache/migraine, and back pain<sup>11</sup>. The conclusion to be drawn from these and other data is that there is a large performance gap in management of disorders connected with the greatest loss of productivity and that current models of intervention and behavior change are not meeting the need.

The movement for intensive case management is not well documented in the literature, unlike the abundant literature on the health promotion movement. Employers are engaging in this reluctantly, aware that the approach may be considered intrusive by employees and unions and consider that they are being forced, in effect, to assume responsibility for direct delivery of care, which is outside their core business and comfort zone.

This is fertile ground for outcomes research and demonstration programs. The literature on disease and case management is poorly developed but this approach has been called the most promising in workplace-centered wellness studies<sup>6</sup>.

### **Three Contextual Frameworks**

Workplace-centered wellness is also informed by three distinct theoretical frameworks, each of which are applicable in different settings and for different purposes: wellness and productivity management, economic development, and the population health model.

#### *Wellness & Productivity Management*

Health care today is confronted by severely rising costs, which have led employer-payers to consider new health care reform strategies. This strategy emphasizes prevention, managed care, and marketplace mechanisms and has increasingly considered previously unacceptable measures that involve intensive case management, individual intervention, and personal tracking that would previously have been considered overly intrusive on the part of an employer. However, faced with the burden of paying for health care coverage, employers are increasingly assertive in their role as health care managers and see no alternative to managing their



employees' health as a human resource. What is new about this approach (which is not well documented in the medical literature) is that efforts are targeted and the interventions are specifically designed to reduce high-cost outcomes such as chronic disability.

This framework emphasizes science-based health and human performance conducted to identify target opportunities for controlling costs and enhancing productivity. This would be achieved through reduced sickness incidents, improved case outcomes, increased "presenteeism" (the opposite of absenteeism) and enhanced physical capacity. Unlike past approaches to health promotion, however, the workplace-centered wellness and productivity approach emphasizes assessment of the needs and costs incurred by a particular working population. Most commonly, cardiovascular and mental disorders are the leading targets, and the intervention may take the form of health promotion programs or intensive case management for high-cost categories of insurance claims, such as diabetes.

Studies in support of these goals are often undertaken with the cooperation or even sponsorship of providers and of the pharmaceutical industry, which has an interest in developing the potential of its products. It is expected that such companies, which are increasingly moving from their traditional base in manufacturing and marketing products into integrated disease management services, are likely to be major future employers of graduates of the WW RTP and similar programs.

The prevailing philosophy has been that health care costs could be brought under control - or at least reduced into more manageable proportions - by reducing both the actual need and the market-driven demand for health services<sup>12, 13</sup>. This strategy encourages interventions targeted to prevent loss of productive years of life and to prevent disability, rather than the more traditional goals of extending life and preventing disease. For example, one major initiative undertaken by Thomas Jefferson University was to quantify lost productivity due to migraine headaches, on the theory that intensive management could result in considerable cost savings that would recover the cost of introducing and maintaining the program<sup>14</sup>. This policy approach may require substantial cultural change to discourage risk-taking behavior, to devolve responsibility for personal health management (and triage) on the individual from a practitioner or system, and to manage individual cases through intensive case management, facilitated scheduling or services

and provider discounts (such as drug plans). The goals would be achieved by, respectively, health promotion (and self-care), managed care, and intensive case management.

However, for all the literature evaluating health promotion programs for effectiveness and costs, in 1993 the Health Project Consortium could point to only eight in 200 studies that documented cost savings, despite reductions in sickness absence, outpatient costs, and hospitalization<sup>15</sup>. Some programs previously thought to have been successful have been shown to have had disappointing results when analyzed by superior methodology<sup>16</sup>. Overall, worksite health promotion programs seem to show high efficacy, moderate effectiveness in practice and variable results for sustainability and management of medical costs<sup>6, 17</sup>. Whether this effect is perceived by managers as worth the investment, and whether sufficient return on investment is likely to accrue to the organization to make the intervention an attractive investment is another question. Faced with this dilemma, corporate medical directors and consultants have launched initiatives to improve the state of the art in this field<sup>18</sup>. This strategy is therefore the one most likely in the near future to experience rapid advances in theory, methodology, and intervention "technology".

### *The Economic Development Framework*

A working model of economic development is emerging that incorporates issues of environmental quality, health status, and health compatible with and generalizable to societies at different levels of development<sup>19</sup>. The model builds in four stages, incorporating additional terms such as women's role in society, education, labour dynamics, infrastructure, agriculture, and other issues. In the final stage, the health status and risk of individuals is treated separately but linked to levels of health status in the population. We consider this model to be a starting point for understanding the relationship between health and development in a society such as the United States that has a well-developed industrial economic base but that is going through a transition to the next, unknown level of development. All societies are developing, in a sense, because currently "developed" societies are going through another, sometimes, painful transition to a new type of economy.



Development should no longer be considered to be a problem faced exclusively by the developing world. Developed countries such as the United States are in the midst of another development transition that is profoundly restructuring society: the conversion from an industrial to a “post-industrial,” information-driven economy. For this reason, development problems and development theory are no longer primarily a matter of international assistance and trade. The study of development as a process carries lessons for their own social and community development as well. At present, the outlines of this next level of development are still unclear. The development process is complex and difficult and there is much to learn from sharing the experience of societies at all levels of development<sup>20</sup>.

Although the project has primarily concerned communities of a special nature, the basis for this model has also been drawn from recent work on development policies and health, the environment and health, social policies and development, and the role of women in development and health. All of this comes together in the work of the World Bank, which has been a principal resource for these issues and appropriately influential in our thinking. Although the basic development model has widespread acceptance in the field, it has been difficult to connect to environmental indicators, the consequences of ill-health for members of society, and to the relationship of health and employment. Further development of the new, emerging economic model is needed to accommodate health outcomes, as in Figure 1.

The building blocks of the current model incorporate population health status (frequency of health problems and the level of health by various indicators related to personal risk and behaviour, for the community as a whole). (Figure 1) Access to health is incorporated as part of infrastructure development and urbanization but drives population health status only indirectly, by influencing personal health outcomes in the individual case. These outcomes may result in a largely socially defined role of illness, disability, and invalidism; whether a given condition is recognized as disabling or not is often culturally determined. This is a departure from most models, which would interpret population health measures as reflecting the aggregate of personal health characteristics in the population. In this model, the measures of population health status are assumed to represent the burden and the risk of ill-health for the majority of people and the current state of ill-health for a minority of sick people at any one time who need access to health



care. The total illness burden on society is translated into a population health level by the process by which society defines illness and chooses to accept or to act to prevent a burden of illness. On an individual basis, the burden of ill-health is experienced as disability, loss of employment opportunity, reduced or absent earning potential and social dependence.

### *The Population Health Framework*

Population health is a broad concept that distinguishes between the health status of an entire population, as measured by various indicators, and the sum total of the health conditions or capacity of the individuals in the population. It is best developed in a framework known widely, especially in Commonwealth countries, as “the population health model.” The population health model was an invention of a group of investigators most of whom were associated either with the University of British Columbia and the Canadian Institute for Advanced Research. Much of the model is explicitly based on insights from the Whitehall studies conducted on British civil servants in the 1970’s<sup>21</sup>. The model is outlined in the seminal book on the field, *Why Are Some People Healthy and Others Not?*<sup>22</sup>. The United States has not adopted nor widely discussed such models of population health but they provide an alternative way of looking at health issues that applies to this country<sup>23, 24</sup>.

The essential elements of the population health model can be summarized in Figure 2, which is adapted from this book. The model postulates five determinants of health of the population as a whole (genetic endowment, physical environment, social environment, health care, prosperity and well-being). The population health model also goes into greater depth in considering the social context inherent in the “social environment” determinant, recognizing such factors as place in the social hierarchy, empowerment (akin to the concept of social capacity in economic development theory), social connections, affluence, and nurturing and early child-rearing. It is a tenet of the population health model that the social factors on this list, in particular hierarchy and equity in the distribution of wealth, but also affluence, are more important as determinants of health for *groups* of people than any other determinants on the list<sup>25</sup>. The advocates of the population health model infer from the data that there is a non-material social factor that they assign variously to the community, to individual position in the hierarchy, to

control over one's workplace or personal life or to anthropological phenomena, presumably programmed into the primate brain.

The population health model is a powerful concept in many ways, but its advocates have not yet convincingly demonstrated its central tenet, that there is a novel social mechanism driving the attainment of health status in groups of people<sup>26</sup>. The evidence for the population health model, and for this nonmaterial factor, is based largely on studies that compare indices of health status with income or employment over time in one country or among different countries<sup>27</sup>. Studies based on the population health model suggest that the differences in health status cannot be explained by any of the usual factors associated with income and social class, such as nutrition, lifestyle choices (such as smoking), housing, occupational hazards, access to medical care, threat of violence, neighborhood pollution, culture and ethnicity, attitudes toward health and disability, exercise and fitness, obesity, and access to day-care and help in child-rearing. These findings require confirmation – the population health model is not empirically validated. This provides numerous opportunities for students to tackle theoretical and applied problems involving the model.

The population health model is very controversial<sup>26</sup>. However, elements of it, if validated, may lead to innovations and econometric models (relating input of investment in social and economic initiatives to output in improved health status)<sup>25</sup>.

### **Evaluation of Workplace-Centered Wellness Models**

Table 2 presents an evaluation of the intrinsic features of the seven models by the following criteria, applied solely to the issue of workplace-centered wellness:

- *Theoretical grounding.* Is the model based on a well-developed theory sufficiently developed to guide implementation and evaluation?
- *Empirical validation.* Is there a robust and broad empirical literature that evaluates the model in many applications and provides technical guidance for implementation?
- *Management tools.* Does the model lead naturally to the formulation of management tools?
- *Employer interest.* Does the model address the economic and other interests of the



employer?

- *Worker interest.* Does the model address the economic and other interests of the worker-participant?
- *Community interest.* Does the model address the economic and other interests of the community as a whole and the social benefit to be derived, apart from the sum of the individual benefits to the community?

The strongest models, by this evaluation, are the prevention model (not surprisingly, since it is a fundamental paradigm), the employee-assistance model (largely because it addresses the interests of stakeholders very explicitly), the health and productivity model (largely because of its empirical strengths) and the economic development model (which is not generally applied to wellness). The economic development model demonstrates surprising strength in integrating the interests of workers, employers, and society as a whole. To be applicable to workplace-centered wellness, however, the economic development model requires further development with respect to health-related behavior and its relationship to social capacity, along the lines of the thinking of Amartya Sen<sup>28</sup>. A combination of conceptual approaches may be the best way forward.

An eclectic approach, incorporating different models, makes sense for many reasons. One is that the different models have different emphases. The prevention model, for example, is a fundamental approach that underlies the others but provides on general guidance in terms of application. The health promotion model is a general strategy that provides the necessary application for largely healthy and functional populations as does the employee assistance model for workers with problems of a social or dependency nature. The case management model operationalizes wellness interventions for the individual worker, who is generally presumed to have a health problem, but says little about community impact. The population and economic development models describe relationships at an abstract or population level but are difficult to operationalize for individual workers or workplaces. Integrated strategies therefore have the potential to lend complementary strengths to workplace-centered wellness programs.

Similar conclusions have been reached independently by Ockene et al., in the context of community-centered wellness initiatives<sup>29</sup>.



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Table 1. Typical Components of Worksite Health Promotion Programs

**Health Education:**

Cancer prevention	Common minor illnesses
Heart disease	Child health
Mental health	Care of the elderly
Nutrition	Diabetes
Substance abuse	Allergies
Smoking	Automotive safety
Accident prevention	Families relations
	Back school (prophylactic)

**Preventive Medicine:***Screening Activities*

Hypertension screening  
 Diabetes screening  
 Glaucoma screening  
 Cardiovascular risk factors  
 Pulmonary function testing  
 Weight monitoring  
 Breast cancer  
 Stool occult blood

*Intervention Activities*

Smoking cessation  
 Dietary interventions  
 Back school (rehabilitation)  
 Weight control  
 Stress reduction  
 Prescriptive exercise regimes  
 Unsupervised exercise  
 Hypertension control, monitoring



Table 2. Evaluation of Intrinsic Features of Models for Workplace-Centered Wellness.

<i>Model</i>	Theoretical Framework	Empirical Base	Management Tools	Employer Interests	Worker Interests	Community Interests
Prevention (all levels)	+	+	+			
Health Promotion	+	+	+		+	
Employee Assistance	+	+	+	+	+	
Case Management				+	+	
Health & Productivity		+	+	+	+	
Economic Development	+		+	+	+	+
Population Health	+					+

Figure 1. Building blocks of a model for economic development and health. (Guidotti, 2002)

Population / Public Health Status				
"Sick role"	Environmental Quality	Occupational Health		Health Care Access
	Children	Wage Economy	Infrastructure	
	Human Rights	Population / Resource Imbalance	Urbanization	
	Women	Rural Economy	Agriculture	
	Education	Culture		
Personal Health Status				



Figure 2. The “population health model” as adapted from the Canadian Institute for Advanced Research. (Evans et a., 1994)

