

Population Health Management as a Strategy for Creation of Optimal Healing Environments in Worksite and Corporate Settings

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ABSTRACT

This paper provides an (OHE) overview of a population health management (PHM) approach to the creation of optimal healing environments (OHEs) in worksite and corporate settings. It presents a framework for consideration as the context for potential research projects to examine the health, well-being, and economic effects of a set of newer "virtual" prevention interventions operating in an integrated manner in worksite settings. The main topics discussed are the fundamentals of PHM with basic terminology and core principles, a description of PHM core technology and implications of a PHM approach to creating OHEs.

INTRODUCTION

Population health management (PHM) is a relatively new term that refers primarily to efforts at shaping the health status and demand for health care associated with a defined population.¹ This paper is intended to help clarify the conceptual framework for the formal testing of this approach to optimal healing environments (OHEs). Because of the relative newness of the concept of PHM, no commonly accepted definition exists. This leaves both the flexibility and ambiguity of the term under the control of the term's user. The following definition is used in this paper.

Population Health Management (PHM) is a proactive, organized, and cost-effective approach to prevention that utilizes newer technologies to help reduce morbidity while improving health status, health service use and personal productivity of individuals in defined populations.

There are several key implications inherent in this definition that deserve further attention. There are three explicit foci for intervention. Combinations of these three interven-

tions have emerged as providing a strong foundation for PHM:

1. Interventions that affect the individual (i.e., as consumer and patient).
2. Interventions that affect the work or social organizations involved.
3. Interventions that affect the culture of subgroups or entire populations.

The demand for health care since drives health costs. The primary focus of PHM is the stabilization, control, and/or reduction of medical care costs.² This in turn results in a focus on conventional prevention activities that are most likely to make an impact on the health care utilization experience of defined populations.³ This means that epidemiology is a primary analytic tool of PHM, because it provides the tools and analytic framework to measure clinical need and to target interventions that will affect the prevalence and incidence of clinical problems in the population. By modifying risk factors and by affecting factors that contribute to morbidity, the patterns of illness and injury will be directly improved.

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Use of the term "morbidity" implies that in addition to medical conditions and recognized diseases, injuries are also a concern of PHM. This includes reducing the collective illness and injury burden in defined populations including work-related accidents and injuries, home injuries, recreational injuries, and transportation-related injuries.^{4,5}

There is an equal focus on influencing the patterns of health care use behavior in individuals and summarily in populations. This represents a variety of concerns including consumer health skills, knowledge about providers, the provision of health information, the establishment of incentives to counter apathy, and the sense of entitlement among health consumers.⁶

The inclusion of "defined population" into the definition implies that our approach to PHM is population-based and systems-oriented in nature. This orientation has natural implications that bring us to managed care populations, employer and insurer health plans and community-based PHM interventions. At the heart of this perspective is the ability to identify each individual as a part of a defined population.⁷ This includes personal and work productivity, impacts on quality of life, social support, functional capability and "Presenteeism." The impact of PHM on the individual extends to families, health plans, institutions, communities, and sub-populations. The outcome measures relate to how we are affecting health risks, health status, quality of life, self-efficacy, and health care utilization behavior.

CORE PRINCIPLES

PHM activities are based on the following core concepts.

Core principle 1: Individuals in populations must modify their behavior in relation to a selected set of health risks

These selected health risks will vary according to the attributes of the population. Some of the major risk factors and behaviors are listed in Table 1.

Each of these factors or elements can be targeted at individual and at population levels, thus reducing the modifi-

TABLE 1. IMPORTANT AREAS OF RISK AND BEHAVIOR

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| <ul style="list-style-type: none"> • Cardiovascular risk factors • Workplace risk-taking behavior • Home safety practices • Vehicular safety practices • Recreational safety practices • Nutritional practices • Mental health and stress management practices • Dental home care practices • Rest and revitalization practices • Social support activities • Reproductive health practices |
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TABLE 2. IMPORTANT DIMENSIONS OF HEALTH CARE USE BEHAVIOR

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| <ul style="list-style-type: none"> • Monitor family diseases/"genograms" • Symptom identification • Self-care practices in the face of symptoms • Site-of-care choice • Information provision to practitioners • Assertiveness skills • Weighing various health care treatment options and alternatives • Use of screening opportunities • Choice of providers • Timing of care • Shopping skills for care • Compliance with advice • Handling financial issues |
|--|

able risks associated with excess morbidity in individuals and populations. The more these risks are reduced, the closer we get to the goal of absolute minimum illness and injury or morbidity burden for all populations including the unemployed, uninsured, underinsured, and those who do not seek medical care.⁸ However, the major portion of effort in PHM needs to be directed at strategies and interventions that are designed to help lower the risks associated with each of the identified areas of behavior.⁹ A level of priority for each individual organized by primary, secondary and tertiary prevention targets among the variety of possible risks and behaviors identified above, is also an important part of the overall picture.¹⁰

Core principle 2: Individuals in populations must modify their personal health care utilization behavior in relation to a set of basic consumer skills

Modifying health care use patterns and behaviors involves the introduction of incentives and feedback systems designed to help improve and augment the appropriateness of decisions consumers make in the use of health services. It also involves the transfer and assimilation of a variety of skills necessary to make wise choices in each of these areas (Table 2).

Consumer decision-making skills are critical in shaping patterns of health care utilization in defined populations. They can integrate well with much of the clinical oversight currently directed through utilization management and case management efforts.

Core principle 3: Individual and population data must be used to identify PHM disease management targets and priorities

Health care administrators are often required to make choices among many possible targets and issues when they

begin an integrated effort to improve the health of an employee or enrollee population and to help reduce their need (and demand) for health care services. Some of the possible PHM "targets" are contained in Table 3.

A significant problem in targeting PHM effort is the relative paucity of diagnostic data with which to make good analytic decisions.¹¹ There are also a number of useful questions to ask in setting population-based priorities, and these will be addressed in a later section.

Core principle 4: It is necessary to integrate primary, secondary, and tertiary prevention issues at the level of each individual

Health promotion and wellness professionals have traditionally viewed prevention from a "primary prevention" emphasis designed to reduce the risks of morbidity. Examples of this emphasis include smoking cessation, weight management, physical fitness, nutrition, stress management, sexual behavior and acquired immune deficiency syndrome (AIDS) education. Physicians have traditionally approached prevention from the "secondary prevention" perspective,

TABLE 3. POSSIBLE POPULATION HEALTH MANAGEMENT TARGETS

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- Low-back pain and injuries
 - Cardiovascular risk reduction
 - Smoking-related illnesses
 - Work-related injuries
 - Vehicular injuries
 - Recreational and sports injuries
 - Home accident prevention
 - Somatic complaint (i.e., stress problems) intervention
 - High risk pregnancy prevention
 - Family planning
 - Early disease detection
 - Minor self-limiting medical conditions
 - Alcohol abuse
 - Drug abuse
 - Diet and nutrition choices
 - Mental distress and depression
 - HIV/AIDS prevention
 - Asthma management
 - Arthritis condition management
 - Medical treatment counseling
 - Prevention of sexually transmitted diseases
 - Long-term disease management
 - Modifying passive consumer behavior
 - Overuse and misuse of emergency departments
 - Health service abuse
 - Inappropriate site of care
 - Inappropriate choice of provider
 - Inappropriate type of provider
 - Prescription complications
 - Inappropriate use of prescription drugs
 - Prevention of cumulative trauma disorders
 - Inadequate consumer cost sharing
 - Inappropriate use of complementary medicine
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HIV/AIDS, human immunodeficiency virus/acquired immune deficiency syndrome.

with clinical screening and testing to detect clinical conditions prior to their symptomatic emergence. Examples of this include blood pressure, lipid profiling, mammograms, prostate-specific antigens (PSAs), glucose tolerance tests, Pap smears, and similar early screening and detection technologies and diagnostics.¹² Health educators have traditionally addressed "tertiary prevention" issues, while seeking to help those with confirmed diagnoses effectively manage their condition in order to minimize adverse sequelae and to improve clinical outcomes. This area was historically called "patient education." Examples of tertiary prevention include diabetes management, asthma management, arthritis management, cardiac rehabilitation and pregnancy education.¹³

The PHM focus of prevention is to integrate all three levels to respond to the needs of the individual. Each person has a unique set of primary prevention issues that are shaped by age, gender, stage of readiness to change, and lifestyle behaviors. Similarly, each person has a unique set of secondary prevention issues influenced by family medical history, personal health history, age, gender and risk-taking behavior. Finally, the unique set of tertiary prevention concerns is affected by our chronic disease history and by our unique pattern of comorbidities and medication practices.

The most powerful forms of prevention in the decade ahead will seek to integrate all three levels of prevention at the level of the individual, and while doing so, determine the relative readiness to change or manage these personal high priority prevention issues.¹⁴ For systems of care or defined populations, the identification and consolidation of these individual prevention activities across large numbers of people will also provide prevention targets and types of intervention modalities that have the greatest health effects, the greatest economies of scale and the most favorable administrative feasibility. This type of approach will likely characterize PHM and prevention activities in the twenty-first century.

Core principle 5: It is necessary to utilize a full range of intervention modalities in our approach to PHM

There are a large number of possible intervention modalities that can be used in PHM, as noted in Table 4.

Core principle 6: It is necessary to base PHM strategies on a "shared responsibility" model

The current "entitlement model" for medical care is primarily a reactive model that responds to people appearing with a problem at a clinic or emergency room. The reasons for this model include deference to the sick as part of our collectively held belief in the sick role, fear of loss of patient satisfaction and business and lack of a financial incentive to more aggressively manage health.¹⁵ Unfortu-

TABLE 4. MAJOR INTERVENTION MODALITIES FOR POPULATION HEALTH MANAGEMENT

<i>Intervention modality</i>	<i>Brief description</i>
Individual patient	See individual patients in health care settings
Group programs	Conduct group education sessions in health care settings
Refer patients	Refer patients to another outside organization
Printed materials	Provide printed materials
Video materials	Provide video materials
Audiotape materials	Provide audiotape materials
Self-directed change materials	Provide self-directed change materials with or without formal incentives
Support group	Provide a support group opportunity
Laboratory test	Provide a laboratory test
Fax information	Provide health information by fax
Worksite group education	Provide worksite-based group education sessions
Health advice line	Provide health advice line using online telephonic support
Personal coaching	Provide personal coaching or mentoring
Newsletter	Provide periodic newsletter
Home care	Provide home care with education
Health risk appraisal	Provide health risk appraisal
Internet	Provide Internet web site
Formal incentives	Provide a formal incentive
Community event	Provide a community event
Prescription drug	Provide a prescription drug or supplements

nately, this reactive model does not fit well with the characteristics of demand management and PHM. People usually do not take good care of their health unless there is a clearly perceived threat to some aspect of the health and the well-being they desire to maintain.¹⁶

The problem is even more challenging in working populations. After more than 20 years of worksite health promotion and wellness programming, it is still a struggle to attract the at-risk population into entirely voluntary programs. At the same time, heightened organizational demands for evidence of cost effectiveness and impact on health benefit costs must be addressed in order to continue funding worksite programs. Furthermore, most employees, even when they want to, are less able to attend time-intensive programming during the workday.¹⁷ Thus, there is a long-term need to create cultural change in worksite populations to help support greater individual adherence to positive health behavior.¹⁸ A final part of this challenge related to working populations is the deep-seated entitlement mentality that exists among employees in virtually all work organizations, a sense of being "owed" their health benefits, vacation, special privileges and work-related perks.

The pressures for change in this voluntary-only or reactive approach to health are moving toward some aspects of

demand management or mandatory PHM. These forces include the need to affect a larger proportion of employees and/or retirees, the need to move away from labor and time-intensive programming strategies, and the need to reach the unmotivated at-risk population more effectively. Importantly, some elements of mandatory programming or more proactive programming respond to our ability to improve the health of individuals.

Counterforces that keep us in the reactive or "voluntary" posture include our fear of legal challenge and potential financial penalties, the threat of adverse employee reactions, and the fear of mishandling confidential information about an individual's health. However, each of these rationales for maintaining the reactive *status quo* are currently being successfully challenged by employers and managed care vendors.¹⁹

From a general PHM perspective, there are three kinds of activities that should be mandatory for all employees. The first is a mandatory exposure to the description of the extent of PHM activities available to the group. Everyone needs to hear the rationale for the PHM effort and what activities, policies, incentives, and benefits are available. These are customarily conducted at times of new program rollouts or when major program changes have been implemented. For health plan enrollees, it would be subsequent to health plan election decisions or after enrollment. The second type of PHM activity that should be mandatory is the educational activities on self-care and health care consumerism. This training should address the skills that are necessary to effectively manage individual and family health as well as how to use the resources and tools provided to the consumer. This type of activity is also designed to increase the level of confidence or self-efficacy the individual has in dealing with health issues.²⁰ The third type of mandatory demand or PHM activity is the completion of initial and periodic health surveys that deal with health behavior, health risks, medical history, perceived health status, and prevention interests.²¹ Participants receive back a personalized report with customized prevention suggestions and this is done on a periodic basis.²² This ongoing process will allow people to move through the various stages of readiness to change over time.²³ These types of provisions are fully allowable under Public Law 103-191, The Health Insurance Portability and Accountability Act of 1996.²⁴

FUNDAMENTALS OF POPULATION HEALTH MANAGEMENT

As the health care reform debate continues, there will be increasing pressure to define the role of worksite-based programming in ways that help modify people's use of health care services. If PHM is to be effective, it must set in motion both incentives and interventions to manage more aggressively the demand for health care as well as reconfig-

ure and functionally reorient the supply side of the health care cost "equation." The health care cost equation, in simplified form, can be stated as follows:

$$\text{Total Cost} = (\text{Price} \times \text{Quantity} \times \text{Type of Service}) + \text{Administrative Cost of Health Care}$$

"Price" is the unit price of each service consumed, while "quantity" is the number of units of various services used, and "type of service" is the actual identity or nature of the service(s) that were consumed. Administrative cost is the cost involved in paying claims, monitoring quality, protecting consumers and insuring against unusual risks. Price needs to be stabilized, quantity needs to be minimized consistent with good health outcomes, and the type of services used needs to be the least costly choices to produce the best health or clinical outcome.²⁵

A direct corollary of the premise that the demand for health services must be managed is the need to know the major factors that influence the use of health care services (i.e., the quantity and type of service used).^{2,26} These factors are numerous, extremely complex, highly interactive, and vary from population to population. The variables are endogenous (i.e., inside the individual) and exogenous (i.e., outside the individual). There are age specific and age independent, modifiable and nonmodifiable factors, and culturally dependent and culturally independent factors. Observations about the endogenous and exogenous factors that affect health and medical care use are particularly important.

The major endogenous factors are:

- Family medical history (genetic predisposition)
- Age
- Gender
- Sense of self-responsibility for personal health* (see the following paragraph for the meaning of the asterisks)
- Personal health behavior*
- Clinical risk factors*
- Safety and risk taking behavior* and
- Attitudes about personal health and health care use*

The major exogenous factors are:

- Extent of insurance coverage*
- Point-of-use cost sharing*
- Geographic access to services
- Regional or local practice patterns
- Provider incentives for diagnosis and treatment decisions*
- Work and home environment.

We estimate that PHM programs can directly affect 25% to 30% of current utilization by focusing efforts on programming strategies that address the **asterisked** exogenous and endogenous variables in utilization. If these efforts are combined with interventions directed at the other exogenous

factors identified above, it may be possible to reduce as much as 35% to 45% of utilization.²⁷

However, the two most powerful variables in predicting health care use are age and gender, and the literature is not entirely clear on the degree to which age-related and gender-related use of health services is fixed or nonmodifiable in nature. Some more recent studies are showing significant reduction in health care use among older individuals with wellness-related interventions. Thus, age- and gender-based health care use patterns may not be as fixed or immutable as convention presupposes, and may offer hope for the long-term stabilization of health costs and the concomitant improvements in the quality of life throughout individual life spans.²⁸

The five endogenous factors identified are appropriate for targeted intervention by employers and managed care organizations.

Factor 1: Sense of self-responsibility for personal health

PHM programs can directly affect the extent to which employees, dependents, and retirees perceive themselves as responsible for their own health. This belief directly affects the demand for health care by shaping the degree of passivity or assertiveness expressed by the patient in interactions with health care providers and their initial response to treatment options, later examination of treatment alternatives and the assumption of responsibility for actions to prevent disease reoccurrence and future complications. The individual's sense of personal responsibility for their own health also helps shape the extent to which they change behavior to help maintain or enhance their own personal health or to take actions to protect or preserve the health of their spouse, children and/or elderly parents. If individuals in a group have a relatively low sense of individual responsibility for their own personal health, they will likely rely to a much higher degree on only conventional medical services, while ignoring preventive health behaviors, complementary health interventions or related activities.²⁹ Their attitude is also likely to lead to a passive role as health care consumers, frequently contributing either to higher utilization, higher cost experience, and/or failure to press for needed care.³⁰

There are several reasons for the relative absence of an attitude of personal responsibility for health among plan members. First, the perception of responsibility for personal health plays a significant role in health care decision making as well as healthy lifestyle choices and effective health consumerism. In the majority of employer managed care plans, there is a tendency to foster an attitude of significant dependency and reliance on the intervention of health practitioners to solve health problems. At the same time, little advice is traditionally given by employers or providers, which places emphasis on the individual's role in their own health and well-being.

Another major reason for low levels of personal health responsibility is that health practitioners have been trained in a way that reinforces patient dependence. They believe that the patient depends on them for information, entree to other services and health care products, and ultimately the remedy or "fix" for their problem. The pervasiveness of the placebo effect in medicine has also complicated efforts to empower patients to see themselves as having responsibility for their own health. The dynamics of dependency in clinical medicine and health care also work to enhance the provider's sense of value and worth, and are generally thought to be useful for the psychology of patient care. In addition, from the provider's vantage point, anything that enhances the patient's sense of responsibility is likely to enhance their sense of autonomy and reduce the extent of control exerted by the provider over the patient's behavior and choices. It is also difficult to tell someone who is sick that their own behavior or their own choices may have contributed to their health problem, and that they failed to exercise sufficient responsibility for their own well-being. If this is done in a direct manner, the provider stands a chance of alienating (losing) the patient and being accused of being "heartless" toward the pain, suffering and situation of the individual involved.

There are several major strategies that can be used in PHM programs to enhance the general sense of self-responsibility for personal health that individuals hold. Here are several approaches:

- Give permission for people to feel responsible for their own health.

Employers and providers have the potential to validate the attitude of personal responsibility for health among employees and patients. Values that are formally expressed and approved of within the work culture are usually absorbed and adopted by the work force.³¹ This is particularly true when a sound rationale is given for the expressed value, and it is related back to the associated personal benefit to be gained by the individual. Places where the formal recognition of the value of personal responsibility for health can be communicated include: employee newsletter articles, key speeches from senior management, value based organizational creeds, direct messages from health staff, paperwork and forms for injuries or disabilities and phrases that are associated with overall employee or member health programs.

- Educate about the way that personal behavior affects health.

This can be done by presenting prevention strategies for highly prevalent chronic conditions (e.g., high blood pressure, adult diabetes, respiratory conditions, cardiovascular disease conditions, asthma, and chronic obstructive pulmonary disease) in various communication vehicles. Another facet of this approach includes the connection between

individual health habits and the likelihood of illness and injury (e.g., the use of a seat belt reduces the risk of mortality associated with motor vehicle accidents by one half).³² The message should be grounded in the philosophy that "it's up to you," or a similar approach that recognizes that a significant portion of our health problems are related to our own behavioral choices. The use of lifestyle or modifiable claims analysis methodology that identifies the proportion of health claims that are linked or related to modifiable risk factors is another example of this strategy. An additional method would be the use of actuarial data that identifies the relationship between health risks and health costs, such as showing that smokers have an average per capita health expense that is 20% higher than nonsmokers.³³

- Provide tools and skills to enhance personal health.

Another basic approach is for employers to provide tools and skill-building opportunities that are grounded in the exercise of increased personal responsibility. For example, medical self-care workshops, distribution of medical self-care reference materials, wallet cards with questions for your doctor, and/or distribution of medical self-care self-study behavioral guides are the types of activities that are predicated on the value of greater personal self-responsibility for your own health. This kind of intervention strategy also is likely to enhance self-efficacy, which is considered as the degree to which one has confidence in their own decisions about their own and their family members' health and health care.

- Provide a health advice line to support employee or member decision making on health and health care issues.

This approach typically uses a toll-free number staffed by specially prepared nurses or health educators assisted by computer software support programs. It can be presented as part of the employer's or medical care organization's efforts to support a greater sense of self-responsibility for personal health. One of the core values of the health advice line staff that use this service is a commitment to support the caller's sense of self-responsibility for his or her own health. This would include presenting options for solving the problem or questions posed by the caller, and providing an analysis of the pros and cons of the options discussed. The use of direct verbal statements placing emphasis on the caller's responsibility for decision-making should also be a defining characteristic of how the health advice line operates. The follow-up mailing of decision support materials or provider specific cost or quality information would also function to enhance the effects of this kind of effort on the user's sense of self-responsibility.³⁴

- Communicate the same message of personal responsibility in various employer health-related activities.

This approach involves the training and orientation of all human resource staff that may have direct contact with any

beneficiaries so that their statements all support the concept of self-responsibility for health. This should include the worker compensation, safety, disability management, benefits, occupational nursing, occupational medicine, wellness, fitness, Employee Assistance Program (EAP) staff, and health insurance customer service or claims staff in employer settings. The repetition of the message from many different sources is important in being able to influence the cultural norms surrounding personal responsibility for health, regardless of the setting.

Provide personal examples of individuals who exercised more of a sense of responsibility for their health and what happened as a result (Table 5).

Short case vignettes can be used to show the practical side of taking more responsibility for personal health. This can include bill correction cases, examples of rectifying clinical errors or iatrogenic risk situations, resolution of consumer complaints, outcomes of self-initiated provider searches, use of alternative care providers, prevention of a reoccurring condition based on individual actions, outcome of work with a case manager, successful use of dietary supplements, or instances of improved quality of care resulting from intervention by the patient or family member.

- Shape your health care plan design to emphasize shared responsibility.

The development of Summary Plan Description (SPD) statements, cover memoranda, benefit education, and communication materials that provide a clear message of the need for individuals to take more responsibility for their own health can be developed for employer or managed care environments. This cooperative process can also help benefit staff and PHM staff to work together more effectively. Another aspect of this approach is to work with employee benefit staff to help shape the consumer cost-sharing aspects of health plan coverage.³⁵ Basic levels of cost sharing are essential to the development of a greater sense of self-responsibility for health. When health plan choices are offered

to employees, they should provide examples of coverage and cost sharing so that employees can be viewed as managers of their health and health benefits and as "contractors" who engage providers to work for them. This is equally applicable in traditional indemnity, preferred provider plans (PPO), health maintenance organization (HMO) plans, point-of service (POS) plans, and in the newer context of consumer-driven health plans (CDHPs).

- Communicate the importance of the role of the consumer in health care use and in lifestyle and health risks.

The role of the consumer is usually ignored or downplayed in discussions about health costs and health care. A listing of some of those functions and roles are found in Table 5.³⁶ Changing the basic values in a population regarding their individual sense of personal responsibility for health is an important precursor to any effort to manage the demand for health care.

Factor 2: Personal health and health care behavior

Personal health and health care behavior are fundamental to the attainment of personal well-being, and have a direct impact on the need and demand for health care services and products. PHM programs can play a significant role in helping individuals change the discrete and identifiable behaviors that make up health and health care behavior. Health behavior activities or actions include physical activity, food and nutritional patterns, stress management practices, modification of tobacco use, medical self-care and consumer health activities, creative endeavors, safety activities, communication skills and patterns, spiritual health pursuits, and actions taken to establish healthy social connections. The major strategies that PHM programs can use to change these specific behaviors are as follows.

- Provide frequent exhortations for the desired behavior.

Multiple effective marketing exposures are a critical element in the creation of demand for a product that a sale or purchase represents. Frequent exposures with an emphasis on the matching of the product or behavior to the perceived needs of the individual is a requirement for purchase or adoption of any new behavior. On the other hand, there is also the risk of solidifying resistors who become angry from a persistent quest.³⁷

- Provide an individualized behavior modification or management approach.

This involves a personalized clinical assessment of behavioral practices, physiologic parameters, health risk factors or practices and the development of an individualized plan or prescription for making a change in a specific health behavior. This can include a number of behavioral management techniques such as: personal role in feedback, iden-

TABLE 5. THE EMPLOYEE'S ROLE

<i>Health care use</i>	<i>Lifestyle/risk taking</i>
Monitor family diseases	Reduce cardiovascular risk factors
Symptom identification	Minimize workplace risk-taking
Self-care practices	Perform home safety practices
Site of care	Exercise vehicular safety
Information provision	Recreate safety
Assertiveness skills	Adopt sound nutritional practices
Screening use	Use good mental health practices
Provider choice	Active manage excess stress
Timing of care	Utilize good dental home care
Shop wisely for care	Get rest and revitalization
Compliance with advice	Cultivate personal social support

tification of factors that may thwart the change, incremental objectives, use of support systems, attachment of personal rewards to the accomplishment of the goal, focus on positive attainments rather than avoidance of negative behavior, follow-up protocols and retest scheduling, or revision of self-talk patterns. These types of behavioral management strategies and techniques vary greatly in the soundness of their theoretical bases and their execution.³⁸

- Provide a supportive social or group setting for the behavior.

Typical examples of the strategy of social support derived from the activities of groups include outdoor recreation events such as walking programs, fun runs, free-throw contests, hikes, and team games. The use of social and peer reinforcement is also used in behavioral support groups, education classes, food market tours, restaurant demonstrations, nutritional pot-lucks, and cafeteria and cooking demonstrations. The primary value of this strategy is to provide reinforcement, encouragement and a limited degree of informal accountability for the desired behavior.

- Provide opportunities to demonstrate and involve people in the behavior.

Direct experience applied to a worksite or managed care PHM program helps people identify directly with a specific behavior. It is generally believed that if the behavior is reasonably pleasurable and repeated from 20 to 60 times, there is generally some long term tendency toward adoption and assimilation into an individual's self-concept and lifestyle.

- Provide a desirable incentive for adherence to a specific behavior.

Most human behavior is purposeful. People need reasons to change existing patterns of behavior. Incentives that involve personal challenge, increased physical or mental hardness, more free time, flexible work hours, increased take home pay, expanded benefits, greater work flexibility, increased personal effectiveness or efficiency, increased personal contentment or increased sense of achievement are all examples of the use of incentive rewards as another major strategy for PHM programs. The incentives can be linked to specific health behaviors, clinically assessed risks, use of sick leave, completion of health risk appraisals (HRAs), injury experience, and many more options.

- Provide a series of formal policies that address the behavior.

Another major strategy is to adopt a series of prevention oriented human resource and benefits policies that help establish consistent behavioral expectations for the work force. Some of the types of worksite prevention-oriented policies are included in Table 6.

These policies help communicate organizational norms and help define the culture of the work site. The wellness policies can cover such issues as management's position on personal wellness, release time policies, commitment to wellness programming, employee involvement in programming, program administrative structure, relationship to organizational credo, and policies governing benefit features.

- Provide a formal process for modifying cultural norms concerning the behavior.

The use of employee teams and a formal process to examine and modify organizational and cultural norms is another major strategy for changing selected health and health care behaviors. The primary target of this formal and intentional activity is to change the "way we think around here." These efforts can include a survey of wellness norms and perceptions among the work group, management communication strategies, self-directed work teams or making changes in personnel record keeping practices. One example would include the cultural norms that deal with emotional stress and its prevention.

- Physically change the environment to bring about the desired behavior.

Physical environment changes usually require a significant amount of money. For example, a company may physically restructure the employee parking area to require a longer walk for employees. Other examples of change include constructing shower facilities for men and women to encourage exercising during the work day, reorganizing the company food services to provide nutritional information and a greater range of healthy food options and the construction of a fitness facility or a wellness center within the worksite.

TABLE 6. WORKSITE PREVENTION-ORIENTED POLICIES^a

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- Smoke-free worksite
 - Benefit and injury program policies
 - Seat belt policy
 - Alcohol and drug use policy
 - Sick leave policy
 - Safety policies
 - Hazard communication policies
 - Vending machine policies
 - Flextime policy
 - Athletic club subsidy/discount policy
 - Expense account policies
 - Periodic physical policies
 - Risk-rated benefit contribution policies
 - Wellness policies
 - Cafeteria policies
 - Policies concerning the health aspects of the worksite
-

^aDefinition: "Those formal worksite policies that require or facilitate health behavior and health behavior changes that are conducive to personal health and well-being."

TABLE 7. MAJOR CLINICAL RISK FACTORS FOR WORKING POPULATIONS

- Total cholesterol levels
- HDL ratio
- LDL level
- Blood pressure
- Blood sugar level
- Body-mass index
- VO₂ uptake
- Flexibility
- Low-back pain
- Skin lesions
- Diminished visual acuity
- Incidence of depression
- Alcohol abuse
- Drug abuse
- Lung impairment
- Incidence of CTD
- Musculoskeletal injuries
- Somatization disorder
- Diminished hearing

HDL, high-density lipoprotein; LDL, low-density lipoprotein; CTD, cumulative trauma disorder.

- Offer a radically different approach that focuses only on customer based desires.

This major strategy involves offering activities that do not fit the more traditional medically based wellness program approaches that are envisioned above. The major thrust involves a holistic focus on the individual's innate desire for healthier living and on the psychological and emotional undercurrents for their present unhealthy behavior. This approach removes the testing, incentive and clinical role from the program and uses more of a self-help model.³⁹ An individual's choices are not questioned, but natural consequences are explained. This model is undergoing further refinement and examination and will likely provide some helpful insights to future worksite PHM efforts.

All of these strategies are intended to assist in the modification of personal health and health care behaviors. The more these strategies and activities are implemented, the more likely we will see behavior change in the targeted pop-

ulation. Likewise, the greater consistency in effort, the greater results we will see in the observed population.

Factor 3: Reducing the prevalence and severity of clinical risk factors

There are a large number of studies in the published literature that correlate the incidence and prevalence of a risk factor in a population with particular patterns of health care utilization and cost.⁴⁰ The consensus is that the greater the risks, the greater the health care costs. The few studies that have attempted to correlate the full range of health-related costs with risk factor prevalence, such as health benefit costs, sick leave costs, worker's compensation costs, disability costs, and early retirement cost savings also show similar patterns as those studies using health claims costs alone.

This type of evidence in reducing the prevalence of clinical risk factors in employee, plan members, dependent and retiree populations makes clear the economic rationale for PHM and health risk reduction. As a corollary, the key clinical risk factors that should be targeted by worksite or employee programming from the perspective of the U.S. Task Force on Preventive Services and others is shown in Table 7.

OVERVIEW OF MAJOR PHM CORE TECHNOLOGY

The model PHM components include eight major elements. This section is intended to provide a more detailed description of each of these components along with specific characteristics necessary to enhance their effectiveness with all populations. The major components are highlighted in Table 8.

Annual survey

One of the most important core technologies for proactive PHM programming is a health survey that is used every 12 months. These surveys should fulfill a wide range

TABLE 8. CORE POPULATION HEALTH MANAGEMENT INTERVENTIONS

Annual survey	Annual health survey questionnaire
Personal report	Highly personalized feedback report
Intervention	Selective telephone intervention with those who are high risk or at-risk
SDC materials	Provision of self-directed change materials upon request
MSC text	Provision of an appropriate medical self-care text
Newsletter	Provision of a monthly wellness newsletter
Advice line	Toll-free health advice line
Personal incentives	Custom component based on population need

SDC, self-directed change; MSC, medical self-care text.

of functions including identification of at-risk individuals, monitoring health risk prevalence in the population, providing proxy measurement variables for economic extrapolation, determination of stage of readiness for key health behaviors, learning preferences, identity of primary care physician (PCP), identification of prevention and screening priorities and providing information that can be fed back to the individual about their composite health status. These surveys can also be constructed with more sophisticated computer technology to respond with "smart" future surveys that are shaped by selected responses from previous surveys.

The intake survey should capture information such as family medical history, demographic information, and selected biometric measurements that are unlikely to change over time and can be deleted from future survey instruments. Intake surveys may be 8-10 pages with 50-75 questions, while subsequent surveys may be 4-6 pages with 30-50 questions. The survey device needs to be completed on a regular basis, and should eventually become a requirement for continued benefit coverage. Employers should not have access to individual health data, but should be able to receive aggregate reports that capture a population health profile for monitoring and comparison purposes.

Personal report

The personal report from the processing of the health survey should look professional, credible, and reflect a number of modifiers for each individual. The higher the educational attainment of the individual, the more references and authoritative the sources should be. As the technology evolves into more sophisticated computerization, the reports should have from 40 to 100 triggers for individualization of the report to the respondent. The report should also have composite scales that show previous scores by date and should plot out for recipients the trend in the individual's wellness. Other scales for satisfaction with life, quality of life, life fulfillment, key health behaviors, and selected additional items should be fed back to the individual in a serial fashion. The report should also come with mail request or business reply cards that allow the individual to order self-directed change materials and informational materials. Clear linkages with the other core technologies should be highly visible (i.e., health advice line, at-risk follow-up, incentives, and health communication vehicles). The reports should also include season-sensitive recommendations and enough detailed suggestions offered to the individual to help them select possible behavioral alternatives.

Individual intervention

A key byproduct of the processing of the health survey is the identification of individuals who can benefit from a

follow-up telephone or mail contact concerning one or more health risks or issues. The more advanced health survey instruments can identify from 25 to 45 at-risk conditions of respondents depending on how they respond on the health survey. The sponsoring employer or managed care plan can determine how proactive they want to be in addressing the at-risk conditions uncovered through responses on the health survey. The interventions can be divided into high and medium risk levels, with mail-based materials used with medium risk individuals and telephonic contact with high risk individuals. Once the individual is contacted by the interventionists, their willingness to be helped or coached is determined and a follow-up protocol is established for future follow-up and contact. For selected at-risk categories (i.e., exercise activity) an average of 3-4 follow-up contacts may be sufficient. With other at-risk conditions (i.e., chronic diseases) it may require an average of 6-10 follow-up contacts. The at-risk interventions need to utilize stage of change assessments and will likely evolve in effectiveness and sophistication over time. These interventions may look somewhat like case management interventions as a basic model for the future. Personal mentor and coaching roles are also likely directions for this core technology. At-risk individuals should have interactions with the same interventionist and a personal relationship should become a strong component of the intervention if at all possible.

Self-directed change materials

Self-directed change materials and carefully prepared health communication materials are the major areas of focus with this core PHM technology. Based on information provided in the health survey, this material is then offered to the individual in the personal written feedback report and at the time of any at-risk follow-up contact. The self-directed change materials would provide an 8-24-week self-guided or self-administered change process for the individual to utilize. The 10-40-page handbook would provide key information, help the individual make gradual changes, help deal with stage of change and level of commitment to the specific change, help plan for relapse prevention, help with examination of thought-life dimensions to the change, and provide an opportunity for record-keeping and personal feedback. These types of materials can also be connected with formal incentives where appropriate. Feedback pathways can also be established with health providers and/or with process mentors, and sequential, follow-up materials can also be provided to help the individual manage their own change process. The self-directed change materials offer a major alternative to the traditional adult education model. The carefully packaged informational materials can be stage sensitive, highly individualized, and involve a number of active and passive learning strategies.

Medical self-care text

These books have been written for population subgroups such as seniors, young children, infants, Hispanic and other language groups, low-reading-skill level groups, and chronic disease sufferers. The use of a medical self-care reference text as a core component should involve either face-to-face training of 1-2 hours or the accompaniment of the text with an explanatory video on how to best utilize the book. At the same time, the health advice line, at-risk intervention process and the newsletter should all mention and guide people back into the use of their own self-care book where appropriate. The more extensive the reinforcement for the use of each of the core program components, the greater the overall behavioral effect.

Wellness newsletter

This component is a monthly newsletter that is sent directly to the individual's home. It should be a 6-10-page newsletter, that is an upbeat, easy to read, useful, information-oriented, stage-sensitive interesting publication. Ideally, it should reinforce the other components of the core PHM principles by regular highlighting and mention. The newsletter acts provides repeat exposure so that receptivity to new ideas is cultivated. The newsletter also functions to give physical substance to the "virtual wellness" feel of the program. These elements of "physical evidence" become tangible manifestations of the program to the population receiving it. The newsletter should also contain a variety of stage-sensitive information with specific material for the precontemplator group in a form that can be easily shared by the reader with the family member or coworker that may be at that stage regarding those particular health-behavioral areas.

Health advice line

The health advice line should provide the full range of information functions. This toll-free phone line should be available 24 hours per day, 7 days per week. It should be capable of full integration with longitudinal health survey data, content of sequential personal reports, at-risk intervention notes and contact sequence, requested materials, and status within any incentive program. This allows the interventionists who staff the health advice line to know almost all the important PHM issues for the individual calling in with a health-related issue. The contact should be designed to enhance the self-efficacy of the caller around health issues and should include a question as to their interest in related behavior change, interest in self-directed change materials, and referral to local community resources. The health advice line needs to be heavily promoted with the target population and should function as a highly accessible personal health resource for individuals in the population being served by the PHM program. The phone is essentially

replacing the staff intensive nature of an onsite health promotion or wellness program. Callers should have the opportunity to speak with known interventionists where possible.

Personal incentives

This category provides an opportunity for the addition of personal incentives for health improvement and is a key intervention to the above mix of program components. These incentives should fit as an integral element with the core components and should increase the effectiveness of the behavioral change capability of the program. These incentive interventions can also be useful in expanding the recipient population if health survey completion is not a required element for program eligibility.

EMPLOYEE HEALTH ENHANCEMENT— DISEASE PREVENTION

For the majority of corporations, the posting of a stop smoking poster in the cafeteria or similar passive efforts constitute what they call a health promotion program. With regard to serious health enhancement efforts, only 28% of employers offer HRAs to analyze employees' health risks and promote early detection of preventable conditions, and only 40% of these employers provide HRAs on an annual basis. Approximately 75% of employers provide screenings for blood pressure and blood cholesterol through the health care plan or onsite "health fairs." Programs ranging from periodic health-oriented seminars and workshops to counseling for lifestyle habits that contribute to chronic or acute diseases are provided by 72% of employers. Various types of financial incentives or disincentives are offered by 42% of employers.⁴¹

A significant number of literature reviews are available related to return on investment in health enhancement in the form of either improved health outcomes, cost effectiveness, or cost benefit. Pelletier reports on a total of 120 health enhancement studies that consistently document positive clinical effectiveness and cost-effectiveness.⁴²⁻⁴⁶ Heaney and Goetzel⁴⁷ reviewed 47 studies from 35 programs and concluded that evidence for positive outcomes was rated "indicative/acceptable," with positive results primarily in programs that included both health assessment and targeted follow-up counseling.⁴⁷ O'Donnell⁴⁸ assessed 36 studies and reported two thirds of them had experimental or quasi-experimental designs. A review by Aldana⁴⁹ indicates positive cost outcomes, as do reports by Chapman⁵⁰ and Stokols et al.⁵¹ Collectively, these reviews clearly indicate that multicomponent or comprehensive interventions rank higher in both clinical effectiveness and cost effectiveness compared to single-factor programs, such as a periodic smoking cessation effort. Second, results from randomized clinical tri-

als and quasiexperimental designs suggest that providing individual risk reduction programs within the context of comprehensive programming is the critical element for successful worksite health enhancement.

Despite limitations in methodologies, the vast majority of the research indicates positive clinical and cost-effectiveness outcomes. Unlike clinical medicine, where the question of return on investment (ROI) is rarely an issue, ROI is often the prime question raised by employers who have interests in worksite health enhancement. Aldana reviewed 13 studies that reported average benefit/cost ratios of \$3.48 in reduced health care costs and \$5.82 in lower absenteeism costs per dollar invested.⁵² Goetzel⁵³ states "the return from well-designed comprehensive programs may be at least \$3 to \$8 per dollar invested, within 5 years following program initiation."

ROI can best be reviewed by breaking PHM programs into five categories of interventions: health enhancement, risk management, demand management, disease management, and disability management. Combined health enhancement and risk-management intervention strategies focused on lifestyle behavior change have been shown to yield a \$3 to \$6 ROI for each dollar invested in 2 to 5 years.^{17,52,54} These ROI numbers include only the medical cost impact of these programs so they substantially underestimate the total ROI by excluding cost outcomes such as absenteeism, disability, and lost productivity while at work. Limited research suggests that these indirect factors may account for 50%–75% of the total ROI.⁵⁵ Demand management interventions (i.e., self-care, decision support) have been shown to yield a \$2 to \$3 ROI for each dollar expended in reduced medical costs within a 1-year period,^{2,56,57} and limited data indicate a similar return in the second year. This makes demand management a reasonable way of offsetting much of the 5-year cost of the overall program, while the much larger ROI impact of health enhancement and risk management interventions have reported up to \$7 to \$10 ROI for each dollar invested on medical costs within one year.⁵⁴ It is likely that disability-linked programs will yield a similar ROI although little research has yet been reported.

This kind of ROI makes these interventions very attractive as part of a comprehensive PHM strategy, especially in addressing the often important issue of offsetting early-year program costs until the impact of health enhancement and risk management interventions are realized. However, while these interventions target a small percentage of the population, they generate a big return on a small number of people. In contrast, health enhancement and risk management interventions, where the return per dollar invested is not as great and takes longer to accrue, address virtually the entire population. A \$3–\$6 ROI for each dollar invested on a program targeting 100% of a population is much greater than a \$7–\$10 ROI on a program targeting less than 10% of that population.

Research on ROI also illustrates a commonsense, but crucial, factor for success: participation is the key that opens the ROI door. A recently reported analysis⁵⁸ vividly demonstrated the power of participation by showing that a comprehensive health enhancement/risk management program could break even, if participation in HRA and follow-up interventions succeeded in shifting just 1% of employees from "high-risk" to "low-risk" status. Recent research on the Citibank program reported that 51% of eligible employees completed an HRA, and only 5% completed a follow-up intervention, yet the program yielded an ROI of \$4.56 per dollar invested.⁵⁹ These results illustrate two crucial facts. First, because the cost of health risks is high, a positive ROI can be achieved at surprisingly low participation rates. Second, with the right participation-building strategies, ROI could increase dramatically.

IMPLICATIONS OF PHM IN CREATING OHEs

This new prevention and PHM strategy has important implications for population health, the creation of OHEs and the long-term control of health and medical costs. Application of this strategy will require a redefinition of the traditional roles of employer, managed care vendor, practitioner, and informed consumer. Also, the convergence of this strategy will also produce some significant challenges because of the need for consistent information flow and the multiplicity of information pathways that must be brought into an integrated and congruent stream for interventionists who desire a positive impact on the health of the individual. Because this approach relies so heavily on technology, sufficient attention will need to be paid to the integration of holistic or whole person features of relationship and healing in order to assure that it is, and feels, both personal and caring.

Use of this newer strategy will also require a reorientation and reeducation of traditional health care and health promotion providers. Movement away from traditional reactive interventions where the patients initiate the contact will necessitate different skills and capabilities among those who perform key functions. In addition, this approach will likely move PHM from a largely niche-oriented, service intensive nature to much more of a commodity good. This change brings with it a movement from small to large vendors and distribution channels, and will require thoughtful adaptation to prevent loss of effectiveness.

An important corollary of the PHM approach for further analysis is the differential effectiveness of these newer PHM technologies when matched with a consumer driven health plan (CDHP) that potentially provides much more powerful economic incentives for personal responsibility for health and wise consumerism.⁶⁰ The "best practice" consideration for the creation of OHEs may well be the technical integration of PHM concepts with a CDHP.

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