Conceptual Review: International Health

International Collaboration in Health Promotion and Disease Management: Implications of U.S. Health Promotion Efforts on Japan's Health Care System

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Abstract

For more than 25 years, health promotion and disease management interventions have been conducted by large employers in the United States. Today there are more than 100 studies of such multifactorial, comprehensive interventions that all demonstrate positive clinical outcomes. For those interventions that have also been evaluated for return on investment, all but one have demonstrated cost-effectiveness. This article is an evidence-based overview of the clinical and cost outcomes research to elaborate on the insights gained from this research in the areas of implementation and evaluation of such programs; integration of health promotion and disease management programs into conventional, occupational medicine; accessing difficult to reach populations, such as mobile workers, retirees, and/or dependents; areas of potential conflict of interest and privacy/confidentiality issues; health consequences of downsizing and job strain; and, finally, recommendations for improved integration and evaluation of such programs for both clinical and cost outcomes. With medical costs rapidly escalating again on a global scale, these interventions with evidence of both clinical and cost outcomes can provide the foundation to improve the health, performance, and productivity of both individuals and their corporations. (Am J Health Promot 2005;19[3 Supplement]:216–229.)

Key Words: Disease Management, Health Promotion, Cost and/or Outcomes, Prevention Research

Japan is often cited as one of the healthiest nations in the world evidenced by the longest disability-adjusted longevity and its universal health coverage with relatively low medical care costs. However, Japan has been faced with an enduring recession and the steady increase in medical care expenditures largely due to its aging population. For employers to regain their competitiveness in the global market, it is crucial that they explore strategies to reduce medical care costs. Excessive medical costs add to the cost of every product and service and adversely impact the global competitiveness of that product or service.[1] It seems appropriate that employers, as the purchaser of health insurance, focus on the demand side of the health care system. Health promotion and disease prevention activities have been proven to reduce health risk, resulting in lower medical care utilization, and promote more appropriate and timely use of medical care.

This article examines the characteristics and selected clinical and cost outcomes of corporate health promotion and disease management interventions in the United States with implications for similar developments in Japan. To examine these complex issues, this article points out both the characteristics of successful interventions and their limitations and future innovations. Based on a series of five review articles by the author since 1980,[2-6] the format is an updated, critical review of those reviews and

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selected additional reviews focused on both the clinical and cost outcomes of corporate health promotion and disease management interventions that have been rigorously evaluated for effectiveness. Focus in this article is on comprehensive, multifactorial interventions that have also been evaluated for both clinical and cost outcomes. Single-factor interventions, such as smoking cessation, or programs that have not been evaluated are commendable and often effective but have not been included in this literature review.

Societal changes are altering the structure, incentives for, and locations of work, as well as the organization and provision of medical care services. These changes include trends toward corporate downsizing and part-time employment, desktop computing and telecommuting, use of computers for delivery of medical interventions using a telemedicine approach, and increasing employer medical costs.[1] Although these are often perceived as crises, these trends also provide opportunities to rethink the role of health promotion and disease management in the workplace and to better integrate medical care and preventive services for employees and their dependents.

For many years, medical and health promotion and disease management perspectives developed along parallel but separate tracks, owing to the different emphases they placed on curative and preventive strategies and the tensions between these alternative, yet complementary, approaches to health care.[7–9] Recently the need to reduce rapidly escalating medical costs, the shift toward outpatient services and managed care, increasingly sophisticated use of telemedicine delivery models via telephone and computers, and the emergence of community care networks have created a more favorable climate for collaboration among physicians, hospital administrators, health promotion specialists, and private corporations.[10–12] Clearly, the prospects for achieving a more clinically effective and cost-effective health care system will be improved to the extent that medical and disease prevention strategies can be better integrated in the coming years.[13–17] Worksites are especially amenable to the development and delivery of more integrated approaches to health care.

Worksites are those settings in which one or more individuals engage in work-related tasks, including the offices, factories, warehouses, and other facilities controlled by organizations; vehicles operated by employees, such as trucks, buses, and taxis; and residential offices of home workers. Worksites afford a high degree of leverage for influencing the health of the population. More than 110 million persons are employed in the United States, and an additional 200 million of their dependents are potentially affected by worksite health programs. Many adults spend a substantial proportion of time at work each week (approximately one-third of their waking hours).[18,19] Moreover, worksite health programs are likely to assume increasing importance in the national debate about managed care, since many large self-insured corporations have implemented and evaluated alternative plans for managing employee health costs during the past decade.[20] This extensive corporate database can help inform future efforts to develop managed care models that are maximally effective with regard to their health and cost benefits.

Overall, the purpose of this review is to determine the lessons learned from the clinical and cost outcomes research of United States–based health promotion and disease management interventions for application with Japanese corporations. This approach is evidence based and cumulatively derived from a series of five review articles published by the author since 1980. To present this large body of research as succinctly as possible, this article addresses the most important issues and lessons learned to implement effective interventions and evaluations.

PREVALENCE AND EFFECTIVENESS OF WORKSITE HEALTH PROGRAMS

During the past 20 years, worksite health promotion programs in the United States have expanded rapidly in response to regulatory, economic, medical, and social forces.[18] A major incentive for employer investment in worksite health promotion has been the rapid and sustained increase in health benefit costs since the late 1970s, despite substantial corporate investments in a variety of cost-control strategies.[21] In recent years, corporations paid an estimated 30% to 40% of the national health expenditures, the total of which increased from approximately 6% of the gross national product in 1966 to nearly 14% in 2002.[14,22,23] Health promotion and disease management programming has been embraced as a rational effort to prevent the high-cost illnesses that consume most corporate health benefit dollars.[24] Employers' investment in health promotion programs is supported by a growing number of well-designed epidemiologic studies that relate modifiable risk factors for heart disease, many cancers, stroke, and common causes of morbidity, such as low back and repetitive strain injuries. Public policy statements, such as the Surgeon General's 1979 report on health promotion and disease prevention[25] and the 1991 publication of *Healthy People 2000: National Health Promotion and Disease Prevention Objectives,*[16] have emphasized the potential benefits of investment in health promotion and disease management programs.

A national survey of 1358 worksites indicated that two-thirds of the participating companies with 50 or more employees offered at least one health promotion activity.[26] Smoking cessation, health risk appraisal, back care, stress management, and physical fitness programs were the most frequently cited health promotion activities at these worksites. Spouses, dependents of workers, and retirees were found to have less access to corporate health programs than employees. Specifically, all permanent employees were eligible to participate in health promotion activities at 85.4% of the worksites, whereas spouses and dependents were eligible for these programs at only 30.1% and retirees at 30.4% of the participating companies.

A second national survey of 1507

worksites found that, by 1992, 81% of the companies sampled offered at least one health promotion activity.[27] The activities mentioned most frequently in the 1992 survey included injury prevention, physical fitness, smoking control, and stress management, with the prevalence or worksite smoking policies increasing by 118% between 1985 and 1992. Both the 1985 and 1992 surveys indicated that larger companies sponsor a broader array of health promotion activities than smaller ones. In 1992, for example, worksites with 750 or more employees were nine times as likely to offer cancer screening programs than companies with fewer than 100 workers and approximately three times as likely to provide blood pressure control, physical fitness, and weight management programs.[28] Most recently, a third survey was conducted in 1999 by the Association of Workplace Health Promotion, which confirmed these trends.[29] Clearly, the larger worksites confer an advantage for such interventions, but the new telemedicine approaches that use mail, telephone, and computers can reach individual employees anywhere in the world.

As corporate investment in worksite health promotion and disease management programs increased during the 1980s and 1990s, scientific efforts to evaluate the health and cost benefits of these initiatives also expanded. Between 1980 and 2000, peer-reviewed studies evaluated the effectiveness of worksite health programs. Two recent reviews of these evaluations found convergent evidence of improved health outcomes relative to smoking cessation, weight loss, and coronary heart disease risk factor reduction after employees' participation in worksite health programs.[1,5] Also, among the 54 programs that were evaluated in terms of cost-effectiveness or cost-benefit criteria, only one failed to indicate a positive return on investment. Evaluations ranged from 6 months to 6 years, with the studies of longest duration, the largest number of participants, and the most rigorous research designs using randomized clinical trials occurring since 1991.

Specific health promotion strategies that show promise for being both health and cost-effective include (1) intensive marketing efforts to obtain high levels of initial and continuing participation among employees in worksite health programs[30]; (2) targeting all employees but providing higher levels of program intensity to those with identified medical risk factors[31,32]; (3) employee participation in health risk appraisal and lifestyle change programs that provide multiple, periodically updated program offerings that target a wide range of risk factors and medical problems[24,31,33]; (4) employer policies banning smoking at the worksite and requiring the use of safety belts in all employer vehicles and company-sponsored trips[16,34,35]; and (5) personalized telephone contacts, counseling, and feedback to recruit employees into medical screening programs and encourage their adherence to recommended lifestyle changes.[36,37] Such interventions have been demonstrated to have positive clinical and cost outcomes in industrial sectors, such as airlines, banking, telecommunication, and high technology.

Comprehensive health promotion and disease management programs have evolved significantly during the last two decades in both large and small worksites. Large self-insured and self-administered corporate medical plans are prototypes of the increasing emphasis on comprehensive health promotion and disease prevention programs in managed care plans. Inherent to managed care is increasing emphasis on both clinical effectiveness and cost-effectiveness. With the second generation of worksite programs, there is a greater emphasis on disease management with high-risk employees, combinations of public health and individualized behavioral risk management, and harnessing of telemedicine delivery technologies. Such innovations at least offer the opportunity of extending such interventions to dependents, retirees, racial and ethnic minorities, and the working poor. These programs are more likely than general health promotion programs to generate return on investment because they focus on high-risk individuals who typically affect medical or related costs in the near term, such as absenteeism and productivity.

Increasingly, the evidence supporting both the clinical effectiveness and cost-effectiveness of such programs is becoming more compelling. Previous literature reviews of the clinical and cost outcomes of comprehensive health promotion and disease management programs in the worksite have been published by this author,[4,38,39] other researchers,[40] and an ongoing series by Chapman.[41] Based on these reviews of comprehensive health promotion and disease management programs in worksites, 77 studies have been cited in a previous series of four reviews.[4,39,42] There have been three additional reviews written since 1995. In 1997, Heany and Goetzel reviewed 47 studies based on 35 programs; they concluded that the evidence for positive outcomes was rated as "indicative/acceptable." An overview by O'Donnell later in 1997 assessed 36 studies, with two-thirds of them having experimental or quasi-experimental designs.

Based on these studies, the area of multicomponent programs was again rated "indicative to acceptable."[43] A review by Aldana[40] in 1998 indicated positive cost outcomes of such programs. Collectively these reviews and those of this author clearly indicate that multifactorial or comprehensive interventions rank higher in both clinical effectiveness and cost-effectiveness compared with single-factor disease management programs, such as smoking cessation. Studies cited in this article and in previous reviews are providing corporations, insurance providers, consulting firms, and government with the preliminary data to guide program design, implementation, and evaluation.

CAVEATS REGARDING EARLIER WORKSITE HEALTH PROGRAMS

Although evaluative studies have documented the health and financial benefits of worksite-based programs, they also reveal some important shortcomings in earlier interventions. First, most corporate health programs implemented to date have been limited rather than comprehen-

sive in scope. These programs have emphasized risk factor reduction strategies, such as smoking cessation, stress management, and health risk appraisal, but have not integrated disease prevention and safety programs with organizational policies to enhance the physical and social quality of the workplace.[2,18,38,44] Increasingly, corporate policies and procedures are evolving to be more supportive to creating an overall healthy environment.

Second, previous worksite interventions, especially during the 1970s and early 1980s, emphasized primary prevention efforts to enhance wellness and illness risks. Unfortunately, they neglected opportunities to combine health promotion with secondary prevention, early detection and treatment of disease, tertiary prevention strategies, and medical and rehabilitative services to minimize morbidity and hasten recovery from disease. Ideally, employers could offer worksite wellness activities in conjunction with a variety of preventive services (e.g., periodic physical examinations and screening for hypertension, high cholesterol level, and cancer risk) and rehabilitative programs to facilitate workers' recovery from cardiac events, back injuries, and other medical problems. An encouraging trend in this regard is the higher percentage of companies that offered some form of preventive service between 1985 (30%) and 1992 (52%).[28] Nonetheless, preventive services at the worksite are often provided in piecemeal fashion rather than as part of a more comprehensive approach that integrates health promotion strategies with diagnostic and rehabilitative services.[3,45] This is beginning to change. In the last 2 years,[1] there has been an increasing integration of general preventive services with health promotion and disease management.

Third, worksite health resources have been unevenly distributed among different segments of the labor force. In general, access to corporate health programs has been greater among permanent employees who work for larger companies at a single worksite. For other groups, such as highly mobile workers (e.g., drivers, sales personnel) or those employed by small businesses, residing in rural areas, and working in such industries as agriculture, mining, construction, and manufacturing, the availability of worksite health programs has been more limited. Access to corporate health programs also has been lower among chronically or transiently unemployed individuals, employee dependents and retirees, and individuals whose social, cultural, or educational backgrounds make them less responsive to commonly used health promotion messages.[25–27] Reaching such populations requires new methods, such as the use of telemedicine by telephone, mail, and computer.

Fourth, although there is increasing evidence of the health and cost benefits of certain interventions, such as personalized counseling and follow-up sessions to enhance employees' hypertension control, weight loss, and smoking cessation,[36] as well as health risk appraisal and behavioral change programs,[46,47] many worksite-based programs implemented in previous years have not been rigorously evaluated for their clinical effectiveness and cost-effectiveness. Among those programs that have been evaluated, the conclusiveness of research findings is sometimes limited by methodological constraints, such as nonrandom assignment of workers to intervention and control groups, the use of narrowly circumscribed measures to evaluate employee health status, and the lack of standardized criteria for calibrating the cost-effectiveness of worksite programs.[44,48] Despite these limitations, the preponderance of research indicates positive clinical and cost outcomes.

Finally, as companies expand their efforts to reduce employee health costs through managed care, health risk appraisal, mental health counseling, and medical surveillance programs, potential conflicts of interest can arise among employers' financial concerns, employees' privacy rights, and physicians' concerns about patients' well-being.[48,49] Balancing individual, corporate, and societal ethics and mores is a complex area that ranges beyond the provision of medical care.

IMPLEMENTATION AND EVALUATION CHALLENGES FOR HEALTH PROMOTION

Numerous clinical interventions and epidemiological studies of chronic disease clearly indicate that behavioral risk factors play an essential role in the etiology of disease. Overall, the evidence from this review indicates that multifactorial, comprehensive worksite health promotion and disease management programs focused on multiple risk factors are likely to reduce employee risks for chronic disease.[5,50–56] By extension, such interventions may be both a clinically effective and cost-effective means to deliver comprehensive risk reduction programs to additional worksites, ranging from small to large employers.

One unequivocal caveat is that a public health model of exposing the entire employee population to such programs is a necessary but not sufficient condition to achieve enduring risk reduction.[39,42,57] Interventions that depend solely on educating the general employee population are relatively inexpensive. However, they do not appear to be as effective as a more intensive and expensive approach, which adds sustained, periodic individual counseling and support.[50–56,58–62] Every program included in this review that focused on a high-risk employee or condition offered individualized risk reduction counseling to high-risk employees in the context of a worksite risk education reduction for all employees. Overall, the general health promotion and disease prevention environment of a worksite appears to be a necessary but not sufficient prerequisite to engender sustained risk reductions among high-risk employees.

Following directly from this observation is that once such a supportive worksite environment is established, the most significant clinical and cost outcomes are likely to be evidenced when a subsequent intervention is introduced that focuses on identified individualized risks.[50,53,55,58] Such a disease management intervention

needs to provide focused, consistent, sustained behavioral change, plus appropriate medical oversight.[51,52,54,59–63] Such a multiple risk factor intervention model is also applicable to single risk factors, such as smoking and hypertension, and to other chronic conditions, such as stress, arthritis, musculoskeletal disorders, video display terminal and/or repetitive motion trauma and disabilities, back injuries or pain, and cancer, that constitute major clinical and cost liabilities to employers.[51,52,60] One study at Chevron by Goetzel et al.[53] reported reduced pharmaceutical expenditures. This is a significant outcome, since pharmacy costs remain one of the most rapidly rising, unchecked areas of medical expenditures.

From 1998 to 2002, there were three new trends that became clearly evident. The first trend is a marked decrease in the number of formal randomized controlled trials in worksites. This may be due to the difficulty in obtaining either government or private foundation funding for such research. Based on this observation, the second trend is toward companies conducting focused disease management programs on areas that are of specific importance to the employer and evaluating such interventions as predemonstration and postdemonstration projects with both clinical and cost outcomes[53,56] but not with control trials. Such demonstration projects are excellent and commendable by the company but represent a major lost opportunity for more formal research designs and analysis. Following from this trend is the third trend, where companies conduct an observational study to track the preclinical, postclinical, and cost outcomes of participants vs. nonparticipants in comprehensive worksite programs.[51,52,58,59,61,63] Most notable are the Citibank studies conducted by Goetzel et al.[50,53,56] Company-sponsored clinical and cost outcomes research is a new and positive trend.

Given these three trends, these studies are predemonstration and postdemonstration projects that are conducted within the context of an ongoing, comprehensive worksite program. Most often the evaluation design is that of an observational study of preoutcomes and postoutcomes with participants vs. nonparticipants as the control and comparison group. These studies are of a quasi-experimental design with preoutcomes and postoutcomes of the participating subjects.[6] Although these are not at the usual level of randomized control trial sophistication, they represent the most significant trends from 1998 through 2001 but underscore major new areas of innovation for future programs and evaluation using more rigorous methods.

Methodological rigor of worksite health promotion evaluation and disease management studies has evolved considerably throughout the years. Methodological challenges are great, and further innovation and refinement are necessary. All of the currently reviewed studies indicate both favorable clinical and cost outcomes in both experimental and quasi-experimental designs. Despite the many limitations of current methods, most research to date indicates (1) favorable clinical and cost outcomes[5,50–56,58–63]; (2) more recent and more rigorously designed research tends to support rather than refute earlier and less rigorously designed studies[50,53–56,59]; and (3) rather than interpreting the methodological flaws and diversity as preemptively negative, it may be equally indicative of a robust phenomena evident in many types of worksites, with diverse employees, different interventions, and varying degrees of methodological sophistication.[51,52,55,56] In any case, even the most rigorous method cannot compensate for predictably unsophisticated interventions that do not take into account more than 2 decades of increasingly precise multifactorial, effective intervention strategies.

Limitations evident in earlier health promotion programs suggest several strategies for improving the design and evaluation of future worksite initiatives. Four general categories of programmatic directions for the future are as follows: (1) the development of closer ties between worksite health promotion programs and medical service providers; (2) the establishment of ethical standards for worksite health promotion to protect employee privacy and job security; (3) the integration of corporate policies, environmental enhancement, and behavioral workplaces that are responsive to community needs; and (4) the development of improved methods for evaluating the health outcomes and cost-effectiveness of corporate wellness policies and programs.

INTEGRATION OF WORKSITE HEALTH PROMOTION AND DISEASE MANAGEMENT WITHIN THE CONVENTIONAL MEDICAL CARE SYSTEM

The organization of health services in the United States is rapidly evolving toward a managed care system that will place increasing emphasis on cost containment and the development of communitywide partnerships among physicians, hospitals, insurance carriers, and employer organizations for more integrated health care provision. These ongoing changes afford unique opportunities to better integrate worksite health promotion programs with medical care services. Integration of primary, secondary, and tertiary prevention efforts does not mean that worksite health programs should duplicate community-based medical services. Rather, worksite programs should complement and reinforce the medical services provided by physicians who work in nonoccupational health care settings. For instance, a physician whose patient is returning to work after coronary bypass surgery could collaborate with worksite health professionals to develop a plan for monitoring the employee's physiologic status at work, facilitating his or her compliance with prescribed medication regimens, and encouraging the development and maintenance or improved health habits through stress management, smoking cessation, physical fitness, and a low-fat diet. This approach has been implemented effectively in the cardiac rehabilitation program at Stanford University for recovering patients at the worksite.[45]

At the same time, corporate programs that provide routine medical surveillance and health risk apprais-

als could identify employees at greatest risk for subsequent health problems, such as those with hypertension or elevated blood glucose levels, and refer them to community-based physicians.[27,33,47,64–66] Additional examples of worksite-based preventive services that could be integrated into corporate health promotion programs include on-site mammography screening, immunization against influenza, cholesterol monitoring, company-sponsored self-care programs, and nonsurgical treatment of patients with lumbar disk herniations and lower back pain.

DEVELOPING INNOVATIVE APPLICATIONS OF NEW TELEMEDICINE INTERVENTIONS AND TECHNOLOGIES

An important priority is the development of new technologies for providing cost-effective worksite wellness and health care programs. Examples include medical surveillance and risk appraisal programs that use mail contacts to monitor and encourage changes in individuals' health behavior, self-care books, nurse educator telephone counseling with employee groups, and "electronic house calls" to extend primary care services to patients at their homes and worksites.[45,46,66–68] One program consisted of health risk assessments mailed at 6-month intervals, combined with self-care instructional materials and personalized recommendation letters that emphasize behavioral risk reduction. This intervention achieved improvements in computed health risk scores of 18.4% at 18 months and 25.7% at 30 months among participants 64 years and younger. This same program resulted in lower rates of medical insurance claims relative to case controls (who received printed materials only) and self-reported use of medical services from baseline.[47]

Telecommunications technologies, such as Internet listservers and bulletin boards, electronic mail, fax, video-based computer-interactive systems, and interactive cable television, such as the National Health Network, could be used more widely in corporate settings to encourage employee participation in worksite wellness activities and to deliver multimedia educational programs on risk-factor reduction, disease prevention, and environmental health and safety.[33] Again, the future of telemedicine adds a new dimension that is more conducive to improved clinical and cost outcomes.

IMPROVING ACCESS TO POPULATIONS THAT ARE DIFFICULT TO REACH

Self-selection remains a complex, confounding issue. Nearly all worksite programs are voluntary, and the issue of self-selection is of the utmost importance. Participation rates are defined and operationalized in numerous variations. Among the most common criterion for defining a participant was simply completing an initial risk assessment and screening. It has received considerable attention from researchers and practitioners.[50,53,56] Evaluations that focus only on changes among the active participants overlook the fact that the program may not attract the participation of large numbers of employees, especially those who may be at elevated or even high risk. None of the published studies of the comprehensive worksite programs have been implemented with dependents and/or retirees. None of the studies have considered differential responses from the "working poor" or racial and/or ethnic subpopulations in the worksites.

Future worksite health initiatives should ensure greater access among employees who are relatively difficult to reach and should be tailored to the unique needs of small and medium companies, as well as those of larger corporations. One study demonstrated the effectiveness of health promotion programs in small companies, owing to the greater opportunities for personalized feedback and goal setting in small vs. large organizations.[69] Yet, small businesses generally offer fewer health promotion and disease prevention programs than large companies because of their lack of staff, financial resources, and economics of scale.[70] These barriers to health promotion programming in small firms may be lowered as managed care providers make routine preventive services and wellness activities available within their employee health programs and as legislative reforms require companies of all sizes to establish worksite injury and illness prevention programs.

Programs that can effectively reach highly mobile workers, those based in rural locations, uninsured employees, spouses and dependents, and retirees are additional priorities, as are those that address the needs of workers temporarily or chronically unemployed because of corporate downsizing, layoffs, and business closures. In a study conducted by the Michigan Prevention Research Center, community interventions designed to assist unemployed workers through counseling services and increased social support yielded significant mental health benefits and reemployment gains among program participants relative to case controls.[71] Also, studies of employee risk appraisal and medical surveillance programs indicate that mail and telephone contacts initiated by nurses and health educators are effective in reducing behavioral risks for acute and chronic disease.[33,45,46,68] These same strategies can be used to provide medical and preventive services to mobile and rural workers, dependents, and retirees located away from centralized worksites and community health centers.

Although some of the studies distinguish between high- and low-risk employees, relatively few documented the differential participation by these two distinct groups.[50,52,54] For a program to be effective in reducing overall morbidity and mortality, it needs the sustained involvement of high-risk employees. In this domain, there is a recent trend in disease management programs that focus on high-risk employees with positive results reported in mammography screening programs,[51] prostate cancer screening,[55] diabetes mellitus interventions,[58] screening for hemochromatosis,[61] cumulative trauma programs,[60] influenza immunizations,[59] and high-risk pregnancy.[55] Preliminary results from such specific

disease management programs indicate both clinical effectiveness and cost-effectiveness in a relatively short period. This return on investment may be due to the fact that high-risk employees are likely to incur medical costs in employer and/or health plans in the near term. Management of such high-risk individuals appears to result in short-term clinical and cost outcomes and is within the time frame that employers find more acceptable than more formal, multiyear randomized controlled trials.

Finally, corporate health initiatives should be organized to address better the needs of racially and ethnically diverse populations and incorporate strategies for actively involving these underserved groups in health enhancement programs through the development of multilingual and culturally sensitive health communications.[72–77] Reaching the growing Asian, Hispanic, and Filipino populations is essential.

INTEGRATING HEALTH PROMOTION AND DISEASE PREVENTION INTO CORPORATE BENEFIT PLANS

Many companies that establish their own health benefit plans, as frequently occurs in large corporations, do not include health promotion and clinical preventive services among the benefits provided to employees and dependents. For example, immunizations for children are often omitted from corporate health plans, and even when they are included, many children remain unimmunized, highlighting the need for closer coordination between worksite benefit plans and clinical service providers.[78] To correct these deficiencies, employee benefit plans should routinely include preventive services and health promotion activities for which effectiveness has been well documented.[79] Companies also should expand their efforts to improve employees' and dependents' access to preventive services. The cost-effectiveness of integrating health promotion programs into corporate benefits plans was demonstrated in a 5-year evaluation of a worksite health intervention for approximately 4000 city employees in Birmingham, Alabama.[32] That program, which combined yearly medical screening, health education, preventive services, and physician referrals for high-risk employees, held the costs of benefits constant, whereas they increased in other areas of the state. The average medical benefits expenses per Birmingham employee, which were 24% (or $397) higher than the state average at the outset of the study, were 30% (or $992) lower than the state average by the fifth year of the program.

In addition to the characteristics of the health care system, long-term employment may be an interesting characteristic of the workplace in Japan. In the United States, high turnover rates make it difficult for employers to invest in their employees to promote health in the long term. However, in Japan, long-term investment could benefit the employer. This aspect is good for research and evaluation purposes, too. The uniformed health care reimbursement system helps decrease the variance in costs among providers. The fee-for-service–based reimbursement system still allows us to take a look at the claims data as a function of medical care utilization, whereas we have difficulty in obtaining medical care utilization data in the prepaid payment system under managed care in the United States.

DEVELOPING WORKSITE HEALTH PROGRAMS THAT ARE COMPATIBLE WITH MANAGED CARE

Worksite health programs that are consistent with and have the potential to improve managed care approaches to health services delivery (e.g., via partnerships among employer corporations, health maintenance organizations, exclusive and preferred provider organizations) are a major priority. Especially needed are programs that (1) better integrate health promotion and disease prevention strategies with the medical service modalities currently emphasized by health maintenance organizations[15,78,80]; (2) establish policies and procedures within employer and health maintenance organizations to ensure that the quality of patient care and preventive services is maintained at a high level and not compromised by financial cost-containment goals; (3) further evaluate the capacity of worksite health promotion and disease prevention programs to reduce the use of medical services by employees, retirees, and their dependents and the financial costs of health insurance claims[10,47]; and (4) create new alliances among hospitals, insurance carriers, employer organizations, and primary care service providers, with a mutually shared risk relative to capitated health programs.[3,12] Development of corporate wellness coalitions, such as the Bay Area and Washington Area Business Groups on Health, and evaluations of worksite health programs based on community vs. experience rating systems are important directions for the future.

POTENTIAL CONFLICTS OF INTEREST BETWEEN MANAGEMENT AND HEALTH PROFESSIONALS

Development and linkage of managed care, health risk appraisal, employee assistance, and medical surveillance programs at the worksite may pose a variety of ethical dilemmas for physicians and other health professionals employed by or working in employer organizations. A major problem is how to protect confidential health information when dissemination of that information, intentional or inadvertent, can adversely affect an employee's job situation and lead to reassignment, lack of advancement, or even preferential termination.

There is a fundamental tension between management's desire to maximize workers' productivity and reduce their health benefit costs and physicians' responsibility through oath and law to protect employee privacy and ensure the confidentiality of all health information. For example, management may want to know whether frequent absences of an employee are caused by acquired immunodeficiency syndrome or some other progressive disease that requires

staff realignment or whether employees who are at highest risk for coronary artery disease are taking active steps to reduce their risks. A company physician, who knows the answers on the basis of the results of company-sponsored employee counseling, health risk appraisal, or medical surveillance programs, is in the middle. The physician needs not only to be the patient confidant and advocate but also to satisfy management that he or she is safeguarding the company's interests.

Given the likelihood of these potential conflicts of interest, it is crucial that worksite health promotion programs develop and adhere to clear ethical standards and procedural guidelines for ensuring the confidentiality of health information. Levitt noted that workers participating in employee counseling programs must be assured that their health data will not be shared with others without their written consent, except as required by law in cases such as potential suicide, homicide, or child abuse. Counseling records must be securely maintained with restricted access and should not become part of the employee's personnel file. Other safeguards include the use of third parties to gather, code, and analyze employee health data and the use of numeric codes rather than employee names in computerized and written medical records.

The best patient safeguard, beyond the physical security of all hard-copy and software records, is a climate of highly ethical behavior where both explicit policy and practice reinforce probity in health professional conduct and any lapses are cause for dismissal. However, it is difficult for employees to be sure that information provided to medical personnel will remain confidential, and some employees may decide not to participate or may provide unreliable information when they mistrust the health services department.[5,42] The trend toward using outside vendors rather than company employees to provide health services may reduce the likelihood that confidentiality will be breached.

HEALTH PROMOTION PROGRAMMING, MEDICAL SCREENING, EMPLOYMENT ELIGIBILITY, AND JOB SECURITY

Worksite health promotion programming, where the objective is to identify risks for illness and strategies for health improvement, has largely supplanted the traditional preemployment physical examination, which was meant to identify those with conditions that might preclude employment. This change is largely the result of legal restrictions on the use of medical information in determining job suitability. Exceptions are those positions for which specific physical or other requirements have been established for successful job performance, such as police and fire department work, which may require heavy lifting. Preemployment screening for illicit but not illegal substances, such as alcohol, and human immunodeficiency virus status or even future genomic screening may also be conducted but may not be performed without a job applicant's or employee's permission. Employers are reluctant to obtain preemployment information other than the use of illicit substances, because if employment is denied, it may be difficult for them to refute the presumption that they had access to health screening information that could have influenced their decision-making process.

Future worksite health promotion services are likely to be more closely integrated with employee assistance and medical surveillance programs. Periodic health examinations to meet Occupational Safety and Health Administration requirements, for example, can include tests and counseling services designed to ascertain, track, or reduce health risks as diverse as smoking, hypertension, and stress. However, employee participation in activities not required by federal or state agencies should be voluntary, with previous informed consent. The integration of data from both required and voluntary activities may help ensure that confidentiality of information is respected, since governmental requirements impose procedural safeguards to ensure that personal health data are not made available to management.

DEVELOPING MORE INTEGRATIVE APPROACHES TO WORKSITE WELLNESS

Future worksite health programs will be more effective to the extent that they are comprehensive in scope and consistent with the demographic and technologic realities that are transforming the organization of work, the structure of households, and the composition of the labor force. Rosen and Berger's[81] concept of healthy companies highlights the importance of implementing comprehensive, multifaceted programs to promote employee well-being. Earlier studies have examined the health and financial impacts of focused interventions to improve workers' health habits, the environmental quality of their worksites, or the social climate of their organizations.[82,83] Others have shown that multicomponent interventions achieve greater health and cost benefits than single-component programs. For example, a broad-gauged risk reduction program that encompassed both changes in lifestyle and medication resulted in significantly greater reductions in the progression of atherosclerosis during a 4-year period than did medical treatment alone.[33] Similarly, an intervention that combined health communication networks and support groups was five to six times more cost-effective in reducing cardiovascular risks and in preventing relapse among ex-smokers than was health education alone.[24] Increasingly, the evidence is that more intensive and initially more expensive interventions result in both better and more enduring clinical outcomes. In both medical and economic terms, this return on investment (ROI) requires a reasonable investment time.

Relatively few programs that are truly comprehensive in scope, in that they combine health risk appraisal, lifestyle change, employee counseling and support groups, medical interventions, environmental enhancement, and health-supportive facilities planning, have been implemented

and evaluated to date.[18,84] The worksite health programs developed by certain large companies, such as AT&T, Kansas City, Missouri, and Johnson & Johnson, New Brunswick, New Jersey, are exceptions to this trend, although, even in those cases, the health efficacy and cost efficacy of environmental change strategies have not been assessed.[44,85,86] There are indications that even such well-established and managed programs will be subject to both clinical and cost outcomes evaluations.

Creating healthy companies through multifaceted interventions suggests some important tasks for the future. Corporate health programs should integrate and evaluate the joint effects of active and passive interventions and include a variety of behavioral change and lifestyle modification programs (e.g., smoking cessation, exercise, and dietary interventions) that require voluntary and sustained effort by individuals to achieve the desired health benefits.[87] Passive interventions subsume organizational policies and environmental changes (e.g., establishing smoke-free worksites, flex time and job-sharing programs, physical fitness facilities, and on-site child care) that require little or no effort on the part of individuals. The joint effects of these different interventions on employee health remain to be evaluated in future research.

Occupational homicide, violent episodes, and nonfatal assaults on employees at the worksite are an increasing problem in the United States, yet little is known about the cause and prevention of intentional or violent injuries in work settings.[28] Between 1980 and 1989, homicide was the leading cause of occupational death from injury among women and the third leading cause of death for all workers.[28] Corporate health promotion programs that teach employees conflict resolution and stress management skills and those aimed at reducing the stressfulness of work environments can play an important role in ameliorating workplace violence.[88] Important priorities for the future are to (1) identify major risk factors for workplace violence, such as working alone or in small numbers, late at night or during early-morning hours, and in high-crime neighborhoods, and (2) develop and implement worksite violence prevention programs that integrate behavioral, organizational, and facilities design strategies, such as modification of work schedules and procedures, provision of employee training programs for crisis intervention, and enhancement of surveillance and emergency response systems.

HEALTH CONSEQUENCES OF CORPORATE DOWNSIZING, JOB STRAIN, AND UNEMPLOYMENT

Economic recessions of the 1980s and 1990s increased the unemployment rate among US workers and prompted major changes in corporate structure, including downsizing, reengineering, and a shift from full-time to part-time work in many sectors of the economy. These changes have placed greater job demands on employees, who are often asked to do more work for less compensation.[89,90] At the same time, employees are confronted by more frequent changes in the physical arrangement and location of their worksite[91] and the threat of job displacement through workplace automation.

The demand-control model of occupational stress[92,93] suggests that highly demanding jobs, which afford minimal opportunities for exercising decision latitude and personal control, create the greatest psychological strains and vulnerability to stress-related diseases. These occupational health risks can be expected to become more severe during times of rapid economic, organizational, and technologic change.[94–96] Moreover, the higher levels of stress and interpersonal strain brought about by corporate restructuring and impending job loss may increase the incidence of employee burnout and workplace violence.

Socioeconomic and technologic changes have transformed the U.S. workplace in recent years, and these changes pose several challenges for worksite health promotion. First, high-strain jobs can be redesigned to achieve a better balance among workers' psychological needs for autonomy, the day-to-day demands of their work, and the performance criteria of their employers.[91,93,97,98] Second, employers should develop new resources to provide counseling and support for workers coping with job insecurity, relocation, and outplacement.[99] Third, employee assistance programs, which provide workers and dependents with a variety or assessment, counseling, referral, and case management services for substance abuse, mental health, and other problems, should be integrated with worksite health promotion programs.[100,101] Finally, corporate programs to assist employees who have lost their jobs in making the transition to new careers should be developed and evaluated for their effectiveness in preventing the health problems often associated with unemployment.[99,102,103] Retraining of skilled and dedicated employees is of highest priority to prepare for economic upturns and necessity to increase the hiring of employees.

IMPROVED METHODS FOR EVALUATING THE CLINICAL AND COST OUTCOMES AND PRESENTEEISM IMPACT OF CORPORATE PROGRAMS

Development of more rigorous approaches to evaluating the health and cost benefits of corporate wellness programs will provide a stronger empiric basis for maximizing the effectiveness of these initiatives. A key criterion for judging the value of corporate wellness programs is the extent to which they result in improved health outcomes or the health effectiveness of the programs. Earlier studies of worksite health programs often have used divergent and nonstandardized measures to assess changes in employees' health status as a function of their participation in these programs. Therefore, a priority for the future is to develop broader-gauged program evaluations that consolidate previously disparate measures of the health impacts of worksite interventions (e.g., biomedical, behavioral, and psychosocial indexes of employee health).

By using a wider array of measurement strategies, future evaluations of

corporate health programs will be better able to test hypothesized links between behavioral and environmental interventions at the worksite, physiologic and psychosocial processes, and disease or wellness outcomes.[84,104] Another important direction is to develop improved methods for evaluating the organizational and financial outcomes of worksite health programs.[2,21,48,105] Variables other than direct medical costs need to be factored in to calculate total costs. Among such variables are replacement worker salaries, short-term disability costs, long-term disability costs, decreased productivity, and lost business opportunities.

Anticipated cost-effectiveness of worksite interventions is an important factor in corporate decisions to implement, discontinue, or postpone health promotion programs. Cost-effectiveness is defined as net program costs expended per health benefits achieved. The cost-effectiveness of worksite health interventions during a 6-month to 5-year period has been increasingly demonstrable.[3,32,36,47] Future evaluations of the cost-effectiveness of worksite health programs should incorporate a wider array of productivity and organizational effectiveness criteria than has been used in the past. Among these criteria are reflecting the quantity, quality, and timeliness of employees' work performance; aggregate rates of absenteeism, staff turnover, and retention; frequency and quality of communication among coworkers; the company's reputation in the broader community; and presenteeism.

Workforce productivity has become a critical factor in the strength and sustainability of a company's overall business performance. Absenteeism affects productivity. However, even when employers are physically present in their jobs, they may experience a decrease in their productivity and work quality below normal. This concept is known as presenteeism. In 2002, a research team at the Stanford University School of Medicine published the creation and testing of a presenteeism scale that evaluated the impact of health problems on individual performance and productivity. A total of 175 county health employees each completed the 32-item Stanford Presenteeism Scale (SPS-32). Using these results, the research team identified six key items to describe presenteeism, resulting in the SPS-6.[106] The SPS-6 has excellent psychometric characteristics, supporting the feasibility of its use in measuring health and productivity. Further validation of the SPS-6 on actual presenteeism, such as on work loss data and/or health status, through health risk assessment or utilization data is needed.

Noting the general success of comprehensive worksite programs should not, however, be interpreted as a blanket endorsement of every program that has been attempted to date. Cost-effectiveness varies widely, since investigators rarely use the same methods for imputing intervention costs or cost savings associated with changes in risk factors.[51,52,55,58,59] It is clear that there is a lack of standardization of what constitutes either costs or benefits in such interventions and their subsequent evaluations.[5,50,53,54,56] Costs such as space, utilities, salaries of on-site health personnel, paid time for employee participation, and other significant cost variables are not standardized. Additionally, these variables are often either included or excluded in cost considerations in an arbitrary manner in cost considerations.

Likewise, the benefits of such programs in terms of cost savings specific to individuals, savings to the corporation, decrease in the rate of medical expenditure, and overall impact on areas of absenteeism, performance, and productivity are often equally arbitrarily defined and selected. This is not to be critical of any specific study but to point out a methodological issue that limits compatibility and generalizability. One additional caveat is that cost-effectiveness is often based on assigning a dollar value to specific risk factor reductions. Although this is a common procedure, such extrapolations are tenuous at best. Given the high degree of variability in the operational definitions of both the cost and benefits, interstudy comparisons are difficult to determine.

The issue of high-cost analysis is also extremely important.[41] High-cost analysis is based on the observation that medical claims data are highly skewed and violate the statistical assumption of normality. Since a small percentage of employees incur a large percentage of medical costs, the SD is large and skews the claims data to the upper end of the normal curve continuum. As a result, the mean is generally much higher than the median. This inappropriate use of means in cross-sectional studies underestimates sample bias, overestimates the descriptive difference in cost for high-risk and low-risk employees, and underestimates the statistical significance of large difference observed between the means for the two groups.

DISCUSSION AND FUTURE RECOMMENDATIONS

There is a clear need to acknowledge the limitations of the randomized controlled trial, especially in worksite programs. According to the report of the World Health Organization European Working Group on Health Promotion Evaluation,[63] "The use of randomized control trials to evaluate health promotion initiatives is, in most cases, inappropriate, misleading and unnecessarily expensive." Based on this observation, there is a major trend toward companies conducting focused disease management programs on areas that are of specific importance to the employer and evaluating such interventions as predemonstration and postdemonstration projects with both clinical and cost outcomes.[51,52,54,55,58–62] Such focused disease management interventions are clearly of more extensive use among employers in the last 2 years compared with formal randomized controlled trials.

None of the multifactorial comprehensive intervention programs reviewed herein reduced all indicators of risk. However, most programs of sufficient intensity, breadth, and duration resulted in a decrease in an adequate number of the risks to result in an overall risk reduction.[50–53,55,56] One major advantage of comprehensive, multifactorial programs is that different employees can

benefit from the same program in different ways by focusing on one particular risk factor, such as controlling hypertension, reducing cholesterol, managing stress, or quitting smoking.[53–56] Future interventions and evaluation efforts should give more attention to developing other nonspecific outcome measures, improved overall health status, and enhanced functional status that will better reflect overall reductions in risk and improvements in general health status.

Most importantly, future assessments of cost outcomes for a given clinical intervention need to address the potential financial impact in terms of integrated disability management. Interventions may affect not only medical costs per se but also related costs, including absenteeism, sick days, sales/revenue losses per employee, replacement costs of temporary workers, performance, and productivity.[56] Although such factors have been demonstrated to be affected by interventions in a piecemeal fashion, the potential economic impact is yet to be determined in an integrated model. As such integrated approaches evolve, the cost-effectiveness of comprehensive, worksite-based interventions is likely to evidence even greater return on investment.

Few of the interventions cited herein focused on the physical, psychosocial, or policy work environment and its role in employee health. Based on earlier reviews of comprehensive health promotion and disease prevention programs in worksites,[2–4,40,43] it is evident that employees need to know that their organization is seriously concerned about their health. Ideally, employees need to be afforded the flexibility necessary to participate in worksite health promotion programs. Employees need to perceive that their senior management, supervisors, and coworkers have positive attitudes toward health, since these factors have all been associated with improved employee health status.[5,50,51,53,55,56] Interventions and evaluations of worksite programs may benefit from including such components and measures of the work environment to determine the influence of such factors on the overall clinical effectiveness and cost-effectiveness of these interventions.

Every intervention cited herein and nearly every study in the worksite health promotion and disease management literature were provided to active employees only. Numerous medical insurance surveys have cited the fact that the actual medical expenditures for a corporation are greatest for retirees and dependents rather than for their active employees. Partially, this is due to the growing ratio of the number of retired vs. active employees and to the overall aging of the population. Since chronic disease increases with age, resulting in greater morbidity, mortality, and cost to employers, a future significant direction would be to extend such programs to both retirees and dependents. Additionally, such interventions need to be focused on and evaluated relative to the unique characteristics of the working poor and racial and/or ethnic subpopulations in the worksite.

Other unaddressed issues in worksite-based prevention are the durability of the effects over time and potential impacts on medical care costs. If such programs are to be self-supporting over time, the following need to be demonstrated. First, a mature program must be in place for a period of years that results in a healthier workforce. Virtually all of the research to date has addressed effects during short-time intervals of a year or two. Second, effects have only seldomly been evaluated using the entire workforce. None of the studies have taken into account changes in workforce size and composition as a result of turnover and changes in medical benefits plans. Third, new research that focuses on this issue by using the worksite as the unit of both randomization and analysis would be useful in evaluating the full potential of this type of intervention. Fourth, a longer time scale of at least 3 to 5 years is also important in evaluating the potential cost-effectiveness that may accrue from comprehensive worksite health promotion. This is true because health care costs tend to be distributed unevenly, as in high-cost analyses, and may be manifested most strongly in later years of life after active employees have retired. Finally, there is one additional caveat, which is that the extraction of the data and findings was conducted by the one author, as in the previous five reviews. Although colleagues provided ongoing input, there is an inherent potential bias in any review by only one author.

CONCLUSIONS

Recent and impending changes in the U.S. medical care system and refinements in methods for improving employee health have created favorable conditions for achieving a more thorough integration of worksite health promotion and medical care services than has been possible in the past. A growing body of research testifies to the effectiveness of many worksite health promotion programs in reducing illness risks, improving employee well-being, and lowering employers' health benefit costs. Capitated health programs have established shared incentives for cost containment among physicians, hospitals, insurance companies, and employer organizations. As community care networks emerge, the success of hospitals and other medical settings will depend on how well they establish partnerships for health promotion with local businesses, government, agencies, and schools and a strong reputation for high-quality patient care.[10] Likewise, health education and self-care programs provided by nonmedical personnel can benefit hospitals and physicians by reducing the demand for nonacute care and enabling them to focus on medical services that are of highest priority to the community.

More than ever before, physicians, hospitals, employer organizations, and public agencies share a common stake in providing affordable, accountable, and accessible health care.[14] Modern epidemics of chronic disease, acquired immunodeficiency syndrome, neighborhood and workplace violence, and unintentional injuries have placed an enormous burden on society during the past two decades.[16,28,107] Initiatives outlined in

this article can help reduce the economic and human toll associated with these contemporary health problems by fostering a more integrative approach to health improvement and a more clinically effective and cost-effective health care system.

Looking toward the future, there are a number of major lessons to be derived from these clinical and cost outcome evaluations that are applicable to Japan and the international, postindustrial nations: (1) multifactorial or comprehensive health promotion and disease management interventions result in positive health outcomes for a broad range of conditions for all levels of the employee population; (2) although such intensive interventions are inherently more expensive at the outset, the clinical and cost ROIs justify such an investment of resources, since they are more effective in a relatively brief time of 6 to 12 months than single-factor programs; (3) use of a telemedicine model of delivery via mail, telephone, and/or computers is a new and effective approach with equally positive clinical outcomes in a cost-effective delivery; (4) corporate programs have an appositive impact on health indicators, medical outcomes, and ROI and a positive impact on performance, productivity, presenteeism, short-term disability costs, long-term disability costs, recruitment, retention, replacement workers, and union-management agreements; (5) beyond reaching the active employee populations, there remains the challenge of improving the health status of dependents and retirees and the facilitated return to work of injured or disabled employees; (6) given the commonality of risk factors and the documentation of what works vs. what does not work in the experience of large United States–based corporations, these results and the actual intervention materials can be effectively applied to the international offices of US corporations and are applicable to Japan and the other postindustrial nations; (7) innovations in the benefits plans of major corporations with an increased emphasis on both consumer-driven health care and exercising choices with regard to both conventional and alternative medicine is providing individual employees with the simultaneous positive of choices coupled with the potential negative of higher copayments and deductibles; and (8) no medical plan or interventions can adequately address either clinical or cost outcomes in the absence of corporate policies that support the evolution of a healthy environment free of violence, excessive job strain stress, and/or exposure to environmental toxins. By focusing on the synergy between individual employees and the corporation, it is now possible to achieve the ideal of "healthy people–healthy business" to the benefit of all parties.

Results of the comprehensive, multifactorial risk and disease management interventions in worksites reviewed herein provide cautious optimism about the clinical effectiveness and cost-effectiveness of these worksite programs. Also, these results provide initial insights regarding the critical components and characteristics of successful programs. At this time, the most salient issue for insurers and corporations to address is not whether worksite health promotion and disease management programs should be implemented to reduce risks and enhance productivity, but rather how such programs should be designed, implemented, and evaluated to achieve optimal clinical effectiveness and cost-effectiveness.

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