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INDICATORS AND MEASURES OF HEALTH PROMOTION/HEALTH PROTECTION AT THE WORKPLACE

by

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ABSTRACT

Worksite health protection represents those efforts concerned with reducing worker health and safety risks posed by hazardous working conditions, the emphasis being on engineering control measures. Worksite health promotion is directed to the worker's personal lifestyle and seeks to alter those behaviors and habits which present risks of disease or injury. Education and motivation are the techniques employed in this instance. This paper describes health protective and health promotion programs and practices now evident at the workplace. Actions and indicators reflecting governmental or legislative support to such efforts are described as are those depicting employer and employee actions and responsibilities. While this treatment illustrates the segregated nature of worksite health protection and health promotion activities, special recognition is paid to the benefits that could accrue through their effective integration. Initial ideas for attaining this objective are offered.

I. INTRODUCTION

Today's workplace is becoming an arena for two kinds of health related activity. One involves the more traditional concerns of ensuring protection against hazardous working conditions (Office of Technol. Assess., 1985). In this regard, health risks stemming from occupational exposures to toxic chemicals, harmful physical agents (excess noise, heat, radiation, vibration) and dangerous electromechanical equipment continue to command significant attention as do those resulting from strenuous job demands and psychologically stressful work conditions. Engineering or physical (hardware) control options have been considered as the preferred ways for dealing with these hazards. Self-protective approaches requiring training in safe work practices and use of personal protective equipment are also prescribed but as interim or fall-back procedures.

This type of activity can be distinguished from a second, popularly referred to as worksite health promotion or wellness programs which are being introduced in a growing number of establishments (Office of Disease Prevent. & Hlth. Promotion, 1984). In broad terms, these programs represent varied educational and motivational efforts to effect behavioral and lifestyle changes among workers (and their families) such as to improve their health and well-being. Weight control, improved nutrition, smoking cessation, reduced alcohol consumption, physical fitness and stress management are among the more popular health promotion goals, these being acknowledged as factors in the etiology of many chronic diseases and injuries.

Despite the contrasting nature of the two activities, they in fact bear a complementary relationship. Though the problem behaviors and lifestyles targeted for change in health promotion programs transcend the workplace, these same factors can interact with environmental hazards at work such as to significantly add to the risk of occupational illness and injury. For example, smoking is a recognized co-factor in the development of work related lung disorders (Archer, Wagoner and Lundin, 1973), and drinking looms as a contributing cause of workplace accidents (Sleight and Cook, 1974). Thus, reduction of these habits as outcomes of health promotion programs can further nullify certain job hazards for which these factors pose added risks. Moreover, the intent of health promotion programs to induce greater self-care can be easily translated into greater self protection with respect to workplace hazards. That is, the educational and motivational efforts used for fostering healthful behaviors can spur greater acceptance of personal protective devices, greater adherence to safe work practices and increased awareness of job hazards so as to increase one's margin of protection against worksite health and safety risks (Cohen, Smith and Anger, 1979).

Viewed in this way, the combination of worksite hazard control and worksite health promotion activities can clearly enhance the level of one's health both on and off the job. In actual practice however, a merger of these programs is seldom seen. Indeed, health promotion and health protection activities at the worksite remain segregated. More will be said about this

later in the course of focussing on the major subject of this paper - indicators and measures of health protection and health promotion behaviors at the workplace.

Kar and Berkanovic (1983) have offered a global framework for viewing health promotion behaviors in a systematic way. A dynamic process is acknowledged involving states of behavioral action leading up to and necessary for the achievement of specific health goals, which are depicted in physical, mental and social terms. Suggested indicators of such actions are given at both the individual and social or group level, the latter including legislative acts as supporting requirements among other considerations. This paper will draw upon the Kar and Berkanovic scheme with one major exception. Whereas health protection behaviors are subsumed under health promotion in this framework they will remain separated here because this is the reality in the workplace. The specific intent of this paper is to:

1. Describe the nature of health protective and health promotion actions evident at the workplace at the individual worker, employer and governmental level.

2. Describe indicators of these actions - noting in-process, surrogate and direct measures which bear on worker health, both on and off the job.

3. Indicate gaps, needs for alternative actions and measures to spur more effective worksite health protection and health promotion efforts.

II. THE WORKPLACE AS A DETERMINANT IN THE NATION'S HEALTH

At the outset, the real and potential impact of everyday work on the nation's health status must be noted, both in terms of workplace hazards and needs for safeguards as well as opportunities for promoting healthier lifestyles. The following elaborates on some major considerations:

1.The U.S. workforce now is estimated at over 100 million workers. Between 30 and 35% of this group comprise blue collar workers representing those who may be subject to an array of significant environmental and job dangers presenting health risks which warrant control actions (Guiliano, 1982). Bureau of Labor Statistics data for the years 1981-82 reported 10 to 15 work related disabilities occurred for every 100 person years of employment in mining, construction, and manufacturing jobs (Bureau Labor Stat.,1984). For certain types of work within these industries, the incidence rates were in excess of 20. These stand in contrast to typical white collar occupations where incidence rates rarely go beyond 3 cases per 100 person hours of employment.

Overall, it is estimated that 10 million persons suffer traumatic injuries on the job each year (Morbid. & Mortal. Rept. 1984). About 3 million are severe, 70 thousand resulting in some form of permanent impairment and 10 thousand are fatal. Another 400 thousand develop work related diseases. These figures are imprecise, being collated from a number of sources as single, comprehensive surveillance system for reporting such data does not yet exist. In terms of cost, the latest National Safety Council estimates

(1984) indicate 33.4 billion dollars spent on work-related injuries alone, i.e., not including occupational disease cases. These cost figures include insurance/medical payments, wage losses, production losses, administrative expenses covering investigation of the accidents, filing of reports and claims. The human and economic costs as related here underscore the need to improve occupational health and safety protective efforts.

2. That the workplace means access to large populations both workers as well as their families makes it a natural base for activities aimed at promoting healthier lifestyles. Also, the existence of co-worker support groups and the availability of medical services committed to the health/safety needs of the workers can mean further reinforcement to such efforts. These facilitative circumstances have to be tempered somewhat by the realization that less than 50% of the U.S. workforce is employed in establishments of 100 or more workers (U.S. Bureau of Census, 1981), and the latter smaller employers have in many instances barely minimal occupational safety and health services albeit a wellness program. Joint company and/or communal programs may be needed to cover these situations.

3. Changing trends in the make-up of the workforce and in work conditions hold new implications for worker health which will have to be factored into the nature of existing hazard protection and health promotion programs. The current shift away from physically demanding jobs to mental work should bring corresponding shifts in occupational health programs to stress/fatigue issues and stress management emphasis in health promotion offerings (Giuliano, 1982). At the same time, application of new computer based

technology both on the shopfloor (robotization) and in the office (video display systems) are suggesting newer, more subtle worker health issues (Ginzburg, 1982; Gunn, 1982). The presence of more women in the workforce many assuming traditional male dominated jobs will also present added health concerns especially in those jobs where strength, size and other physical requirements will remain burdensome (Accident Facts, 1984). Setting back the retirement age, thus enabling many workers to remain employed into their later years may raise new occupational health questions as well. Staying productive longer has positive benefits but perhaps pose added risks as well for older persons in jobs which are rapidly changing.

4. The fact that work in our society offers opportunities for satisfying socioeconomic needs and deriving a sense of self-worth also has health significance. Indeed, loss of one's job or the inability to work has been shown to have negative health effects (Cobb and Kasl, 1977).

Reflecting on the aforementioned points it would seem clear that the workplace is a major determinant in the nation's health status.

III. HEALTH PROTECTION AT THE WORKPLACE

Legislative Actions - Federal Responsibilities

Passage of the Occupational Safety and Health Act of 1970 (OSHact) followed soon after by the Coal Mine Health and Safety Act of 1972 brought a new federal thrust to addressing work safety and health needs. Till this legislation was passed, the only federal statutes of relevance were safety rules specific to coal mining and provisions of the Walsh-Healy public

contracts act which called upon contractors providing goods or services to the government in excess of 10,000 dollars to comply with existing health and safety standards. There was no agency in place to carry out routine inspection for compliance with such directives. Indeed, actions were only taken after-the-fact, usually in cases where near catastrophic mishaps had been reported. Standard development was typically an uncertain process, typically left to trade/professional groups and compliance largely voluntary. The OSHact of 1970 established new governmental responsibilities in addressing this state of affairs. These included:

1. Formulating and promulgating national occupational health standards

2. Enforcing standards through inspection and fining violators.

3. Expanding research to identify, evaluate potential workplace hazards and to ascertain effective control measures.

4. Prescribing record-keeping requirements for employers to ensure accurate reporting of job related illnesses, injuries and deaths.

5. Developing professional manpower to administer to occupational health and safety needs.

6. Promoting worker education of workplace hazards and control practices.

7. Investigating suspected or alleged toxicity hazards in the workplace upon request from employers, groups of workers or their representatives.

8. Disseminating technical information on the toxicity of workplace chemicals and control technology.

The coverage of the OSHact was all work establishments engaged in interstate commerce, having 25 or more employees which was later reduced to 10.

Two new Federal agencies were created to implement the aforementioned provisions, the Occupational Safety and Health Administration (OSHA) in the Department of Labor, and the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health and Human Services. The former, OSHA, was given responsibility for standard setting, workplace inspection and enforcement, record-keeping, and worker education. The latter, NIOSH, was given responsibility for undertaking needed research for furnishing the technical basis for new standards, supporting training programs to provide the professional manpower to carry out purposes of the Act, and responding to requests for field investigations of workplace hazards.

Mechanisms for carrying out these various functions have been put in place and are working though the pace is slow and uneven owing to economic and political pressures as well as technical constraints. The standard development process remains one of the more difficult technical and administrative tasks to work through. Setting limits for workplace exposures to chemical and physical agents posing risks of chronic disease are

especially formidable. Quantifying occupational (as opposed to off-job) exposures, and attributing to them illnesses which are delayed or insidious in development present complications with regard to specifying appropriate safeguards. Needs for considering cost/benefit aspects in adopting new standards has added further controversy to the process. Under the circumstances, few new occupational health regulations have been issued, most of those enforced being adopted earlier by consensus. Nevertheless, the data bases for setting new or revised exposure standards are continuing to be improved such as to make for more defensible rulings. In some instances, industry has set into place more updated provisions rather than wait for their issuance.

OSHA inspections for compliance with health and safety standards are being carried out, though not as many as in the years just after passage of the Act (Office of Technol. Assessment, 1985). The focus now is in those industries and employers showing the greatest number of violations, frequent reports of worker illness or injury or both. While penalties are still levied against offenders, current OSHA inspections have taken on a more consultative purpose with regards to remedying workplace hazards. Checking employer logs of reportable worker illnesses and injuries which are to be prominently posted are a regular part of such inspections along with environmental measures.

Research into occupational safety and health issues has become less diffuse with now major efforts targeting those work related disorders which rank highest in terms of incidence, severity, population at risk, and tractability considerations.

The NIOSH list (Morbid. & Mortal. Rept., 1983; Millar and Myers, 1983) of such problems includes the following:

Occupational Lung Disorders

Musculoskeletal Disorders

Occupational Cancer

Fractures, Amputations, Traumatic Deaths

Cardiovascular Disease

Reproductive Problems

Neurotoxic Illness

Noise-induced Hearing Loss

Dermatologic Problems

Psychologic disorders

With reference to the need for integrating health protection with health promotion activities, one can see workplace environmental factors as well as behavioral/lifestyle determinants influencing most of these kinds of outcomes. Necessary research to study workplace factors in the occurrence of these occupational disorders is the mainstay of current NIOSH research but there are now increased efforts to consider lifestyle variables as co-factors in these efforts. Smoking and alcohol consumption have been singled out in current work.

Owing to the Act, there is federal support for training new occupational safety and health professionals and 15 regional centers have been established offering specialty training in occupational medicine,

occupational nursing, industrial hygiene and safety (Weis and Purcell, 1979). Efforts are now being made to include occupational health and safety courses into business school and engineering school curricula (Thelan, Ledgerwood and Walters, 1985). These are intended to sensitize future business leaders and engineers about workplace hazard control considerations when making decisions and plans about new industrial ventures. Similarly, the federal government has made grants available to unions and schools for workers for the purpose of upgrading the average worker's knowledge of workplace hazards and control practices (Office of Technol. Assess., 1985).

Requested investigations of workplaces to ascertain the presence of particular hazards as mandated by the OSHact are also being carried out. Presently, over 500 requests are received and responded to annually. Though such evaluations were to be directed to questions of toxic substances, inquiries have been answered with regards to other forms of alleged hazards as well.

Legislative Actions - State/Municipal Roles

The OSHact of 1970 enabled State labor and health agencies to assume the inspection and regulatory directives called for under the legislation upon submission of a plan equal to that to be implemented by OSHA. The thinking here was that local control could create a broad base for effective action as well as reinforce occupational safety and health interests at the state and local levels. Presently, 23 states have full responsibility for plant inspection and enforcement, and two others have limited coverage (Office of Technol. Assessment, 1985).

Legislative Actions- Employer Responsibilities

The OSHact held individual employers accountable for safe and helpful working conditions thru compliance with occupational health and safety standards. Health standards included procedures for monitoring the environment as well as the health status of the workers and acknowledging measures in place to reduce exposure hazards. The latter typically emphasized engineering control approaches followed by use of safe work practices as established thru training and use of personal protective equipment. Safety standards largely dealt with specifications for limiting sources of impact or traumatic injury through a similar control hierarchy.

Indicators and Measures - Legislative Actions

The Kar and Berkanovic (1983) framework alluded to earlier list legislative actions as a social or group level indicator for physical health and safety promoting behaviors. That society has recognized the human and economic toll of work related hazards and has passed laws dictating control actions is to be appreciated. In actuality, the provisions of the OSHact would suggest a number of indicators and measures that would seem to have much face validity in affecting physical health and safety outcomes. Immediately coming to mind are the following:

1. Number of new occupational safety and health standards established and or refined.

2. Number of workplace inspections carried out to ensure compliance with such standards and/or to offer consultation in controlling known hazardous conditions.

3. Number of requested worksite evaluations conducted to determine if hazards are present and to recommend needed control measures.

4. Numbers of business/engineering schools sensitizing their students to occupational safety and health considerations as part of their training.

5. Numbers of employers able to mount health and safety programs providing state of the art control efforts.

As already noted, some of these efforts have been quite slow in development while others are fairly new and their impact still remains to be realized. Still others may be limited owing to insufficient resources. Perhaps this explains why in the 15 years since the passage of the OSHact, the expected drop in the rate of work related injuries and illnesses is yet to be seen. A report from the Office of Technology Assessment (1985) in acknowledging the slow progress has suggested a number of options. These have included expanded research to improve control technologies, better use of reporting systems for hazard identification, better dissemination of information thru demonstration projects, on-site consultations, improving incentives for installing control systems. At the same time it is important to stress that many of these actions will only set the stage for improved worker health and safety-individual employer reactions and worker behaviors can be far more telling in this process. It is to these indicators that we now turn.

Employer Actions

The advent of the OSHact and subsequent directives prompted employers to solidify their safety and health practices and establish formal plans and programs for addressing evident hazards in their work establishments. Common characteristics in such efforts were statements of management policy regarding
their responsibilities and what they expected from workers, specifications of hazard control plans and formalization of safety rules as needed, training provisions, systems of inspections and record-keeping. Use of pre-employment and periodic follow up medical exams to monitor health status also became a part of such programs. Larger employers readily adopted such plans but smaller establishments, many with the most significant hazards, could only do so in a marginal sense.

Though an indicator of improved health and safety on the job, certain qualities in the program practices and other company factors proved to be more closely associated with reduced injuries and illnesses than others (Cohen, 1977). In particular, studies contrasting safety practices in companies with high and low work experience and analyzing factors common to companies having outstanding safety records indicated the following as correlates of success:

1. Top management's strong commitment to safety as reflected by the rank and stature of the company's safety officer, regular inclusion of safety issues in plant meeting agenda, personal involvement in safety matters.

2. Close contact and interaction between workers, supervisors, and management enabling open communications on safety as well as other subjects.

3. Greater workforce stability with evidence of positive personnel approaches to ensure such stability (e.g., well developed selection, job placement and advancement procedures, plus other employee support services).

4. Better housekeeping and more orderly plant operations emphasizing environmental controls.

5. Training emphasizing early indoctrination and follow-up instruction to employees in safety procedures.

6. Evidence of customizing traditional safety practices to increase interest, relevance to target group or job operations of concern.

Taken together, these different factors suggested that effective safety program actions and indicators are those heavily dependent on "people" oriented considerations.

Employee Actions

As already noted, promoting a greater worker awareness and concern for occupational safety and health matters was one of the provisions of the OSHact. At the individual plant level, this meant workers being informed as

to apparent hazards that could affect their health and safety, being appropriately trained in use of hazard control procedures and use of personal protective equipment. A number of worksite demonstration studies in recent years have applied behavior management techniques to safety and health training with excellent results (Cohen, Smith and Anger, 1979; Cohen & Jensen, 1984; Komaki, Barwick and Scott, 1978). These techniques emphasize to the workers the needs for specific instruction, invite their inputs into the process, identify the particular conditions and behaviors of consequence, and use a variety of rewards to reinforce the attainment of the desired actions with frequent feedback to mark progress. Typical safety and health training offered to workers may contain some of these features but their effectiveness remains uncertain due to the lack of any evaluative element. The latter is a key factor in the behavior management approach.

Employee membership on company safety and health committees has remained one way for promoting their interest in such issues and gaining their commitment to adopted measures. A recent study has also demonstrated the efficacy of a worker-based system for hazard recognition, reporting and problem-solving (Lin and Cohen, 1983). This represents a more active role for workers, effectively deepening their appreciation of workplace risk factors and corrective steps that could be proposed. A comparison of the hazards noted in worker reports versus those detected through more traditional injury/illness reports suggested the merits of the approach and how it could be further improved.

Unions have become more conscious of worker health and safety issues and a lobby for supporting actions as provided for in the OSHact. At the national level, they have hired occupational safety and health professionals to advise them on relevant issues, indeed, conduct their own studies. In addition, they have been the recipient of Federal grants to establish training programs for workers dealing with hazards specific to certain high risk occupations. Locally, unions have been vigilant about workplace hazards and related risks, helping to direct worker requests for health hazard evaluations to the appropriate investigative agency. About 30% of all requests received for such evaluations emanates from workers or their union representatives.

Measures of Effectiveness

Measures for evaluating the impact of actions taken to reduce work-related injuries and illnesses are as varied as the different legislative (governmental), employer and worker/union actions just described. Table 1 furnishes examples of different measures, classified in terms of their relation to the desired end-results sought. Reduced frequency and severity of occupational injuries, illnesses and deaths represent direct outcome measures as does fewer days lost due to these adversities. These different measures are not uniformly defined, a fact which accounts for variable estimates in attempting to chart trends using different data bases (Office of Technol. Assess., 1985). These types of measures require large data banks and are typically used in national surveys or by large employers to track progress in controlling work related hazards and their consequences.

Bureau of Labor Statistics surveys are of this type and have reported a decline in both injury and fatality rates beginning in 1980 and continuing thru 1983, which is the latest report (Bureau of Labor Statistics, 1984). OSHA has attributed this reduction to the effectiveness of their programs. However, at least part of the drop is believed due to the business downturn in these same years which meant laying off younger, inexperienced workers who tend to have more accidents. These surveys can sort those industries and occupations which have disproportionately high rates of problems, prompting greater attention to the particular hazard control needs in such workplaces. Governmental actions including the development of new standards can ensue to remedy these problems.

In actuality, efforts made at determining the impacts of particular health or safety standards as measured by injury, illness kinds of measures have been rare. One analysis found that the issuance of a new safety standard (servicing of certain truck/bus tire rims) resulted in a 75% reduction in relatable work injuries (OSHA, 1982). Other studies suggest however, that the circumstance surrounding reported injuries at work indicate that no more than 40% could have been prevented by the issuance of standards (Bacow, 1980). Adequate training and education were felt to be the more evident need in the majority of these cases.

Evaluations of health standards for limiting exposures to toxic chemicals and harmful physical agents are problematic owing to the long latency period typically required for the agent specific disease to occur. Indeed, afflicted persons may leave the workforce before the disease manifests itself, thus complicating the assessment.

As work-related injuries and illnesses are statistically rare events, individual plant data may not have sufficient range of variability to be revealing of a company's health and safety standing. Surrogate measures have been suggested to overcome this kind of limitation. With regard to injury control, for example, counting more frequent "near misses" as opposed to real accidents has been prescribed. Companies having the best safety performance records have employed this technique, using it to (1) dictate needs for control actions before the fact, and (2) gain more information about would-be accident causes because those involved can talk about it more freely (i.e.,no blame or fault issues to contend with) (Cohen, 1977; Cleveland, et. al. 1979). Reductions in exposure levels to known hazardous substances have been used as a substitute for determining the actual illnesses averted thru control actions. Available evidence from OSHA plant inspection data shows some favorable effects following the issuance of more stringent exposure standards for a number of workplace contaminants. It is indicated that workplace exposures to asbestos, silica, lead, cotton dust, have all dropped in recent years (summarized in Office of Technol. Assess. 1985).

Still another substitute measure for gauging improvement in hazard control has been to use a behavioral sampling procedure, in effect observing the extent to which workers actions comply with procedures aimed at reducing exposure to harmful, toxic agents or to sources of traumatic injury. This approach is particularly appropriate where hazard control functions are strongly dependent on safe work practices, and use of personal protective equipment. Worksite studies have shown behavior sampling to be an effective

technique in determining the effectiveness of worker training aimed at reducing the risk of job injury and illness, and further applications are encouraged (Zahar et al., 1980; Hopkins, 1981; Cohen and Jensen, 1984). Evidence of increased safe behaviors in these studies has been coupled with reduced accident rates and lower exposure levels, where the latter data have been available, thus adding to the credibility of the indicator (Hopkins, 1981). Other more indirect measures are also possible. These could include inventory audits revealing greater use of safety related equipment (more replacement cartridges for respirators, greater use of soap in locker rooms, etc.).

In-Process Measures

The in-process measures shown in Table 1 are suggested ways for marking the extent of employer and worker response to the dictates of current occupational safety and health legislation. The measures are self-explanatory and, while remote from the final hazard control actions, are intended to set a course for their realization. Indeed, increased plant inspections and closer medical monitoring serve to increase local surveillance and offer a means for early detection of problems along with other audits on a plant's hazard control system. Hazard communications directing worker attention to apparent hazards and training sessions to establish and reinforce safety practices are all preparatory type responses at the employer level. Similar kinds of preparatory efforts are indicated at the employee level through the workers' active participation in such programs, volunteering information which calls attention to unrecognized

hazards or submitting requests for an evaluation as may be necessary. Though plausible, evidence connecting these kinds of measures with the end-goals of reduced illness and injury remains largely suggestive. Companies where these kinds of practices are carried out in a vigorous way do tend to show fewer injuries and illnesses (Cohen, 1977; Cleveland et. al. 1979). Yet the efficacy of certain of these measures seems accepted on faith. For example, worker safety training programs in general remain to be assessed for their effectiveness as do the volumes of posters, pamphlets and other communications intended to inform workers about hazards in their work environs and precautions to be followed (Cohen and Jensen, 1984; Cohen et al, 1985). This is an area where evaluative study is sorely needed.

IV. HEALTH PROMOTION AT THE WORKSITE

This discussion thus far has been directed to health protection issues at the workplace - that is, those actions aimed at controlling hazardous working conditions and the associated health and safety risks to the workers to exposed. Health promotion at the worksite has a different focus. It emphasizes the individual, more particularly, those behaviors and personal lifestyle factors that pose risks to one's health and well-being, and represents efforts to effect positive change. Risk factors of this type may include smoking, poor eating habits or diet, alcohol and drug abuse, inadequate stress coping skills, lack of exercise and poor physical fitness. Health promotion approaches consist of educational and motivational techniques for altering these and other problematic behaviors.

Governmental Actions

Federal Level

A health promotion movement became evident in the 1970's in response to soaring medical care costs coupled with the realization that behavioral factors play a significant role in seven of the 10 leading causes of death in the U.S. The Surgeon General's report Healthy People (DHHS, 1979) documented the preventable nature of many illnesses and established the ground work for emphasizing disease prevention measures through self-help, self-care actions to make progress in enhancing the nation's health status. In particular, the report identified 15 priority areas wherein improvements could be made in the health of Americans, five of which alluded to problem behaviors and lifestyles mentioned above. A follow-up publication, Promoting Health/Preventing Disease: Objective for the Nation (DHHS, 1980), set forth specific and quantifiable objectives within each priority area for attainment at various points through the year 1990.

While not a legislative mandate, the 1990 Objectives have provided impetus and direction to federal health agencies in imparting a health promotion as well as disease prevention emphasis to their programmatic responsibilities. Indeed, agency goals for different Federal health programs have become merged with relevant 1990 Objectives (Millar and Myers, 1983).

References to the workplace were made in two ways in the 1990 Objectives document. It was identified as one priority area considering that occupational illnesses and injury were of human origin and preventable. In

this regard a host of actions were listed for ensuring improved worker health and safety. Most were cast as environmental control-type solutions but two made mention of lifestyle factors or health promotion issues that could affect such outcomes. In addressing personal lifestyle/behavioral risk factors as problem priority areas, the 1990 Objectives referenced the workplace but only in the context of it serving as a vehicle for facilitating remedial actions. While bringing some attention to the interaction of occupational and lifestyle risk factors in affecting health status, the 1990 blueprint for action still maintained a largely segregated view in dealing with such problems. Efforts to interweave activities of federal agencies concerned with occupational safety and health and those identified with lifestyle issues are still quite limited.

State/Community Actions

Actions at this level have been of two types. One has been passage of ordinances restricting activities such as smoking in public places including state/municipal offices and the other has been offering different worksite health promotion programs to public employees and to assist other local private employers in similar efforts. The health promotion program efforts have been supported by Federal grants or those from foundations or other sources.

The Workplace as a Site for Health Promotion

As a vehicle for health promotion programs, the workplace offers (1) convenient access to large, relatively stable populations, (2) available staff already committed to improving worker safety and health, (3) organizational structures to support programs, and (4) opportunities to utilize existing peer support systems to improve participation in and compliance with health promotion activities. Participation in worksite (vs community) health promotion programs is facilitated among workers with pressing familial or social commitments which would otherwise compete for available time (Brennan, 1982; Parkinson and Associates, 1982). That an increasing number of employers have offered health promotion programs in recent years reflects, to some extent, the fact that industry bears a major portion of national health care costs and the bulk of health insurance costs, creating an apparent vested interest in improved employee health (Fielding, 1984).

Aspects of Worksite Health Promotion Programs

Worksite health promotion programs fall into three major categories, (1) assessment of health risk and implementation of risk reduction activities, (2) employee assistance programs (EAPs), and (3) health screening programs. A health risk appraisal (HRA) is the most common tool used to identify health risk and convey the extent of risk to workers in terms of reduced life expectancy. HRA's focus on personal/lifestyle risks (alcohol, smoking, health history, driving habits, etc.) but ignore environmental and psychosocial risks owing to the work experience. Accordingly, life expectancy estimates from HRA's are more valid for "carpeted floor" workers

relative to blue collar workers. For the latter group, the type and extent of workplace exposures to physical and chemical agents render such health risk assessments progressively inaccurate.

Risk reduction programs in work settings most typically accent smoking cessation, weight control, physical fitness, stress management, or proper nutrition. Among the lifestyle programs, stress management and physical fitness activities are mentioned most frequently by employers for future workplace implementation. Alcohol/drug abuse and personal counseling, though categorized by some as health promotion, have traditionally been offered via employee assistance programs. EAPs were designed as remedial not preventive programs for the "troubled worker", the latter being referred by a supervisor because of poor work performance.

Single purpose health screening programs represent a third type of risk reduction activity in work settings. Programs commonly target hypertension, cancer, and diabetes screening for the purpose of early detection and treatment.

Surveys of employers in Minnesota (Minnesota Department of Health, 1982), California (Fielding and Breslow, 1983), and Colorado (Davis, Rosenberg, Iverson, Vernon, and Bauer, 1984) highlight some common characteristics of worksite health promotion activities. Perhaps most significantly, a direct, positive relationship is found between company size and the likelihood of health promotion activities. The larger the company, the more likely that health promotion activities will be made available to its employees. Since

large companies (more than 500 employees) make up 0.3% of all companies and represent only 22% of all employed persons, it is clear that health promotion programs are reaching only a small segment of the working population.

Approaches utilized in worksite programs range from information dissemination through educational efforts to the provision of services in the form of individual or group training. For most health promotion topics, companies tend to provide informational activities more so than service actions (Davis et al 1984). Few companies have utilized incentives or offer reimbursement to employees for offsite activities to foster employee health promotive behaviors.

Employer surveys reveal that most worksite programs are offered on-site and operated by company staff. To supplement onsite programs, company staff commonly arrange no cost services offered by community agencies like the American Heart Association or the Red Cross. Employer support for health promotion activities often involves the use of company time and facilities and payment for the cost of the activity. What is not clear is the degree of dispersion of health promotion programs across company locations. That is, a company may have several programs available at its headquarters but minimal or no activities at its other locations. In the same way, programs may be offered to some employees but not others, the general bias being to offer programs to white collar moreso than blue collar workers. The reverse is usually true for hazard protection programs focusing on accident prevention and exposure to potentially hazardous substances at work.

this state of affairs, economic considerations being the most obvious. Employers who accept the logic that workers will be healthier after a program and thus will be more productive do not consider evaluation a high priority. On the other hand, companies with limited resources may chose to allocate funds to program needs rather than evaluation. Finally, program administrators may resist attempts to evaluate because they are "convinced" of the merits of their program. At least one study (Davis et al 1984) found that most employers perceived that health promotion programs resulted in improved employee morale, health, and productivity in the absence of sound evaluative data.

Evaluation research can provide quantitative and qualitative evidence of the effectiveness of health promotion programs as judged by the goals and objectives set forth prior program initiation. Such data can be useful for program administration and development and for comparison of the relative effectiveness of different programs. Properly designed evaluation studies also permit cost-effectiveness calculations which are particularly useful for justifying program continuation in "bottom line" terms (i.e., return on investment). Companies with limited resources yet a desire to improve employee health in a programmatic fashion could utilize such data to select which type of health promotion activity will be implemented. Finally, the rapid increase in providers and programs increases further the need to know which programs will yield the greatest health impact at the lowest cost.

Employer Action

Most worksite health promotion programs focus on employee risk reduction and measure employee-level indicators of health promotive behavior. As Kar and Berkanovic (1983) point out, health promotion also occurs at organizational and societal levels. Actions at these levels can facilitate or retard individual health promotive behavior. Indicators of employer health promotive behaviors are described below according to the intended effect of the action.

One class of organizational actions enable/foster health promotive behavior by making health promotion activities available and accessible to workers and providing structural support for programs operated at the worksite. Actions here include employer sponsorship of health promotion programs and provisions for the use of company facilities, resources, and employee work time. Employer incentives for employee participation in worksite programs and reimbursement of employees for community programs are actions which may additionally enable/foster health promotive behavior at the individual level. Formulating clear and objective program goals, commitment of management to improving worker health, and provisions for employee involvement in program planning and decision-making processes have been suggested as prerequisites for successful programs.

Another set of employer actions create circumstances which reinforce employee health promotive behaviors and attempt to establish such behaviors as norms.

Indicators here include the designation of no-smoking areas at work, elimination of cigarette machines on work premises, provision of nutritious food in the company cafeteria and vending machines, and existence of a health unit.

Other employer actions acknowledge extraorganizational factors which affect worker health and well-being on the job. The implementation of flexible work schedules and provisions for maternity/paternity leave, child care, and part-time employment opportunities each permit the worker to cope more efficiently with life demands/stresses so as to prevent potential ill-effects (Kiefhaber and Goldbeck, 1984).

A final class of employer actions which may promote worker wellness behaviors relate to health insurance coverage, offered by most employers as a fringe benefit. Considering a health benefit plan which provides major medical coverage for catastrophic events as the norm, employer health promotive actions would include additionally offering insurance coverage for regular physical exams (if not already offered by the company medical department), preventive physical and mental health services, mental health counseling, and treatment with "experimental" therapies like biofeedback. Going a step further, opportunities for employees to "customize" a health benefit plan to suite their needs would likewise represent an employer action could would promote worker health.

Employee Actions

Initial actions at the employee level involve receptivity to health promotion information and activities, participation in program efforts, and commitment to long term behavior change. Several studies have shown that participation and compliance rates are higher in worksite relative to community health promotion programs (See Fielding, 1984). One explanation for this finding emphasizes the positive effects of peer social support at work for fostering/reinforcing acquired health promotive behaviors. As noted earlier, participation may be facilitated in worksite vs community programs among employees with pressing familial and/or social commitments which would otherwise compete for available time.

There is scant data regarding factors which influence employee decisions to participate in health promotion and how successful worksite health promotion programs are at attracting those employees at highest risk. In this regard, Davis, Jackson, Kronenfeld, and Blair (1984) examined relationships among risk factors, psychosocial variables, and intent to participate in health promotion programs. In the areas of weight reduction, exercise, and stress management, being at risk was associated with less satisfaction with one's health and a greater willingness to participate in an health promotion program. This type of association was not evident in the areas of cigarette smoking, nutrition, and alcohol use. Moreover, one psychosocial variable, personal efficacy, significantly influenced workers' level of satisfaction with their health status and intent to participate in a health promotion program.

Beyond receptivity and participation issues, employees can also take actions to initiate health promotion programs, volunteer to serve on topic specific task forces and committees, provide peer support for program participation and compliance with health promotive behaviors. Lack of employee involvement in program planning and implementation has been associated with some program failures.

Measures of Program Effectiveness

As shown in Table 2, outcome measures for health promotion parallel those enumerated for health protection programs and reflect reduced morbidity or mortality. Reductions in illness, injury, health care costs, and absenteeism are direct measures of worker health and well-being. While direct outcome measures address "bottom line" concerns of health promotion, improved health and reduced disease, they are not routinely used in evaluation studies. This is especially curious in workplace (vs community) programs since employer records are often available for these types of measures. Moreover, company insurance carriers maintain health care claim records which could be used to track the number, type, and cost of employee health claims over time. In the same way, most organizations keep reasonably accurate and up-to-date records of employee performance evaluations, absenteeism, and injuries on at least an annual basis which could be used as evaluative indicators.

Of course, in order to accurately attribute health outcomes to health promotion programs, a true experiment type of design (pre vs post measures with randomization of workers to health promotion and control or comparison

groups) is required (Cook and Campbell, 1979). Such evaluations are expensive and this may explain in part the scarcity of health promotion program evaluation studies of direct health outcomes.

Beyond issues of experimental design, direct outcome measures themselves present problems of measurement and interpretation. For example, to the uninitiated, the measurement of absenteeism may seem a simple and straightforward task. In reality, the scientific literature contains over 40 different measures of absenteeism (attendance) which are associated with varying degrees of reliability (Muchinsky, 1977). When absenteeism has been measured in health promotion studies, a time-lost measure (number of hours or days absent) is typically employed. Absence duration measures of this type have high face validity but have the lowest stability coefficients relative to other measures. Absence frequency, which measures the number of instances absent regardless of duration, is the most stable indicator. Taken together, absenteeism indicators do not form a homogeneous set of behaviors (Smulders, 1980) and are not highly intercorrelated.

Conceptually, absenteeism clearly measures more than merely health events. Short absences which do not require a medical certificate are as likely to reflect nonmedical as medical factors. Also, absenteeism rates are affected by organizational policies such that workers permitted more paid sick leave will likely take more sick leave. Adding to the problem, statistical analyses of absenteeism data are complicated since the data distributions are positively showed, leptokurtic, and often truncated (i.e., many workers are not absent at all yet a few have large numbers of absences).

A final point regarding direct outcome measures concerns the lack of clarity in the conceptualization and measurement of health. While health promotion continues to be broadly defined, health is usually measured in a very constricted fashion. In most studies, health is not measured at all, but studies rely on intermediate indicators of health (alcohol use, cigarettes smoked, etc). Kaplan (1984) has presented a convincing case for incorporating more relevant and reliable indicators of health status into health promotion program evaluations. He describes a large literature on health status indexes which attempt to measure overall quality and duration of life. Global definitions of health, like that of the World Health Organization, emphasize the positive aspects of health (mental and physical well-being) in addition to negative aspects (absence of disease). Indexes of health seek to measure both aspects in a quantitative manner and usually factor functional capacity indicators into overall health assessments. The Health Status Index (Fanshel and Bush, 1970), Sickness Impact Profile (Bergner, Bobbitt, Kressel, Pollard, Gilson, and Morris, 1976), and the Index of Well-Being (Kaplan, Bush, and Berry, 1976) are examples of such measures.

Since the ultimate objective of all health promotion programs is to improve health and prevent disease, a generic index of health would be a reasonable measure to incorporate into evaluation studies. Moreover, quantification of health using standardized indexes would also facilitate comparisons among diverse health promotion programs (Kaplan, 1984). Such evaluations would complement cost-effectiveness calculations in adding the dimension of improved quality of life to determinations of program benefits.

Surrogate Outcome Measures

Changes in personal/lifestyle habits, which could lead to improved health constitute surrogate or intermediate outcome measures. These are the most commonly used measures in health promotion evaluation research. For the most part, the measures used have been specific to the type of program offered (e.g., for smoking cessation, the number of cigarettes smoked) and have relied heavily on self-reports of participants. The specificity of measures prevents the statements of the generic health impacts of health promotion programs (i.e., improvements in overall health and well-being). Also, comparative effects of various health promotion activities can be made only for isolated health impacts but not overall health impact. In the example above, by-products of smoking cessation could well include less fatigue, improved work performance, enhanced personal efficacy, and reduced alcohol intake over and above self-reports of cigarette use and anticipated effects on respiratory function and longevity.

In the same way, reliance on self-reports indicators of change, in addition to being subject to a collage of potential biases, restricts knowledge by ignoring physiological changes attendant to health promotion programs. For example, beyond respiratory effects, smoking cessation may result in improved cardiovascular function which additionally lowers health risk and could be factored into health risk determinations and program effectiveness calculations.

Process Measures

Process measures of employee actions include frequency counts of the number of health promotion activities requested by employees, program participation, attendance, and drop-out rates, and anecdotal feedback from participants and program providers. Process measures can be applied inexpensively and efficiently and the data are useful for program development, implementation, and maintenance. Of course, data of this type do not provide insights into the actual health impact of health promotion activities.

V. EVIDENT GAPS AND NEW PERSPECTIVES

Paraphrasing the thoughts of the NIOSH Director in a recent speech (Millar, 1985), the workplace provides a setting where environmental and behavioral or lifestyle factors may come together to produce a synergism of risk. This is clearly seen by the interaction between cigarette smoking and mining uranium (Archer et al, 1973). Each of these factors, taken separately, increase the risk of lung cancer. However, if a person both smoked cigarettes and worked as an uranium miner, the resultant cancer risks would be at least 5 times as great as that produced by each factor alone. In short, 1 plus 1 in this case equaled more than 4!!. The health protective and health promotive actions reviewed in the preceding sections of this paper offer a means of addressing both risks, and in this sense the workplace potentially offers a synergism of prevention thru adroit use of such approaches. Yet this type of concerted action remains to be realized.

As viewed by the occupational health professional, there are three aspects about health promotion as presently practiced which make its acceptance problematic. First, the principal tool of health promotion, the health risk appraisal does not take account, in any individualized way, of the environmental hazards confronted by the worker at the workplace. The appraised age of an asbestos worker who smokes should be noticeably different from a smoker in a dust-free job owing to the potential interaction in the former case. Second, health promoters characteristically have been preoccupied with the convenient captive audience presented by workers on which to ply their behavioral oriented wares. Rarely do health promoters speak of workers' needs for information about their specific occupational risks. In fact, there are reported failures in health promotion programs for workers having this expressed need which went unmet. O'Donnell and Ainsworth (1984) describe a situation in one chemical company where a needs assessment found that workers wanted information about and protection from toxic substances in their work areas, more than fitness, nutrition education. When it was learned that such material would not be included in the program, they refused to attend.

Third, health promotion in the workplace has been marketed rather selectively. The population most served has been typically "white collar" workers, especially, male executives between the ages of 30-55 years. Yet the risk for both injury and disease are highest for "blue collar" workers, especially young ones. More definitive information on this point is expected from a nationwide survey of worksite health promotion efforts as found in employers with 50 or more employees. This survey is in progress.

Admittedly, the health promoters identified with lifestyle concerns may hold equally critical views of the occupational health and safety constituency. While espousing engineering solutions, worker training and education are basic elements in almost every hazard control plan and ones for which most occupational professionals show little skill. In contrast, these are the strong points of the health promotion approach. Moreover, success in efforts to control safety and health risks on the job seem to be fostered in part by workforce stability and the availability of support services covering a whole range of worker needs. These too are considerations that broaden traditional views of hazard control to include those of the health promotor. These considerations suggest an agenda for future actions to help create the right mix of health protection and health promotion ideas that can best serve the U.S.workforce. Foremost in this regard are the following:

1. Foster interactions between health educator/health promotion specialty groups and occupational health and safety professionals so as to build a basis of mutual understanding, knowledge of issues and areas for joint consideration. Some beginning efforts are underway with symposia like this one being undertaken. Attempts are being made to to include health promotion materials in courses of instruction for occupational safety and health trainees in NIOSH professional training centers. Similarly, students in schools of public health are being exposed to subject matter on workplace hazards. These efforts will probably require more reinforcement to have the desired impact.

2. Alternative methods for including occupational risk information in health risk appraisal instruments used in health promotion programs need to be developed. The best means for portraying this information to workers to ensure
understanding, especially to blue collar workers, where literacy level might be a problem, will have to be considered.

3. Model program practices combining worksite health protection and health promotion activities should be formulated based on the pooled knowledge available. Effective practices dealing with both concerns are emergent and need to be blended. One issue which will have to be addressed early in these plans, especially in the case of blue collar workers, is that health promotion elements are efforts to enhance the level of their health. That is, they are not to be construed as the primary defense against workplace hazards which the employer is obligated to undertake via engineering or other direct control techniques. Indeed, some concerns raised by unions and others about worksite health promotion is that it may be offered as a convenient and less effective substitute for management doing something about the environmental hazards. Other points would have to deal with the delivery of risk reduction programs which may differ for white and blue collar work groups. Provision of company time of financial support as incentives to workers who participate in such programs would bear consideration. Specialists with wide experience in health promotion and worksite hazard protection practices, joined by management and union persons having responsibilities for worker health and safety in their organizations in such programs, would be needed to undertake this kind of task.

4. Support the inclusion of health promotion elements in company health and safety programs involving blue collar workers. Worker groups and occupations where combination lifestyle/workplace risks may indicate the greatest need and pay-off in increased health protection should be the targets. Candidate groups in this regard could be:

Worker Group	Occupational Health Risk	Lifestyle Risk
Miners	Lung diseases,cancer	Smoking
Construction Workers	Job accidents	Alcohol use
Warehouse Workers	Musculoskeletal disorders	Poor fitness
Prison Guards	Psychological disorders	Poor stress coping

5. Strategies for evaluating the impact of including health promotion programs in existing workplace hazard control programs for these or other groups should
be prescribed and greater efforts made to document benefits. This could include employer health and safety data reflecting any differences in illness/injury rates, in-process or surrogate measures of such outcomes, before and at various times after the introduction of such activities coincident with employee participation in the health promotion program. The array of health and safety measures used for gauging the adequacy of health protection as well as health promotion actions needs to be studied for their merits in this type of evaluation.

Programs aimed at reducing occupational risk factors and lifestyle factors have the same goal, improved health of the worker. In terms of methodologies, there are worker educational and motivational strategies found in both pursuits and this too should also offer a common ground for moving forward in both health protection and health promotion activities. Greater efforts to coordinate the two are in order and the above ideas are advanced to achieve that end.

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