

**WORKING HARD OR HARDLY WORKING?: A MULTI-SITE EVALUATION OF
WORKSITE WELLNESS COMMITTEES AT A LARGE MULTI-NATIONAL
CORPORATION**

by

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Background: In 2005, 63% of the US population was employed, representing over 142 million people over the age of 16 in the United States. Because so many Americans spend so much time at work, the workplace has become a natural setting for public health interventions. The field of worksite health promotion (WHP) offers many opportunities to improve the health of the US population and achieve Healthy People 2010 objectives.

WHP programs often contain a participatory component in the form of worksite wellness committees (WWC). Despite their popularity, little is known about how wellness committees organize, assess, plan, implement and evaluate programs. This project sought to understand how WWCs functioned at PPG Industries, a Fortune 500 manufacturing company,

Methods: To evaluate the WWCs, two survey tools were developed. The first gathered information about WHP program offerings; the second assessed the organizational processes by which the committees operated. The tools were deployed by email to approximately 100 worksites. The data were analyzed, along with pre-existing HRA data, to see if worksite demographics or organizational functioning were significantly related to the health of employees and if there was a relationship between the processes by which the WWCs operated and the quality of the WHP offered.

Results: Larger, US-based, and older worksites did have significantly more resources and activities in the areas of blood pressure, lipid, and overweight/obesity control, and cancer and depression screenings. In general, worksites in the US had slightly more mature organizational processes than those internationally. However, there were no significant differences were found in the location, size, or age of employees on organizational maturity. Higher functioning worksites did also have significantly higher scores on the Program Inventory in all areas except nutrition and physical activity categories. HRA data revealed that many preventative health behaviors were significantly associated. However, few significant relationships were found between organizational functioning and employee health.

Public Health Significance: WWC need increased attention from researchers and evaluators. Organizational maturity is related to program outcomes, but not necessarily to employee health. Improving organizational functioning may lead to improved WHP programming.

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PREFACE

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1.0 INTRODUCTION

In 2005, 63% of the US population was employed, representing over 142 million people over the age of 16 in the United States (U.S. Department of Labor Bureau of Labor Statistics, 2005). Of these people, nearly all of them spend at least half their waking hours at work. Because so many Americans spend so much time at work, the workplace has become a natural setting for a variety of public health interventions. Taken as a whole, the field of worksite health promotion (WHP) offers many opportunities and challenges to improve the health of the US population and achieve Healthy People 2010 objectives.

1.1 DEFINITION AND HISTORY

The term worksite health promotion (WHP) has appeared in the health promotion literature for over 3 decades (Glanz, Lewis, Rimer, 1997). Since then, a number of textbooks, websites, and organizations have been developed to describe, assist in implementation, and evaluate WHP programs in diverse workplaces. While the term “worksite health promotion” may be the most common to describe the practice of promoting the health (and safety) of employed persons at the workplace, it is not the only term. Indeed, there is no single definition that describes the practices generally referred to as WHP. The terms “worksite” “workplace”

and “employee” are often used interchangeably. “Wellness,” “safety” and “health and safety” are used to describe programs that generally called “Health Promotion” but may also refer to specific nuances of larger health-promoting activities.

A review of the literature finds several definitions for WHP, showing both the commonalities and differences in usages. Pelletier (2005) defines comprehensive worksite programs as “those that provide an ongoing, integrated program of health promotion and disease management that integrates specific components into a coherent, ongoing program that is consistent with corporate objectives and includes program evaluation of clinical and/or cost outcomes” (p. 1051) . Ozminkowski, Ling, Goetzel, Bruno, Rutter, Isaac & Wang (2002), in noting that programs vary tremendously from employer to employer in comprehensiveness and scope, list these activities as the current state of WHP in the US: “an integration of health promotion and disease prevention, medical benefits, occupational health, employee assistance programs (EAP), disease management, work/life balance, workers’ compensation, disability, and absence management” (21-22). Finally, Goetzel et al (2007) identify five “key elements” of a comprehensive WHP program: health education, links to related employee services, supportive physical and social environments, an integration of health promotion into the company’s culture, and employee health screenings with treatment and follow-up provided. Based on these definitions, it seems that WHP programs should be ongoing, comprehensive, designed to improve employee health, and consistent with the workforce-support needs of the corporation.

While many of the above terms are used interchangeably, there is an important, though not clear-cut, distinction between the idea of “occupational health and safety” and “worksite (workplace, employee) health promotion.” Historically, employers, public health officials and researchers were considerably more concerned with occupational injuries and acute or chronic

health effects from work. For example, in 1906-1907, the earliest systematic survey of workplace fatalities in the United States occurred in Allegheny County, Pennsylvania, coal mines. The risks of working in a coal mine to life and limb were examined and categorized by occupational category (Centers for Disease Control and Prevention, 1999). The study was short-term, looked at mortality during a set period from injuries sustained while at work, and represented the majority of interest in work-related mortality and morbidity studies until the 1970s. These studies were primarily concerned with documenting immediate causes of death and disability due to injuries at work and were consistent with a manufacturing-based-economy.

During the 20th century, enormous strides were taken to reduce the rate of occupational deaths. In 1913, the rate of deaths due to occupational injuries was 61 deaths per 100, 000 workers; by the end of the century it had fallen to 4.3 deaths per 100,000. In 1995, leading causes of fatal occupational injury were motor-vehicle related, workplace homicides, and machine-related injuries—quite a contrast from the conditions faced by their coal miner and steel worker grandfathers (Centers for Disease Control and Prevention, 1999). In general, these types of injuries and fatalities are addressed by “occupational health and safety” programs, which are generally short-termed in nature and aimed at preventing acute injuries among employees. Workplaces often make the distinction between “occupational safety” and “worksites health” with different committees, policies, and programs.

Such distinction is not always clear, however. The United States Department of Health and Human Services set workplace-based goals in two ways: under Educational and Community Based Programs and Occupational Health and Safety (U.S. Department of Health and Human Services, 2000). While those under the Educational and Community-Based Programs are conventional WHP goals, the 11 Healthy People 2010 Objectives for Occupational Safety and

Health encompass both what is generally considered to be traditional occupational safety and a more modern worksite health promotion agenda. For example, objective 20-1 is “Reduce deaths from work-related injury”—a traditional occupational safety goal, while Objective 20-9 is “Increase proportion of worksites... that provide programs to prevent or reduce employee stress,” an example of a more modern, chronic disease prevention program. The HP 2010 Objectives for both worksite and occupational health and safety are summarized in Table 1 below.

Table 1: Healthy People 2010 Worksite and Occupational Safety and Health
 Goal: Promote the health and safety of people at work through prevention and early intervention

Objective number	Objective description	Baseline	2010 Target	2005 progress towards objective
7-5	Increase the proportion of worksites that offer employee health promotion programs to their employees.	34%-50% (depending on size)	75%	Data incomplete
7-6	Increase the proportion of employees who participate in employer-sponsored health promotion activities.	61%	75%	Moved away from target
20-01	Reduce deaths from work-related injuries.	4.5/ 100,000 Workers Aged 16 Years and Older for all industries	3.2 / 100,000 Workers Aged 16 Years and Older for all industries	Moved towards target
20-02	Reduce work-related injuries resulting in medical treatment, lost time from work, or restricted work activity.	6.2/ 100 Full-Time Workers	4.3/ 100 Full-Time Workers	Moved towards target
20-03	Reduce the rate of injury and illness cases involving days away from work due to overexertion or repetitive motion.	675 / 100,000 full-time workers.	338 / 100,000 full-time workers.	Moved towards target
20-04	Reduce pneumoconiosis deaths.	2,928 deaths	1,900 deaths	Moved towards target
20-05	Reduce deaths from work-related homicides.	0.5/100,000	0.4/100,00	No change
20-06	Reduce work-related assaults.	1.10/100 workers	0.78 /100 workers.	Moved towards target
20-07	Reduce the number of persons who have elevated blood lead concentrations from work exposures.	12.1 / 100,000	0/100,000	Moved towards target
20-08	Reduce occupational skin diseases or disorders among full-time workers.	67/100,000 new cases.	47/100,000 new cases.	Met or exceeded objective
20-09	Increase the proportion of worksites employing 50 or more persons that provide programs to prevent or reduce employee stress.	37 %	50 %	Data incomplete
20-10	Reduce occupational needlestick injuries among hospital-based health care workers.	384,000/year	269,000/year	Moved towards target
20-11	Reduce new cases of work-related, noise-induced hearing loss.	Not specified	Not specified	Data incomplete

There is a movement underway in a variety of workplaces to integrate the activities of occupational safety and health promotion into a more unified front. This is particularly true in workplaces with strong occupational health programs, such as the manufacturing sector. According to Blix (1999), this may be “particularly important for blue-collar workers, as they are most likely to face hazardous work exposures while maintaining a less than healthy lifestyle” (p. 169). The author also identifies several challenges and barriers to the integrations of such programs. On the positive side, more comprehensive programs can be more effective at lowering health risks and costs and promote joint responsibility for healthy environments and lifestyles between employer and employee. Unfortunately, such programs can also fall victim to the competing demands of management and labor, differing values of safety and health experts, and a lack of collaborative skills needed to integrate programs.

A further discussion of the distinction between occupational safety and worksite health promotion is outside the scope of this project. Pure injury prevention programs, such as back-safety or machine-safety programs, while critical to maintaining the health of the American worker, will not be discussed below. For the purposes of this dissertation, the term “worksite health promotion” will be used to refer to comprehensive, ongoing programs designed for, and implemented in, the workplace intended to improve or maintain the health of persons employed therein, to the mutual benefit of both the employer and the employee. In general, these are largely limited to chronic disease prevention programs (including mental health) and such infectious disease (e.g. influenza prevention) or injury prevention programs (e.g. drug and alcohol abuse) as have been incorporated into model worksite health promotion programs. It is acknowledged that different workplaces have diverse health promotion needs, and thus there is no one set of programs or interventions that will always fall under the term WHP. Therefore,

discussions of worksite characteristics and program components will be included when illustrative.

1.2 PREVALENCE

Often, WHP programs are developed and implemented initially because a senior manager within the company believes, often implicitly, in the value of such programs. Anderson, Serxner & Gold (2001) identify this person as the initial “champion” of WHP within the company (p.281). This person, or people, within the company may believe that WHP provides a range of benefits that may or may not easily be quantified. Among these benefits may be direct organizational costs (e.g. health care, absenteeism, short-and long-term disability, workers’ compensation, life insurance) and indirect organizational costs (e.g. productivity, recruitment and retention), improved employee morale, corporate public relations, or the perception of concern for employees’ health and well-being. In the case of the latter, employee participation and feedback may be the most important outcome of the program (Aldana, 2001). Other companies require evidence of the financial benefit of implementing and maintaining such programs. (Anderson, Serxner & Gold, 2001; Golaszewski, 2001; Aldana, 2001; Merrill, Price, Hardy & Hager, 2005). The 1999 National Worksite Health Promotion Survey found that 76% of employers sponsored WHP programs to reduce health care costs (Association for Worksite Health Promotion, William M. Mercer, Inc. & U.S. Department of Health and Human Service, 2000). As employees and employers face rising health care costs, interest in reducing these costs is likely to grow.

In all likelihood, a combination of the intrinsic and extrinsic benefits of a WHP program drive most companies to develop and maintain their programs (Stave, 2001). In an increasingly service-oriented economy, a company's human capital is a larger share of their total resources than ever before. Investment in that human capital makes sense both from a financial and a quality-of-life standpoint. To illustrate this point, Riedel, Lynch, Baase, Hymel, & Peterson (2001) quote from Forbes magazine's 1998 issue of the 100 Best Companies to Work for in America; "our ranking reveals that high morale and outstanding performance emphatically go together" (p.169).

Despite the evidence that WHP programs are popular for both their economic and non-economic impacts, they are far from being universally adopted. According to the Department of Labor's 2006 Employee Benefits Survey, only 23% of American workers in private industries and only 9% of those employed in small businesses (1-99 employees) had access to "wellness" programs, (Department Of Labor, 2007), though that number would likely be somewhat higher if public employees were also included in the survey. Obviously then, many employers are not offering WHP programs in their workplaces, or are not doing a sufficient job of marketing such programs. Goetzel, et al (2007), in their CDC-funded study of promising practices in WHP, identify three main reasons for the lack of interest amongst some employers in offering programs. First, many employers do not believe that there will be an adequate return on their investment in WHP, which the authors attribute to a lack of knowledge of the evidence supporting the value of WHP. Secondly, they suggest that employers may not have the skills and information to help them select appropriate programs for their workplaces. Finally, they may not feel equipped to implement programs in their particular settings. Research and dissemination will be key to improving attitudes towards WHP in these populations.

Numerous attempts have been made to understand the state of WHP in the United States, but, not surprisingly, they all come to somewhat different conclusions. The Department of Health and Human Services has conducted four national surveys of WHP programs over the last three decades: 1985, 1992, 1999 and 2004 (Association for Worksite Health Promotion, William M. Mercer, Inc. & US Department of Health and Human Service, Office of Disease Prevention and Health Promotion, 2000; Goetzel, et al 2007). These surveys were all conducted with approximately 1,500 randomly-selected employers and demonstrate an increasing proportion of programs and program components in the last 20 years. For example, in 1985, 27% of employers reported offering physical activity programs; by 1999, that number had increased to 36% (2004 numbers are not yet available). Similarly, in 1985, worksites were not asked about such things as HIV prevention and education (in 1999 25% of worksites had such programs), or cholesterol management programs (23% in 1999). Likewise, as the understanding of WHP has changed, questions related to injury prevention have been dropped, even though data shows in the past (1992) that a majority of worksites had such programs (Chapman, 2004). As the definition of WHP has evolved, it has become clear that few employers are offering what are considered comprehensive WHP programs in the broadest sense. According to early data published from the 2004 National Worksite Health Promotion Survey, only about 7% of employers are offering programs that are considered by the U.S. Department of Health and Human Services to be truly comprehensive, though the proportion of worksites offering some kind of WHP program is quite high. Not surprisingly, large companies with dedicated WHP staff are most likely to offer comprehensive programming (Goetzel et al 2007).

The data suggest that the prevalence of both comprehensive and specific programs (e.g. smoking cessation, or breastfeeding support) vary across business sectors, geographical regions,

and company size. A study of small worksites (15-99 employees) found that only about a quarter of them offered any WHP programs to their employees (and not all of those would be considered comprehensive under the US Department of Health and Human Services standards), compared to 44% of larger businesses surveyed. In this study, small workplaces that did offer some kind of program were most likely to offer more traditional occupational health and safety programs (e.g. back care, CPR). In the WHP category, small companies were significantly less likely to offer “wellness” programs and policies than larger companies (Wilson, DeJoy, Jorgenson & Crump, 1999). A more recent survey of large employers by Hewitt and Associates found that 95% of surveyed organizations offer some kind of WHP program, a 7% increase since the mid-nineties. Trends of particular note in that study included:

- 75% of surveyed employers were providing or planning to provide disease management programs
- 40% planned to use financial incentives/disincentives to encourage healthy behaviors (up from 17% a decade before)
- 29% offer Health Risk Appraisals and 76% offer health screenings, either in the workplace or through insurance
- 71% offer health education programs and the trend is away from traditional classroom-based education to distance learning (Hewitt & Associates, 2005).

While the numbers might not look identical across studies, it is clear that there is a substantial and increasing interest by US employers in providing WHP programs to employees. Those who work in large private companies or in the public sector are most likely to have access to the most comprehensive programs, but even in smaller companies employees are

gaining access to at least some kinds of WHP. However, given the assessment that the Healthy People 2010 goals concerning WHP have not shown improvement, and may even be losing ground, it is imperative that work continues to insure consistent access to programs and services across industries and for employers of all sizes.

1.3 COMPONENTS OF WHP

There are any number of configurations and components of a WHP program. Common program elements include:

- Fitness centers
- Health education/promotion programs
- Health Risk Appraisals (HRA)
- Financial incentives
- Employee Assistance Programs (EAP)
- Nutritional programs
- Preventive health screenings
- Drug and alcohol programs
- Breastfeeding promotion programs
- Stress reduction/management programs
- Worksite wellness teams
- Improvement of worksite environment
- Implementation of health –supporting policies

(Sexner, Gold, Anderson & Williams, 2001; Ozminkowski et al 2002; CDC (2007a).

1.3.1 Where are we now?

State-of-the-art programs and concepts within WHP are a constantly moving target, but experts in the field of WHP are moving towards consensus on at least some of the necessary elements to a successful WHP program.

The compiling of data about “best practices,” defined by Chapman (2005a) as “generally replicable activities that contribute in a scientifically-proven manner to the ability to meet or exceed customer expectations” (p. 2) is in its nascent stage. In 1996, O’Donnell identified 76 “excellent” programs that he wished to learn more about. He constructed a 40-question survey and mailed it to each program, receiving 26 responses. From those responses, he visited six programs and identified six key components that he considered “best practices” in WHP. The next year, Goetzel (1997) visited seven organizations he considered to have exemplary programs and identified nine characteristics of those organizations. Goetzel et al in 2007 revisited the idea of best practices specifically relating to health and productivity management. They convened an expert panel of WHP specialists who identified WHP programs that were considered excellent, sent surveys to 99 companies, and received responses from 39. The panel then conducted site visits at 9 of the companies and developed a list of seven “Promising Practices.” Other studies have used similar methods to identify best practices, and were summarized by Goetzel et al (2007) as:

- Organizational commitment
- Programs linked to business objectives
- Effective communication
- Effective operation plan
- Supportive environment
- Program goals include productivity and morale
- Employee input when developing goals and objectives
- Management leads by example

- Inderdisciplinary team focus
- Identification of wellness champions
- Incentives to participate
- Program accessibility
- Effective screening and triage
- State-of-the-art interventions
- Effective implementation
- Ongoing program evaluation
- Data collection, measurement, reporting, and evaluation (including Return on Investment)

As best practices continue to be identified and defined, researchers and practitioners will have increasingly reliable tools to improve program implementation and outcomes. However, the list provided by Goetzel et al (1997) seems to be a reasonable starting place when considering WHP design.

1.4 SELECTED PROGRAM ELEMENTS

1.4.1 Worksite Wellness Committees

According to the CDC, very often WHP programs contain a participatory component in the form of worksite wellness committees (WWC) (Centers for Disease Control and Prevention, 2007b). The theory guiding the use of such boards is the *principle of participation*, defined by Linnan, et al, (1999) as the idea that “large-scale behavioral change is more likely to occur when people affected by the problem are involved in defining the problem, planning, and instituting steps to resolve the problem, and establishing structures to ensure that the desired change is maintained” (p. 317). Similar participatory structures are used in other health promotion settings, including community advisory boards (Green & Mercer, 2001). Perhaps because

worksites are themselves natural communities, these boards have been and are used extensively in WHP programs, and this section will explore what is known about the structure, activities, and evaluations of these groups, as well as what are currently considered best practices for convening and utilizing WWC within larger WHP programs.

1.4.1.1 Results of research on Worksite Wellness Committees

There is relatively little research available investigating the use of Worksite Wellness Committees (WWC) in workplace settings in the United States. (Linnan, et al 1999; Strycker, Foster, & Pettigrew 1997). What studies have been published generally are part of larger, multi-stage WHP programs such as the Working Well Trial or the Treatwell or Seattle 5-A-Day Study (Hunt et al 2000, Thompson, Hannon, Bishop, West, Peterson, & Beresford (2005), Linnan et al 1999). Similarly, many of the papers published have looked at the use of WWC in blue-collar worksites (Thompson et al, 2005; Tessaro, Taylor, Belton, Campbell, Benedict, Kelsey & DeVellis, 2000; Buller, Morrill, Taren, Aickin, Sennott-Miller, Buller, Larkey, Alatorre, & Wentzel, 1999). Despite the limited amount of research conducted, and perhaps because of the relatively homogenous sites in which it was conducted, a few trends emerge.

In all the studies published, WWC were not pre-existing, and so formation of the boards was part of the studies' objectives. WWC formation in Thompson, et al (2005) tended to mirror what happened in most worksites: a pre-existing health and wellness leader encouraged others to join the group, the leader assigned people to the group, a general recruitment campaign was held and employees self-selected into the group, or (least often) study personnel selected people to join the group. Interestingly, how the boards were formed seems to matter little in how effective they generally are. Rather, the boards' operations and levels of enthusiasm shown for their tasks

seem to be much more important predictors of how effective they will be in implementing WHP programs. Thompson et al (2005) found that less enthusiastic WWC (as subjectively judged by the researchers) were less likely to conduct programs or activities, and, conversely, that highly enthusiastic programs had high involvement. Hunt et al (2000) tried to quantify this relationship using a 22-question scale to evaluate WWC and found that the more time WWC members spent on program activities the greater number of WHP programs were implemented, a finding echoed in a paper from Sorenson, Hsieh, Hunt, Morris, Harris & Fitzgerald (1992). Strycker et al (1997) agree and found that more time spent by WWC translated into more programs and higher participation in programs by employees. No further evaluation of programs was identified in this literature search, which seems to indicate that, at best, employee participation in WHP programs was the ultimate outcome. Therefore, it is difficult to draw any conclusions about whether WWC have influence on more distal outcome measures, such as health risk reduction or the reduction of health care costs to an organization.

1.4.1.2 Best Practices for Worksite Wellness Committees

Despite the lack of quantity and quality of literature in this area, there do seem to be best practices that have emerged over time for the development of WWC. Both CDC and the Wellness Council of America (WELCOA) have identified best practices for WWC (Centers for Disease Control and Prevention, 2007(b); Wellness Council of America, 2007). First, in identifying members for WWC, there should be representatives from multiple organizational levels (i.e. upper-, middle-management, labor) and multiple functional areas including human resources, benefits, occupational health and safety, food service, unions, facilities management, legal and other relevant departments. In addition, members-at-large who have an interest in the

topic should be represented, including those with disabilities. Members should be formally appointed and have a portion of their official duty time dedicated to wellness activities. Committees should meet regularly, with formal agendas, produce minutes and other regular methods of communication, and have a strong and structured leadership. One of the challenges to balancing those recommendations is that studies have found that, if committees are formed and run with management leaders, they are not likely to gain the honest input of non-management members; however, those without management experience may not have the skills necessary to run formal meetings (Thompson et al, 2005; Sorrenson et al 1992). The CDC (2007b) recommends four activity areas for WWC to include: assessing employee needs and preferences; developing a WHP plan, including a vision statement, goals and objectives; assisting with implementing WHP programs; and evaluating the programs available at the worksite.

1.4.2 Financial impact of Worksite Health Promotion

Businesses implement and evaluate worksite health promotion (WHP) programs for a myriad of reasons. Similarly, there are as many configurations, components, and depths of WHP programs as there are companies to invest in them. So, why do companies decide to spend resources (financial, temporal, and human capital) on WHP programs? This section will explore the financial reasons cited in the literature, with the understanding that there is no one answer to the question, but rather a range of expectations of and perceived value to such programs.

1.4.2.1 History of Return on Investment studies

While work-related injuries and illnesses have been documented since the time of Hippocrates and Pliny the Elder (and likely, even before), research and publication about worksite health promotion (especially from a chronic disease perspective) is a recent phenomenon (Gochfeld, 2005). The earliest studies were published in the late 1970s, and by today's standards were relatively few and methodologically weak (Edington, 2001; Golaszewski, 2001). The earliest study published was an investigation of controlling asymptomatic hypertension amongst department store employees in 1974 (Alderman, & Schoenbaum, 1975). Possibly due to some encouraging data in those early studies, the investigations into the financial impact of health promotion in the worksite increased in the three decades following the early endeavors.

If the 1970s can be thought of as the infancy of a nascent WHP movement, the 1980s was an adolescence of rapid growth, fueled by the desire for cost-containment (Edington, 2001; Golaszewski, 2001). Along with the advent of managed care, the desire to manage employee health costs sparked the first commercial worksite health promotion enterprises and a heavy interest in justifying the costs of health promotion. Early studies were largely descriptive, not based in social science theory, and often drew conclusions of causality when they were not justified (Anderson, Serxner & Gold, 2001; Ozminkowski & Goetzel, 2001; Edington, 2001; Golaszewski, 2001). Despite their limitations, several critical studies were conducted during this time that have continued to impact the way that WHP programs are viewed today.

Golaszewski (2001) identifies three key studies from the 1980s, set in the worksite, that are worth mentioning in a history of financial impact studies. The first, and probably most famous,

is the initial Johnson & Johnson Study, conducted between 1979 and 1983 (Ozminkowski, et al 2002). This cohort study experimentally tested the value of a comprehensive WHP program by examining health care costs for employees exposed early and late to the WHP and a control group that did not receive the intervention. The results of the study showed that those employees who received the program had significantly lower health care costs than those in the control group, saving J & J nearly a million dollars—a substantial sum in 1979. The result was the “spin-off” Life for Life intervention model that was implemented in worksites across the country over the next decade.

The Dupont Study, implemented during the 1980s, was designed to test the effects of a WHP program on absenteeism—one of the first studies to examine the relationship between health promotion and absence from work. Perhaps fortunately for the field, the study found an ROI of \$1.42, which, as the author notes, is probably an underestimate due to the study’s methodological flaws.

The final study of note from the 1980s was an early study done in the public sector. The City of Birmingham, Alabama, was, like most other employers, eager to manage health care costs. They implemented a mandatory Health Risk Appraisal (HRA), physical fitness activities, health education, incentives for healthy behavior, as well as restructured their health plans. During the five-year period of 1985-1990, the city saw virtually no increase in their health care costs, while those for state employees nearly doubled. As Golaszewski (2001) notes, while the evaluation could not distinguish the outcomes of the health promotion campaign from those of the health plan restructuring, the study is “noteworthy because it demonstrates the possible economic effect of coupling aggressive health promotion efforts with managed care” (p. 336).

In the last two decades, there has been increasing interest in WHP and the potential benefits it brings, as well as an improvement in the techniques used to evaluate programs. The reasons behind this continued interest are rooted in WHP's past: a concern about the costs (both financial and otherwise) of unhealthy employees. From 1990 to 2006 (most recent data available), health insurance premiums have increased nearly 300%. Of increasing concern, the number of employers who offer health insurance to their employees has fallen from 66% to 61% in the last 7 years. Clearly cost-containment continues to be a key issue for employers both public and private, but how do employers view WHP programs in their overall cost-containment strategy? Unfortunately, there is a low level of confidence in these programs to stem the rising tide of costs. In one survey, only 17 percent of small employers and 28 percent of large employers say that they consider such programs "very effective" at controlling health-care costs (though 43% and 58% respectively say they are "somewhat effective") (Kaiser Family Foundation, 2006). In the last 20 years, those studying WHP have tried to demonstrate value (or lack thereof) in a number of ways. Golaszewski (2001) characterizes these studies in an epidemiological way—as cross-sectional, where evaluators look at the relationship between known health risks and economic outcomes; cohort studies, investigating changes in cost outcomes over time; experimental, or quasi-experimental, where hypotheses are tested by evaluating interventions to determine if they change outcomes, and finally by financial modeling, applying econometric techniques to existing data. Edington (2001) characterized the changes in the 1990s as focusing "on the quantitative relationships between health behaviors and health and productivity and the benefits of high risk reduction and low risk maintenance and how these relationships were incorporated into program strategies" (p.341). As time has gone on, program planners have introduced newer prevention technologies and techniques, which have led to better

outcomes from a risk-reduction, cost-control and elegance of evaluation standpoint. While more will be said later about the findings of WHP studies, a meta-analysis by Chapman (2005a), covering literature from 1982-2005, finds that studies conducted after the early 1990s report higher financial returns, which he attributes to greater sophistication in both the programs and their evaluations. Interestingly, Pelletier (2005) notes a “marked decline in both the quantity and quality of studies” in the first half of the new millennium (p.1052). Whichever view of the literature one accepts, there do seem to be some clear trends developing, including an increasing interest by the Federal government in the evaluation of WHP programs, particularly for cost (Pelletier, 2005; Goetzel et al, 2007), and the development of a sister concept to the traditional financial impact of WHP concept—Health and Productivity Management (HPM). (Pelletier, 2005; Goetzel et al, 2007; Chapman & Sullivan, 2003), The term “HPM” seems to be emerging as a way of thinking about WHP in its broadest sense. Goetzel et al (2007), while recognizing that the definition varies widely in the literature, defines it as encompassing

worksite based initiatives that include health promotion (e.g. health management or wellness programs); disease management (e.g. screenings, care management, or case management programs); demand management (e.g. self-care, nurse call line programs); and related efforts to optimize employee productivity by improving employee health. Related efforts might include the use of employee assistance programs to address behavioral health, substance use, or work-related emotional problems; return-to-work programs that usually operate as part of short-term disability benefit; pharmacy management services; and/or programs designed to reduce employees’ caregiver burden for those who have seriously ill parents or children (p.113).

Findings of ROI studies

So, what do the published reports of the financial impact of WHP programs tell us? The result is generally positive, ranging from mildly-to-wildly so, but most authors agree the evidence is moderate. The literature reviewed falls basically into two categories: individual studies reported in the literature, and review articles and meta-analysis conducted on literature. Because the review articles encompass the vast majority of the published literature, and have been conducted by experts in the field, the findings of the significant review articles from the last 10 years will be summarized below in Table 2.

Additionally, recently there has been increasing interest in measuring and improving how ill health can affect productivity. While this concept is not new to the study of the financial impact of health promotion, until approximately five years ago it was limited to merely exploring the effects of ill health on worker absenteeism. Since that time, however, the concept and measurement of productivity have expanded to include the concept of presenteeism. The studies investigating the topic so far have justified the interest—most authors conclude that presenteeism costs comprise the biggest chunk of the overall financial burden of ill health in the workplace. Goetzel et al (2004) estimate that presenteeism issues cost companies between 18%-60% of their overall costs for 10 of the most prevalent health conditions. Hemp (2004), Goetzel (2004) and Chapman (2005) agree that presenteeism-related costs far outstrip absenteeism costs to employers, and Collins et al (2005) estimates that it accounted for nearly 7% of all labor costs in their study at Dow (as opposed to 2.3% for medical costs and 1% for absenteeism. Table 3 below summarizes some of the studies conducted into productivity cost.

Table 2: Summary of Selected Financial Impact Literature Studies

Author & Date	Results
Aldana 2001	<p>Risk factors are associated with increased costs. Association of health care costs and/or absenteeism with seatbelt use, cholesterol, diet, hypertension, alcohol & absenteeism is mixed or unknown.</p> <p>WHP programs associated with lower absenteeism and health care costs, and physical fitness programs with lower health care costs.</p> <p>ROI varied(\$2.5-\$10.1) Average \$3.48 for WHP's effect on absenteeism, \$4.30 for absenteeism and health care costs.</p>
Golaszewski 2001	<p>WHP provides positive financial returns, esp. for health care costs and absenteeism reduction. There is a relationship between health risk factors and costs. Cites another example of the value of WHP programs in that there are so many private Health Risk Appraisal, and WHP companies, etc.</p>
Pelletier 2005	<p>Providing risk reduction for all employees is critical, though currently there is most emphasis on high-risk individuals. Seven major outcomes: 1.) Marked decline in number and quality of studies; 2.) More workplaces only focusing on areas that are of specific importance to them, with less rigorous methodology; 3.) More pre/post observational, cost studies; 4.) A few studies have longer-term follow-ups; 5.) A recent increased attention to mental health and stress-related issues; 6.) Increased attention & the development of measures for productivity, and medical costs 7.) Increased interest internationally in WHP</p> <p>3 of the 8 studies reported a positive ROI.</p>
Chapman 2005	<p>Wide range of quality of studies 22 of 56 reported ROI, with a gross average of \$5.81 for those studies. More recent studies reported higher ROIs. 28 studies reported change in health costs, with an average of -26.1% change.</p> <p>Average duration of study was 3.66 years, representing 1.8 million person years</p>
Pelletier 1997	<p>Favorable clinical and cost outcomes. Newer studies have better outcomes.</p>
USDHHS 2003	<p>Clear evidence that the costs of chronic disease are enormous. More expensive programs have lower ROI, disease management higher ROI than health ed. Few studies are very long-term.</p>
Goetzel et al 2007	<p>Calls for more fed funding, central housing of tools for ROI (called "resource center") and a technical assistance consulting group; federal employee involvement, developing federal awards</p>
Heaney & Goetzel 1997	<p>Absenteeism more commonly used as an outcome (8 out of 35), which is important because it can be "construed as an indirect indicator of health and well-being and as an important indicator of productivity." (p.301)</p> <p>Health Risks most often investigated. Most studies use a combo of self-report and biophysical markers.</p> <p>Studies that provide individualized follow-up and interventions, at least for high-risk folks, are better at reducing risk.</p> <p>Mostly not theory driven, no mental health</p>
Riedel, et al 2001	<p>Strong evidence that health risks increase incidence of disease, as well as costs and that disease prevention/hp improves health status</p> <p>Evidence that multi-factorial programs reduce costs over time</p>

In general, the findings of all of these review articles have been positive towards the question of whether WHP programs can reduce costs to employers. Costs, as thought of by the authors, were generally broken down into two categories: health care costs, which represent direct cost to employers, usually in the form of health insurance and disability claim costs, and absenteeism costs, which are indirect costs (Aldana, 2001; Golaszewski, 2001; Pelletier, 1997 and 2005; Chapman, 2005; USDHHS, 2003; Goetzel et al 2007; Heaney & Goetzel 1997; Riedel et al 2001). Estimates of ROI range from \$2.10 (Aldana, 2001) to \$15.60 (Pelletier, 2005) in all the literature surveyed, with the reported averages in the review articles ranging from \$3.48 (Aldana, 2001) to \$19.41 (Chapman, 2005). Chapman (2005) has the most complete listing of reported ROIs. See Table 3 below for a summary of selected studies reviewed that reported specific ROI amounts, and how those numbers were calculated. It is important to note, though, that these numbers should be interpreted with caution. As mentioned in the limitations section, there are enormous challenges to conducting scientifically-valid research in this area, so the findings may or may not represent the true outcome of the interventions. Additionally, there is a well-known bias in the literature towards reporting positive, but not negative findings. In other words, it is quite possible that a number of programs who did NOT find positive ROIs did not publish that information. Still, when looking at the literature as a whole, given the length of time that the topic has been studied and the diversity of methods and populations, it seems reasonable to agree with the authors of the review studies that there can be cost savings associated with well designed and implemented WHP programs.

Table 3: Selected studies that report ROI

Author	Company	Actual ROI	How Calculated	Length of study
Ozminkowski et al (1999)	Citibank	4.56-4.73	Health care costs, program costs	6 years
Fries et al (1998) In Aldana (2001)	Unknown	6 for high-risk individuals, 4 for control group	Health care costs, absenteeism	6 months
Schultz, et al (2002) In Pelletier (2005)	Manufacturing company	2.3	Disability days	5 years
Aldana et al (2004) In Pelletier (2005)	Washoe, WA county school district	15.60	Direct medical costs and absenteeism	6 years
Harvey, et al (1993) in Chapman (2005)	City of Birmingham, AL	19.41	Health Care costs	Not reported
DHHS (2003)	Motorola	3.93	Health Care costs	Not reported
DHHS (2003)	Northeast Utilities	1.6	Health care costs	2 years
DHHS (2003)	Pfizer	3.51 (ergonomics program) 3.61(physical therapy program) 4.29(fitness centers)	Health care costs and productivity costs	Not reported
DHHS (2003)	Cigna	3 (flu shots) 9.5(smoking cessation)	Absenteeism, health care costs	1 year

Where do these savings occur? First, the theories of what causes health cost related expenditures must be explored. Anderson, Serxner and Gold (2001) in their “Conceptual Model of Health Promotion” posit that there is a direct link between individual health risks and health status and organizations’ (companies’) direct, indirect and other costs. Aldana models the financial impact of WHP programs in a reverse order, but with similar components. He suggests that WHP programs work to maintain low health risks amongst low-risk employees and reduce high health risks amongst high-risk employees, leading to the dual outcomes of reduced health

care costs and improved productivity. Several of the authors of the review studies agreed that higher risk employees cost companies more money (Aldana, 2001; Riedel et al 2001; Golaszewski, 2001). There is also substantial evidence in both the financial impact literature and elsewhere that WHP programs can reduce risk levels (or maintain low-risk levels). Therefore, using either of the models above, it is logical that WHP programs can lower costs to employers by lowering (or maintaining) risk levels amongst employees.

What then are the best ways to design and implement programs with optimal cost-benefit analyses? The answer to that question is not yet resolved, though the literature points to several possibilities. First, the concept of risk-reduction seems to be critical in generating positive financial outcomes. Many workplaces are intervening with high-risk employees to attempt to minimize their costs, but this may prove not to provide all available benefits to the companies. Pelletier (2005) argues that while most of the effort is directed in reducing the risks of those employees with particularly high or multiple risk factors, it is critical for employer to focus on risk-reduction or maintenance for all workers. After all, if they are not developing and maintaining good health habits, today's younger (and generally lower-risk) employees are tomorrow's higher risk employees.

Secondly, there is some evidence of what disease modalities are most cost-effectively addressed. Aldana (2001) identifies stress, overweight and obesity, and "multiple risk factors" as the targets for which there is the clearest financial impact data. Reidel et al (2001) base their recommendations on programs on the relative magnitude of the health problem, including prevalence, direct costs, and loss of productivity. Early detection screenings for prostate cancer, hypertension, and cholesterol are all seen as having high prevalence and high or very high direct medical costs. Hypertension is also cited as having a potentially large impact on performance.

Physical activity interventions, smoking cessation, nutritional interventions and stress management programs likewise are considered to have “high” or “very high” prevalence and impacts on direct and indirect costs. Finally, they cite “care seeking” behaviors for minor illnesses and the use of emergency rooms as “very high” in both prevalence and direct costs, positing that inappropriate visits to primary care and the ER cost as much as \$30/ employee and \$45/employee annually, respectively.

With regard to productivity, Edington (2001) reports that “low-cost diagnoses” (e.g. asthma, allergies, mental health) are associated with very high levels of loss of productivity. Since there is emerging evidence that productivity costs, and not just direct medical costs, may be very important to consider, there has been considerable interest in identifying which morbidities are most costly in terms of both absenteeism and presenteeism. For example, Collins et al (2005) in their study at Dow Chemical find that if one only considers absenteeism, only breathing disorders are cost-effective to treat, but if presenteeism costs are calculated, all 10 diseases (allergies, arthritis, asthma, back/neck disorders, breathing disorders, depression, diabetes, CVD, migraine, and stomach/bowel disorders) become cost-effective to treat. Goetzel et al (2004) estimate that across the five companies’ databases they analyzed, four conditions cost employers more than \$200 per employee per year: arthritis, hypertension, depression, and allergies. At least in part, WHP efforts can prevent or manage each of these conditions, providing evidence of both a need and a partial-solution to the problem.

1.4.3 Health Risk Assessments

Health Risk Appraisals or Health Risk Assessments (HRA) have been in use for approximately 50 years. Originally conceived to help physicians communicate with patients about their risks for premature death, they were an attempt to quantify and operationalize the knowledge gained from the Framingham Heart Study (and others) to a wider population (Institute for Health and Productivity Management, 1999.) In the intervening years, HRAs have become popular instruments in a variety of settings—including worksites—and have morphed considerably in content, form, and scope (Alexander, 1999).¹

The Health Care Financing Administration (formerly HCFA, now Centers for Medicare and Medicaid or CMS) describes Health Risk Appraisals this way:

Health risk appraisal is a systematic approach to collecting information from individuals that identifies risk factors, provides individualized feedback, and links the person with at least one intervention to promote health, sustain function and/or prevent disease. A typical HRA instrument obtains information on demographic characteristics (e.g., sex, age), lifestyle (e.g., smoking, exercise, alcohol consumption, diet), personal medical history, and family medical history. In some cases, physiological data (e.g., height, weight, blood pressure, cholesterol levels) are also obtained. (Rubenstien, et al, 2003, p. 1)

Originally, HRAs were designed as a way to quantify the risk of dying from a certain set of behaviors or characteristics. Over time, researchers became interested in assessing the risks of morbidity as well. Alexander (1999) notes five potential benefits of the HRA:

1. Relative inexpense and ease of use.

¹ Health Risk Assessments are instruments separate and distinct from Health Status Assessments, though in casual conversation the terms are often used interchangeably. Health Status Assessments (HSA) are based out of a standardized set of questions that were the direct result of The Medical Outcomes Study from the 1970s. HSAs also tend to focus on describing many aspects of quality of life such as satisfaction, functional ability and others, and have less of an emphasis on preventing future morbidity/mortality. Further discussion of HSAs are outside the scope of this review (Bowling, 1997, Alexander, 1999.)

2. Popularity with clients and employees, and a potential increase in participation in health promotion programs.
3. Systematic approach to organizing preventive health information and an emphasis on modifiable risk factors.
4. The presentation of group data, to summarize potential problems.
5. The potential for a motivation towards positive behavior changes.

Alexander (1999) also notes some potential limitations of such instruments. These include the lack of diagnostic ability, or the ability to gain a complete medical history. It is also important to understand the distinction (often lost) that the HRA is not a predictor of an individual's mortality (or morbidity), but rather a description of the odds of death occurring in a population with characteristics similar to the person's. An HRA is a necessary, but not sufficient, means of understanding an individual's (or group's) risk; however, HRAs nearly always limit themselves to the individual level and therefore provide no meaningful look at social or environmental factors. Furthermore, HRAs were developed in the context of many studies that looked largely at white, middle-class, and often male populations—how those translate to other groups is not well established. Finally, Alexander (1999) notes that HRAs should never be considered a self-contained health promotion program, but rather one part of such a program.

1.4.3.1 HRAs in the Worksite

HRAs have been used in the worksite since at least the 1980s (National Business Coalition on Health, 2006). During that time, CDC developed a HRA for use with its employees; this HRA was then moved to the Carter Center at Emory University and beyond. In 1992, a revised version was released as the Healthy People HRA with two main goals: first, to assess health behaviors and risks, and to provide feedback to individuals regarding their overall

morbidity and mortality risks. At that time, the “backend” calculations and research were also released to the public, allowing many private companies to develop for-profit HRAs based on this information. By 1999, there were well over 50 private HRA vendors, many of whom offered more than one product (Alexander, 1999). In 2004, 12 years after its last efforts with HRAs, CDC convened an expert panel on HRAs with leaders in academia and the industry, and the Task Force on Community Preventive Services initiated a systematic review of studies set in the worksite to determine if HRAs with and without feedback to the individual were effective tools.

Not surprisingly, HRAs have become popular tools to use in the worksite. In 1999, 36% of all worksites surveyed in the US reported HRA use, with nearly 60% of large companies doing so (Association for Worksite Health Promotion, William M. Mercer, Inc., & US Department of Health and Human Service, Office of Disease Prevention and Health Promotion, 2000). Since ill-health costs employers directly and indirectly, and emphasis has been growing over the years to improving or maintaining employee health, the strengths of an HRA fit neatly into that goal. HRAs help employers gauge the impact of their WHP programs, at least from the health behavior standpoint (Terry, Anderson, & Sexner, 1999). The ability of HRAs, especially now that they are almost exclusively deployed electronically, to provide real-time feedback to employees about their health risks and proposed improvements makes them valuable; however, it is their group-level information that makes them a powerful tracking tool for employers. In nearly all cases, employees complete the HRA privately and anonymously. That data is then captured (often by a third party) and presented in the aggregate to the employer. This provides the employer with population-level data and the ability at the macro level to link the HRA information with health claims data. There is a movement currently in the field to have such

linkages made at the individual level, but concerns about individual privacy have made such linkages difficult without compromising the employees' confidence in the system and thus their honest answers to HRA questions.

CDC's Healthier Worksite Initiative describes five major applications for HRAs within the worksite. These are not mutually exclusive or an exhaustive list, but comprise the most commonly used reasons:

1. Strategic Planning/Design of Workforce Health Promotion Program — Assessing collective risk factors of the population and segmenting the population by certain risk factors and conditions can help program planners target often limited resources. Programs and incentives can be designed to address the modifiable health risks factors that are most prominent in their workforce and to achieve goals specific to employees at various risk levels (e.g., maintenance for those with low-risk, helping those at higher risk move into lower risk categories). HRAs can be part of the baseline data to inform program design and can be repeated periodically to measure progress.
2. Cardiovascular Screening for Physical Activity Program Participation — For safety and company risk-management purposes, employers with on-site fitness facilities sometimes require employees to participate in an HRA or health screening prior to exercising at the fitness center.
3. Individual Health Awareness, Education and Intervention — An HRA might be used to increase employee awareness of personal health risk factors for making appropriate lifestyle changes on their own or with the support of a workforce health promotion program or more intensive counseling services. Repeated HRAs allow the employee to monitor his or her risk factors.
4. Identifying of Individuals for Disease Management Services — The American College of Sports Medicine (ACSM) points out that, while the primary objectives of

workforce HRAs include identifying the health risks of the population, “A more recent development in HRA programs is an emphasis on individuals with chronic conditions or who are at risk for becoming high medical care utilizers.” Through wellness programs and health benefit plans, some companies offer personalized disease management services to assist these employees in reducing health risks.

5. Guidance for Refining Health Plan Services — Population data resulting from an HRA can be used in combination with other data, such as health plan use, to help identify the need for targeted health plan services for preventive benefits, disease management, or other key services that an employer might choose to negotiate as strategies to decrease morbidity and sick care costs (Center for Disease Control and Prevention, 2008).

While HRAs are widely used throughout worksites in the US, limited studies have been conducted to understand how, where, when, and with whom they best should be used. A preliminary report published by the expert panel convened by CDC and the National Business Coalition on Health in 2006 reported that the Task Force for Community Preventive Services found “The Task Force found insufficient evidence to determine the effectiveness of AHRF [the assessment of health risks with feedback] when implemented alone.” However, when the HRAs with feedback were combined with additional components, the evidence was stronger. “There is strong evidence to support the effectiveness of AHRF plus health education in impacting tobacco use, alcohol use, seat belt nonuse, dietary fat intake, blood pressure, cholesterol, worker absenteeism and healthcare services use” (p. 8).

However, the Task Force did find “strong or sufficient evidence to support a conclusion on effectiveness for [HRAs] with feedback plus Health Education” in the areas of tobacco use,

alcohol use, seat belt nonuse, dietary fat intake, blood pressure, cholesterol, worker absenteeism and healthcare services use.

While the evidence seems to support the use of HRAs in a worksite population, there are a number of concerns about HRAs which need to be addressed. First, there are ethical considerations in adopting an HRA. The Society for Prospective Medicine has published General Ethics Guidelines to facilitate the appropriate use of HRA and enhance its benefits for organizations and individuals, while minimizing potential HRA misuse. The guidelines address seven critical areas related to the HRA process: program planning, HRA instrument selection, participant orientation, HRA implementation, protecting confidentiality/data security, report interpretation, access to resources to help participants modify identified risk factors (The Society of Prospective Medicine Board of Directors, 1999). Secondly, legal concerns, such as the Health Insurance Portability and Accountability Act (HIPAA) and the Americans With Disabilities Act (ADA) impact the use of HRAs. For example, “HIPAA contains provisions that impact employer-sponsored wellness programs, such as privacy rules and criteria for modifying employee health premiums as a reward or penalty” (National Business Coalition on Health, 2008). Finally, the applicability of the HRA to individual health behaviors/conditions and employee populations is far from assured. Guidance in selecting an instrument(s) is offered to worksites by a variety of governmental and non-profit organizations such as CDC’s Healthier Worksite Initiative, WELCOA, and National Business Coalition on Health (NBCH).

1.5 WORKSITE HEALTH PROMOTION AT PPG INDUSTRIES

PPG Industries, a Fortune 500 company headquartered in Pittsburgh, is a manufacturer of coatings (including paint for both residential and industrial uses), chemicals, optical products (including “Transitions” lenses for eyeglasses), specialty materials, glass, and fiberglass. PPG employs 20,000 Americans and another 12,200 people world-wide in more than 125 manufacturing facilities in 23 countries. Like so many companies, PPG is moving from an occupational health focus towards comprehensive employee health and productivity management. Currently these efforts are led by PPG’s Corporate Medical Director Alberto M. Colombi, MD, MPH,

Dr. Colombi approached the University of Pittsburgh in an effort to maximize the human capital investments made in PPG. He acknowledges that the funds PPG spends on personal or non-occupational healthcare are at least 10 times higher than what they are spending on occupational-related healthcare, a not-uncommon, yet still unacceptable burden for a multinational company competing in a global marketplace. Dr. Colombi was looking for outside evaluation of the worksite wellness efforts at PPG with an eye towards improving current practices and identifying missed opportunities to “move the needle” on employee risk-factors and healthcare costs. He summed up his desire for the outcome of the project in this way: “We are challenging ourselves in thinking about the following task: how to elevate local and uneven worksite wellness practices to a sustainable corporate wide health promotion system change. Hopefully you find this as interesting and compelling as we do. Unfortunately all currently available examples of “spread” regard hospitals or health care delivery entities. We need to translate those experiences into a concept that is operational for manufacturing worksites

where health is not the main mission but, at best, an attribute of human capital.” (A. Colombi (personal communication, March 14, 2008)

1.6 CONCLUSION

The past 30 years have shown remarkable growth in both the interest in and sophistication of WHP programs and evaluations. The worksite setting offers unique challenges and opportunities for health promotion and is an important setting for public health practitioners and researchers to consider when considering threats and supports to the public’s health. The literature reviewed in this chapter supports ongoing efforts to effect chronic disease prevention and risk reduction in a worksite setting. While far from perfect, the literature reviewed indicates that well-designed health promotion programs can improve health and reduce the financial impact of ill-health.

The literature provides us with several possibilities to consider when designing the evaluation for the PPG project. First, little is known about the particular worksite environments in which the project is taking place. The worksites are extremely varied across geography, size, occupational type, and workforce. They include corporate jobs, research and development, and skilled and unskilled labor. Some of the factories are unionized, and some are not. An initial glance at HRA and medical claims data show a range of health risks and costs. The openness of the management and workers towards WHP is an unknown quantity, and no formalized needs assessment has, to the best of our knowledge, been conducted. These are all areas of concern for the design of the program, nonetheless, It is an exciting opportunity to contribute to what is known about promoting health in the working-age population.

For the WHP field, more and better research and evaluation are called for to refine our understanding of how best to design, implement, and evaluate programs in a worksite setting. Considerable advancements have been made in the last 30 years, but it is clear that researchers have only just begun to understand what is needed to maximize opportunities within the workplace. With what is already known, and what can reasonably be learned in the near-future, WHP programs have the opportunity to play a critical role in protecting and promoting the nation's health.

2.0 EVALUATION DESIGN AND GENERAL METHODOLOGY

2.1 EVALUATION GOALS, OBJECTIVES, AND QUESTIONS

This project by necessity wears two hats. On the one hand, it is conceived of as being an evaluation study. Program evaluation exists “...to examine the operations of a program, including which activities take place, who conducts the activities, and who is reached as a result..., [to] show how faithfully the program adheres to implementation protocols...[and to] determine whether activities are implemented as planned and identify program strengths, weaknesses, and areas for improvement” (CDC, 2005). Program evaluation exists on a variety of levels for a variety of needs and has methods associated with each aim. Some program evaluation exists at a fairly basic level, such as auditing, or program monitoring, which has as its aim the assurance that a certain set of rules or procedures are being followed. Beyond that basic level, program evaluation can be used to accomplish several different aims. Quite often in public health, evaluators employ process or implementation evaluation to see if a program is being implemented as designed and outcome evaluation to see if the intended results (or outcomes) have been achieved; also to assess whether there have been unexpected consequences associated with the implementation of the program. This kind of evaluation provides practical feedback to the organization and is a way of keeping evidence-based programs faithful to their scientific underpinnings. Evaluation studies, however, can also be used to develop or improve evidence-

based programs and procedures. As with any other kind of research, the methods used in the design, implementation, and analysis of an evaluation study will determine what can be learned from the results of the study (Green & Kreuter, 1999; Hatry & Newcomer, 2004).

This evaluation was designed to answer key questions posed by Dr. Alberto Colombi about the shape and scope of WHP efforts throughout PPG². At PPG, WHP efforts are designed and implemented at the local level throughout the organization, without much direction or funding from the corporate office. Because of the decentralized structure of wellness efforts, Dr. Colombi had no systematic way of tracking or evaluating the local wellness teams' efforts; likewise, he was unable to provide them technical assistance or advocate for their needs throughout the company. Additionally, "best practices" were not being shared in an optimal way.

On the other hand, this project was also designed to serve as doctoral dissertation research. Therefore, it seeks to answer some broader questions about WHP that might be applicable beyond the walls of PPG and might illuminate some of the dark corners that still exist in understanding how best to improve the public's health through the workplace. Expert recommendations of what a worksite health promotion program SHOULD look like are available. (Centers for Disease Control and Prevention, 2007(a); Partnership for Prevention, 2001; National Business Group on Health, 2004). However, many of studies that do describe the state of today are usually checklists of basic, individual-oriented interventions, education,

² It is important to note that this was not the only, or most global, question posed by Dr. Colombi and the Evaluation team, but it is the one that this dissertation will attempt to answer, and it exists in the context of a larger evaluation effort taking place at PPG. Other questions and investigations included the effectiveness of "Webinars" at training and empowering community health ambassadors within the company, the use of benefits as a way to influence positive health behaviors and lower costs, and other survey-based and more qualitative conversations about the state of wellness efforts at PPG.

services, or investigations into the relative cost-effectiveness of implementing this program, or that program (Aldana, 2001; Chapman, 2005, Association for Worksite Health Promotion, William M. Mercer, Inc., & US Department of Health and Human Service, Office of Disease Prevention and Health Promotion,2000). While it is important to know “who” is doing “what” (both to PPG and in the larger context), the “whos” and “whats” that have been asked are too narrow, and the question of “how” and “how well” is rarely asked at all.

Therefore, this dissertation seeks to answer, at least at PPG, the question of not only what is happening at the various worksites, but also how the process occurs, with the assumption that by understanding and improving the system in which health promotion occurs, we can better influence outcomes. Little is known about how wellness committees organize, assess, plan, implement and evaluate programs (Thompson, Hannon, Bishop, West, Peterson, & Beresford,,2005). Yet, we know that those organizational fundamentals are key to achieving long-term behavior change and health outcome improvement (Serxner, Anderson & Gold, 2004). From other work by the Institute for Evaluation Science in Community Health conducted on PPG programs, it was known that those responsible at the local level for WHP were, at best, Occupational Nurses, who usually lack intensive training in behavior change, but ,more likely, were simply interested individuals with no formal training in health promotion. However, they do exist in a corporate climate where Continual Quality Improvement is part of the culture. Were they applying that dedication to process change to their health promotion models as well as their business functions?

The synthesis of these two perspectives is to ask “Are worksites that are doing the right things in the right ways (at least where Best Practices exist), via the processes that have been shown to be effective, reaping the rewards with healthier employees?” This ultimately is the

question that all WHP programs, whether at PPG or not, should be asking, and the question that this dissertation will try to answer.

The two broad goals of this study are:

1. To investigate the state of WHP at PPG at both a programmatic and organizational level.
2. To explore the relationship between those findings with self-reported employee health and risk-factors.

Specific aims to reach these broad goals include:

1. To identify the scope and intensity of WHP policies, programs, and supportive environments within select PPG worksites.
2. To explore the level of “organizational functioning” for the development of comprehensive WHP programs and its relationship between to the WHP interventions, levels of organizational functioning, and self-reported health of PPG employees.
3. Develop recommendations for selected worksites to improve program functioning and employee health outcomes.

The research question for this project is:

Do worksites that demonstrate higher levels of functioning WHP programs have healthier employees?

2.2 GUIDING EVALUATION AND CONCEPTUAL FRAMEWORKS

To answer the general research questions, as well as to provide PPG with specific feedback about their wellness efforts, this project was conceived to systematically collect, analyze, and present a picture of what worksites were doing individually and collectively to advance wellness efforts. To this aim, two general evaluation frameworks, the CDC Framework for Program Evaluation (Centers for Disease Control and Prevention, 1999) and the Strategic Prevention Framework (SAMSHA, 2008), provided guidance for the development and implementation of this project.

The Framework for Program Evaluation in Public Health (Centers for Disease Control and Prevention, 1999) identifies six steps to be taken in the course of a comprehensive program evaluation.

1. *Engage stakeholders* Those involved, those affected, primary intended users of the evaluation.
2. *Describe the program* including needs, expected effects, activities, resources, stage, context. Logic models are often helpful at this step.
3. *Focus the evaluation design*, considering purpose, users, uses, questions, and methods.
4. *Gather credible evidence*. Indicators, sources, quality, quantity, logistics
5. *Justify conclusions* through data analysis/synthesis, interpretation. Use judgment to make recommendations.
6. *Ensure use and share lessons learned*. Provide feedback, follow-up, and dissemination.

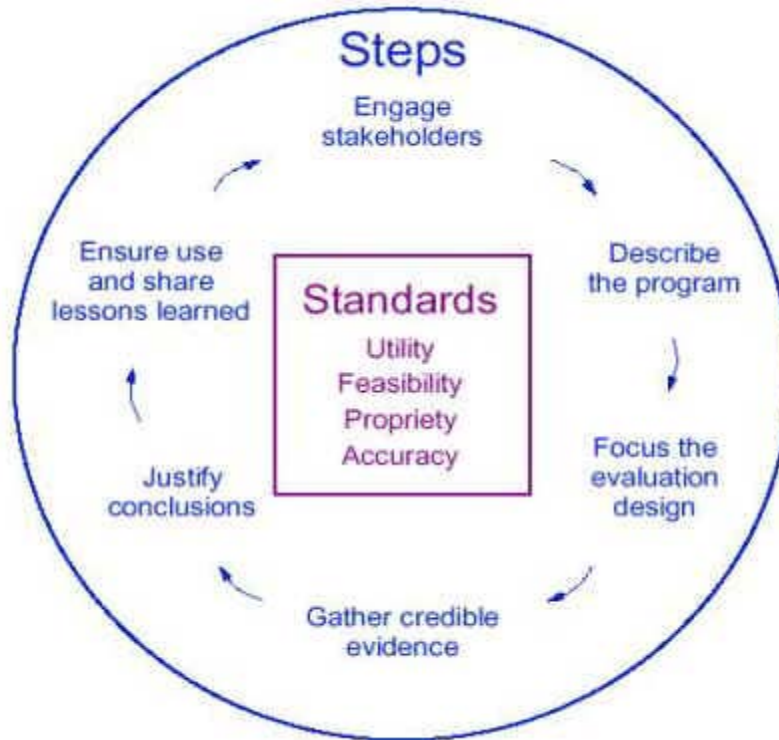


Figure 1: CDC Framework for Program Evaluation in Public Health

This framework is “a practical, nonprescriptive tool,” designed to summarize and organize essential elements of program evaluation.” The framework identifies logical steps to be taken in program evaluation practice, as well as standards for evaluators to observe. It is believed that following these steps and standards will result in a credible, thorough, and ethical evaluation product (Centers for Disease Control and Prevention, 1999).

The second analytical framework that informed this project was the Strategic Prevention Framework (SPF). It has five components:

1. Assess prevention needs based on epidemiological data,
2. Build prevention capacity,
3. Develop a strategic plan,
4. Implement effective community prevention programs, policies and practices, and
5. Evaluate their efforts for outcomes.



Figure 2: The Strategic Prevention Framework

The Strategic Prevention Framework was originally conceived by SAMSHA as a way to improve the implementation and evaluation of substance abuse prevention programs. Janice Pringle, PhD, from the School of Pharmacy at the University of Pittsburgh and a collaborating member of the PPG evaluation team, is researching how the SPF works in other community settings. This evaluation therefore represents a novel and somewhat experimental use of the SPF. However, there are several reasons to think that it provides a complementary approach to the traditional CDC evaluation framework.

First, these two frameworks have significant similarities. They both hold assessment as an important early step. Both frameworks conclude that if a program does not know for whom it is working or what the needs of that audience are it is unlikely that a program is going to have a positive impact. Likewise, both frameworks assume a planning stage where the an evaluation plan will be designed to fit the goals of the project. Finally, both assume that that plan will be faithfully implemented to gather the necessary information. These steps are all well established in the public health and behavior change literature and are logical and reasonable. While there are these similarities in the frameworks, each does bring something the other does not. The CDC framework could be considered more people-oriented. It begins and ends with the people involved in the project; first, it engages stakeholders, and finally it insists that the information learned is shared with those for whom it is relevant. This is critical in worksite health promotion because if all levels of the workforce—from health plans to unions and human resources, executives through management to workers—are not involved, then the potential benefits of such programs are muted. However, the SPF brings an important component too often not considered in WHP programs—capacity. “Capacity building involves mobilizing human, organizational, and financial resources to meet project goals. Training and education to promote readiness are also critical aspects of building capacity” (SAMSHA, 2008b). These elements—the human, organizational and financial resources as well as training and education —are too often forgotten in worksite health promotion programs. By incorporating these frameworks, the overall evaluation design will be strengthened and the probability of meeting the projects goals is increased.

2.3 PARTICIPANTS

This evaluation surveys the entire population of wellness team members at select worksites at PPG. These worksites were identified by Dr. Alberto Colombi, Medical Director, as meeting the criteria of adequate size (>50 employees) and adequate length of tenure in the company (very recent corporate acquisitions were excluded). Ultimately, approximately 100 locations were selected by Dr. Colombi. The surveys were sent by email to Dr. Colombi's wellness contact at each location, with instructions that directed the survey to be completed by a person identified by the wellness team, in consultation with the team.

2.4 DATA COLLECTION

2.4.1 Instrument Development

Following the CDC Framework for Evaluation and the SPF, it became clear that the evaluation team would need to gather information on the offerings and performances of the individual worksite wellness committees in order to assess their current status, their needs, and ways to influence future directions. At the time, PPG had two data streams to capture deidentified, individual employee and site-level data: their Health Risk Assessment (HRA) and medical claims data. While these both provided valuable information, they did not provide a complete picture of the wellness efforts at PPG. HRA data has a number of strengths and weaknesses (please see discussion of HRAs on page 28), and PPG was no exception. The level of employee participation on HRAs varied widely throughout the company, with some sites

having 100% compliance rates and some close to 0%. Additionally, HRA data is self-reported and therefore it is unclear how valid such data is. A strength of HRA data is that it looks at the whole person (for example, 24-hour food diaries, or number of minutes of strenuous activity in a week) but many of the items captured on an HRA are not directly modifiable at work—alcohol consumption being an obvious example, but most employees also eat and exercise outside the bounds of the normal work day. So HRA data was not sufficient to understand the relationship between work and health. Likewise, the systems of Medical Claims data proved to be an unfeasible way to assess WHP performance. Because of the multi-factorial inputs that cause, say, Coronary Artery Disease, it is difficult to determine what effects differences in tobacco policies may have had at differing worksites. Medical claims data helps identify which sites have the highest medical costs, but do little to help understand how well or poorly the wellness committees were fostering health promotion at the individual sites. Clearly a third data stream was going to be necessary, and it was agreed upon that the evaluation team would develop a method to try to capture the missing data.

The group began by reviewing the existing metrics available in the WHP literature. Several instruments are available and, if not widely used, at least were proposed by researchers and practitioners in the WHP field, such as WELCOA and the Health Enhancement Research Organization (HERO) (WELCOA, 2008; Health Enhancement Research Organization, 2007). As the evaluation team from Pitt met with staff at PPG, a list of needed information from each site was generated.

- A basic survey of what is being done
- A tool for benchmarking
- Participation Rates
- List of environmental supports to health at the workplace

- A measure of organizational maturity (i.e. organizational and leadership resources, processes for assessment, planning and evaluation)
- The development of a process to achieve optimized employee, retiree, and family member health
- A list of programs available to employees, retirees, and family members
- Current direction and possible scoring method (“Where is WHP and where should it be?”)

Against this list of needs, the currently-existing instruments were examined. While many of them contained elements of the list, none was found to satisfy all the requirements of the evaluation. It was clear that an instrument would have to be developed, melding the best pieces from currently existing scales and developing content where none previously existed.

The evaluation team decided that the *process* of how WHP happens at PPG was the single most important thing to understand. This fit with other corporate evaluation structures they had in place, specifically a process called “Plan, Do, Act” for continual quality improvement. The company already had a yearly assessment in place for injury prevention and workmen’s compensation control which seamlessly melded into the fabric of US-based PPG locations. That survey had excellent response rates from the worksites; staff at PPG reported taking that survey seriously as a way to annually assess their efforts in health and safety. The group decided that that survey would serve as a template for the WHP survey. This strategy would hopefully increase compliance with the WHP survey since it would come in a familiar form and timing interval. Additionally, the close relationship between health and safety and WHP would make it likely that many of the same people would be completing both instruments, further increasing comfort with the new measure.

Microsoft Excel was used to deliver the instruments to each worksite. Each worksite, world-wide, used Excel and it was an accessible and easily understood format for employees. The Excel file contained 5 “tabs” at the bottom: the offerings survey (“Program Inventory”), the

gauge of their organizational maturity and systems change (“Management Scorecard”), a Best Practices nomination form so employees could submit a report of outstanding service delivery from the Program Inventory to be included at a PPG Health and Wellness Summit and shared with other worksites, the Management Scorecard calculations tab, which provided real-time feedback to the worksite on how well they were doing in a number of organizational maturity categories (please see Section 2.4.1.2 below for more information on this), and finally a Suggestions tab so worksites could comment on the survey and make suggestions for its future revision. (Please see Appendices A and B for copies of the Program Inventory and the Management Scorecard.) The Program Inventory, and the Management Scorecard and its real-time scoring, will be discussed below.

2.4.1.1 Program Inventory

The first instrument is an inventory of potential WHP programs, interventions, or resources available at individual worksites. Naturally, not all potential programs, interventions, or resources can be identified *a priori*, but the tool consists of likely or possible components that appear in WHP literature, including the WELCOA Supportive Environment Questionnaire and Well Workplace Checklist, the CDC Healthier Worksite Initiative website, the C. Everett Koop National Health Awards Criteria, and DHHS’s Healthy Workforce 2010 document, through discussion with Dr. Colombi and the WHP wellness team at their headquarters in Pittsburgh, PA, and the evaluators’ knowledge of WHP programs (Wellness Council of America, 2008; Centers for Disease Control and Prevention, 2007a; The Health Project, 2009; Partnership for Prevention, 2001). Respondents were asked to identify the presence/absence of each component as well as give a qualitative assessment of the completeness of the program, as compared to a description of

an ideal program. Such descriptions were based on pre-determined goals set by the company (such as goals for participation in the company's "Know Your Numbers" campaign, or recognized public health goals such as Health People 2010, and the University of Pittsburgh's Center for Healthy Aging 10 Keys to Health Aging (USDHHS, 2000; Center for Healthy Aging, 2009). Respondents were asked to describe the level of completeness of their program as a way of better understanding how developed their programs are.

The Program Inventory was designed to gather information about the offerings that each worksite had for wellness promotion. This included equipment, programs, interventions, policies, and environmental supports to wellness. Questions were asked about 12 categories: blood pressure control, blood glucose control, lipid control, overweight and obesity control, tobacco, physical activity, nutrition, cancer screenings, muscle and bone health, alcohol and drug control, depression, and a catch-all category of work/life balance, which included issues around breastfeeding accommodation, stress management, and mental health. For greater relevancy in analysis, the physical activity category was subdivided into three categories: policy, promotion, and environment, and the nutrition category was divided into two categories: education and environment. This led to relatively equal category sizes with approximately 3-5 questions per category, which allowed each of the 15 categories to be equally weighted to develop a total mean score.

This Program Inventory was based on inventories of WHP programs, the desire for data for program improvement requested by Dr. Colombi, and a format currently used at PPG for tracking workman's compensation claims. Thus, in form and function it is something that, to North American workers, at least, should have been familiar and comfortable for them to

complete. It was unknown how comfortable worksites outside the US, especially those in countries where English is not the primary language and the health care system is radically different, would find the form, though every effort was made to make it accessible and easily used. Feedback was solicited regarding both the content and format of the program inventory from a variety of locations and employees, and it was pretested with a subset of PPG's worksites before its final revision and launch. Please see Appendix A for the Program Inventory.

2.4.1.2 Management Scorecard

The second piece to the data collection instrument is a survey of worksite health promotion program management. This instrument, based on the Hero Scorecard Health Enhancement Research Organization's performance survey and the Strategic Planning Framework (Health Enhancement Research Organization, 2007; SAMSHA, 2008). It is designed in such a way to not only collect data for the evaluation team's analysis, but to provide instant feedback to the wellness team, using a behavioral scorecard format. Behavioral scorecards are used to measure an individual's (or group's) behavior against a standard or benchmark, and have been used in business and behavioral health care (Santiago, 1999).

In this scorecard, the wellness team is asked a series of questions about its functioning, culture, capacity, and procedures. The questions are posed in such a way as to represent the ideal program functioning, based on established behavior change and organizational functioning theories. For example, using the Strategic Prevention Framework, the survey first asks about the assessment of needs, the capacity of the wellness committees, program planning, and implementation. One notable change in the Management Scorecard from the SPF is that rather than having Evaluation being a fifth and final category, it is integrated throughout the previous

four steps. The purpose behind that change is to emphasize that evaluation is something that must happen at all stages of a program, and not something that is started after the program has been implemented (Green & Kreuter, 1999). Scores are assigned based on the participant's feedback, and are weighed based on the relative importance of the question. For example, using HRA data to plan wellness activities was considered more important by the evaluation team than the wellness team having a recognized chairperson to run the meetings, and thus is worth more points on the Scorecard. Question weighting was assigned by consensus of the team, relying on evidence from the literature and professional judgment. After answering the questions, the wellness team can see a graphical representation of their answers. This provides them with instant feedback on areas they need to improve, and understand where they are succeeding; more importantly, using the questions from the tool, it provides the wellness committees a map or step-by-step directions on how to improve their score. Feedback was solicited regarding both the content and format of the program inventory from a variety of locations and employees, and it was pretested with a subset of PPG's worksites before its final revision and launch. An example

of the scorecard appears below:

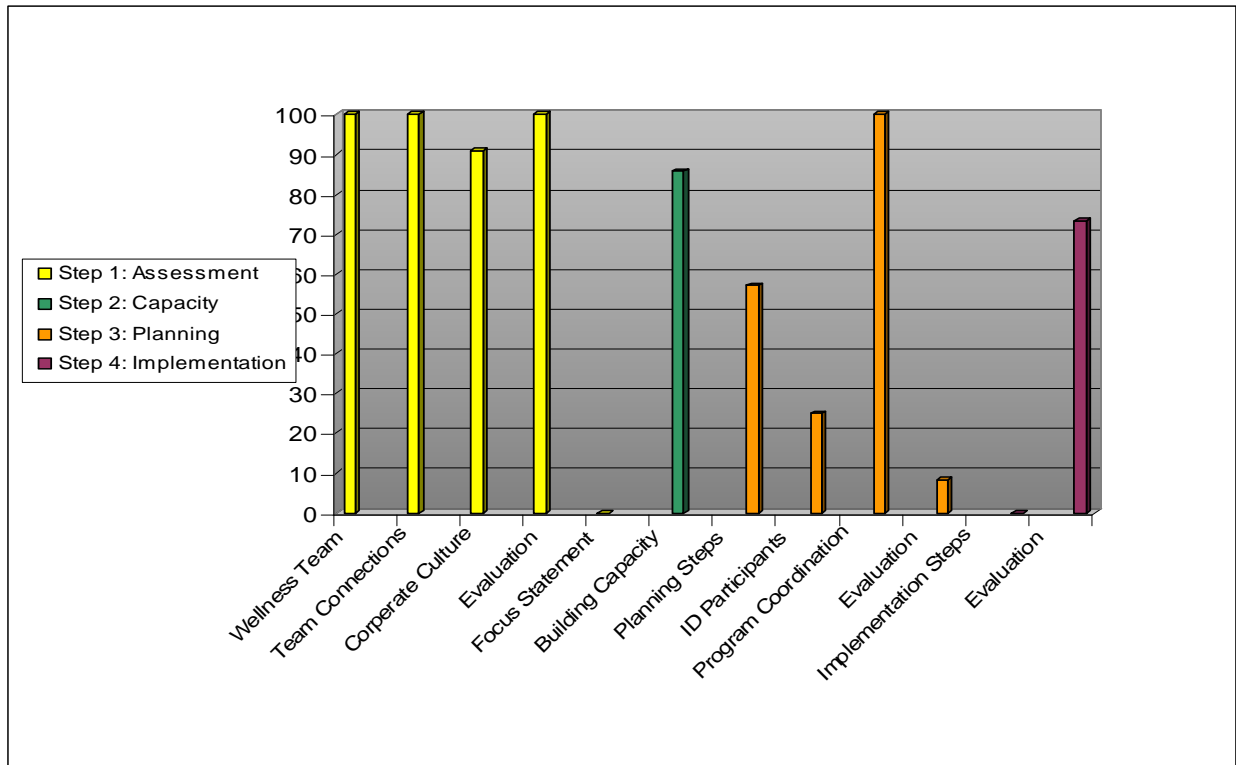


Figure 3: Example of the Management Scorecard Feedback

In this example, the wellness team can feel assured that they have a well-functioning team that is doing a good job of assessment, except in the area of focus statement development. By going back to the scorecard instrument, they will see seven steps that they can take to improve that area of their functioning, starting with “Does the team develop at least 2-3 focus statements that describe what health problems or risks are felt to be the most important to address within the plant/site?” This provides directed feedback to team members who may not have specific training in behavior modification or organizational advancement theories. The team also can see that they are doing a good job making use of their resources and capacity, and probably do not need to focus very many additional efforts there. The areas of Planning and Implementation are where the bulk of their needs lie. They are not doing an optimal job of identifying which

programs would best be suited to their needs, which employees are best matched with (or open to) which programs, or which steps to take to carefully and faithfully implement evidence-based programs. They are also not putting much emphasis on evaluating either their planning or implementation processes. To improve their functioning, wellness teams can access a step-by-step guide simply by returning to the tool and implementing the steps enumerated in the sections they scored sub-optimally. By providing worksites with this level of feedback, and the steps that can remedy deficiencies, it is hoped that programs will be able to show progress over time.

2.4.2 Additional Data Collection

Data were collected in an Excel file with “tabs” at the bottom that allow users to view the Inventory, Management Scorecard, an “instant feedback” score sheet based on the Management Scorecard, a place to identify best practices, and, finally, a place to provide feedback to the evaluators on the usefulness and usability of the instrument.

Finally, the instruments provide numerous opportunities for feedback to the evaluation team about the instrument itself. We recognize that the tool is likely to be a better fit for North American worksites, but that even they may not fit neatly into the boxes drawn by the instrument. Feedback will be used to improve the instrument, as well as to communicate with Dr. Colombi and the PPG team about specific needs, accomplishments, or concerns of the wellness teams.

While these tools will provide necessary and missing information about the state of WHP at PPG, the availability of HRA data is also a valuable resource for understanding the interaction between WHP and health outcomes. At PPG, HRA data is collected by a third party, Wellness

Checkpoint, deidentified, and available at the worksite-level. While subject to the considerable liability of self-reported, de-identified data, the HRA information presents the best available picture of the health of PPG employees at different locations and allows for data analysis to be conducted looking at a number of demographic factors. Most importantly, the HRA data is available at the worksite- unit, which allows for direct comparison of information from all three data sources.

3.0 RESULTS

3.1 RESPONSE RATE

The Program Inventory and Management Scorecard were posted on an internal PPG website and emailed to approximately 101 worksites at PPG on April 17, 2007. Due to a technical glitch with the website, the online version was removed within the week, and the emailed surveys were resent, inexplicably missing 3 questions in the Program Inventory. A deadline of two-weeks was given to return the surveys. The exact number of locations receiving the surveys is unknown, because they were sent by Dr. Alberto Colombi, Medical Director at PPG, and records were not kept. The total number of surveys sent out is thought not to exceed 101, and thus represents the most conservative estimate for calculating response rate. Of the returned surveys, there were 72 Program Inventories and 66 Management Scorecards returned, of a response rate of 71% and 65%, respectively.

3.2 PROGRAM INVENTORY

3.2.1 Data Summary

Table 4: Independent Measures used in the Program Inventory

Name	Description	Derivation
US	Worksites located within the US.	Location
Non-US	All worksites located outside the US	Location
Younger	Worksites where fewer than 33% of employees are 50 years or older	Percentage of workers over the age of 50 as reported on the PPG HRA
Older	Worksites where 33% or more employees are 50 years or older	Percentage of workers over the age of 50 as reported on the PPG HRA
Low Organizational Functioning	Worksites below the 50 th percentile for Organizational Functioning	The sum of scores from the Management Scorecard
High Organizational Functioning	Worksites at or above the 50 th percentile for Organizational Functioning	The sum of scores from the Management Scorecard

Table 5: Dependent measures from the Program Inventory (PI)

Name	Description	Data
Blood Pressure	% of the 4 questions in the PI answered “Yes”	Continuous. Weighted equally.
Glucose	% of the 3 questions in the PI answered “Yes”	Continuous. Weighted equally.
LDL Cholesterol	% of the 2 questions in the PI answered “Yes”	Continuous. Weighted equally.
Tobacco	% of the 4 questions in the PI answered “Yes”	Continuous. Weighted equally.
Physical Activity Policy	% of the 3 questions in the PI answered “Yes”	Continuous. Weighted equally.
Physical Activity Promotion	% of the 4 questions in the PI answered “Yes”	Continuous. Weighted equally.
Physical Activity Environment	% of the 7 questions in the PI answered “Yes”	Continuous. Weighted equally.
Nutrition Education	% of the 7 questions in the PI answered “Yes”	Continuous. Weighted equally.
Nutrition Environment	% of the 7 questions in the PI answered “Yes”	Continuous. Weighted equally.
Cancer	% of the 6 questions in the PI answered “Yes”	Continuous. Weighted equally.
Muscle Bone Health	% of the 7 questions in the PI answered “Yes”	Continuous. Weighted equally.
Work/Life Balance	% of the 6 questions in the PI answered “Yes”	Continuous. Weighted equally.
Alcohol/Drugs	% of the 4 questions in the PI answered “Yes”	Continuous. Weighted equally.
Depression	% of the 5 questions in the PI answered “Yes”	Continuous. Weighted equally.

At the most general level, enormous variability existed across questions in terms of the number of worksites that had implemented individual programs or environmental changes. Some things, such as access to place to store and prepare food, were nearly universally implemented, while others such as depression screenings or stretch breaks were reported less

than 25% of the time. Please see Appendix A for a complete listing of questions asked in the inventory. To answer the question if basic demographic factors such as location, size of worksite, or age of employees affected the results of the program inventory, independent sample T-tests were performed to detect if there was a significant difference in mean scores. In several categories, these were found to be different. US worksites had significantly higher scores in the categories of blood pressure, glucose, lipid, overweight/obesity, and alcohol/drug control, as well as in depression screenings. While not significant, US locations also had higher scores for cancer screenings, muscle and bone health, and work/life balance. The other categories were nearly equal. See Table 6 for results.

Table 6: A comparison of US vs. Non-US locations on the completeness of WHP program offerings, from the Program Inventory.

Program Inventory Health Category	% of possible score on Program Inventory	
	Non-US locations(n=32)	US locations (n=37)
Blood Pressure	61	81*
Glucose	43	68*
LDL Cholesterol	62	91*
Obesity/Overweight	39	67*
Tobacco	47	46
Physical Activity Policy	41	31
Physical Activity Promotion	39	37
Physical Activity Environment	41	41
Nutrition Education	39	36
Nutrition Environment	46	51
Cancer	39	50
Muscle Bone Health	47	54
Work/Life Balance	30	43
Alcohol/Drugs	24	62*
Depression	25	44*

* Significant at .05 level

It was hypothesized that larger worksites would have more resources at their disposal with which to conduct wellness activities. To test this, we dichotomized worksites by size into a small (fewer than 250 employees) and large (250+employees) and conducted an independent T-test. Larger worksites did have significantly more resources and activities in the areas of blood pressure, lipid, and overweight/obesity control, and cancer and depression screenings. They had more resources, though not significantly, in all other categories as well, with the exception of nutrition, where small worksites had a not-significant advantage. See Table 7 for mean scores.

Table 7: A comparison of Small(<250 employees) vs. Large(>=250 employees) locations on the completeness of WHP program offerings, from the Program Inventory.

Average Scores, By Category	% of possible score on Program Inventory	
	Small (n=33)	Large (n=35)
Blood Pressure	62	84*
Glucose	50	63
LDL Cholesterol	67	90*
Obesity/Overweight	42	66*
Tobacco	44	49
Physical Activity Policy	32	40
Physical Activity Promotion	37	38
Physical Activity Environment	41	41
Nutrition Education	38	37
Nutrition Environment	51	47
Cancer (total)	30	60*
Muscle Bone Health	46	55
Work/Life Balance	33	41
Alcohol/Drugs	38	52
Depression	27	44*

* Significant at .05 level

Finally, the data were analyzed to see if worksites where a higher proportion of employees were over the age of 50 (as identified by the PPG HRA) differed from younger worksites. The data were dichotomized at the 50th percentile, which was 33% of employees at a particular worksite were over the age of 50. In the areas of blood pressure, blood glucose, overweight/obesity, and alcohol/drugs control, and depression screening, there were significant differences. While not significant, there were also large differences in lipid and control and in work/life balances. Please see Table 8 for mean scores.

Table 8: A comparison of Younger (<=33% of employees 50+) vs. Older (>33% of employees 50+) locations on the completeness of WHP program offerings, from the Program Inventory.

Average Scores, By Category	% of possible score on Program Inventory	
	Younger (n=33)	Older (n=30)
Blood Pressure	.66	.85*
Glucose	.48	.72*
LDL Cholesterol	.77	.90
Obesity/Overweight	.48	.70*
Tobacco	.42	.50
Physical Activity Policy	.43	.57
Physical Activity Promotion	.40	.34
Physical Activity Environment	.37	.39
Nutrition Education	.44	.36
Nutrition Environment	.38	.35
Cancer (total)	.50	.48
Muscle Bone Health	.53	.54
Work/Life Balance	.33	.46
Alcohol/Drugs	.34	.59*
Depression	.27	.48*

* Significant at .05 level

3.3 MANAGEMENT SCORECARD

Table 9: Dependent measures from the Management Scorecard

Variable Name	Description	Source
% Employees Aged 50+	% of employees at or over the age of 50	PPG HRA data
% Low Risk Employees	% of employees who report 2 or fewer risk factors	PPG HRA data
% Smokers	% of employees who smoke	PPG HRA data
% Smokers Ready to Quit	% of employees who smoke who indicate their readiness to quit	PPG HRA data
% Employees with no Physical Activity risks	% of employees who report no risk factors for physical activity	PPG HRA data
% Mammogram	% of female employees over the age of 50, who report an annual mammogram	PPG HRA data
% Pap Smear	% of female employees over the age of 20, who report an biennial Pap Smear	PPG HRA data
% PSA	% of male employees over the age of 50, who report annual PSA screening	PPG HRA data
% Sigmoidoscopy/Colonoscopy	% of employees over the age of 50, who report either screening in the last 10 years	PPG HRA data
% HDL Cholesterol	% of employees who report knowing their total or HDL Cholesterol score	PPG HRA data
% LDL Cholesterol	% of employees who report knowing their LDL Cholesterol score	PPG HRA data
% Blood Pressure	% of employees who report knowing their Blood Pressure score	PPG HRA data
% Depression Screening	% of employees who report being screened for depression	PPG HRA data

3.3.1 Data Summary

The Management Scorecard was designed to gather information about the way that wellness committees functioned. It included 64 questions in four categories of behaviors from the Strategic Prevention Framework: assessment (31 questions), capacity (7 questions), planning (16 questions) and implementation (10 questions). Each of the sixty-four questions in the Management Scorecard was weighted based on the survey development team's opinion of the relative value of the question. For example, the use of HRA data to inform wellness committee priorities was given a weight of '4', while the relatively less significant "Team has a recognized chairperson who takes responsibility for scheduling and/or conducting meetings?" was weighted '1'. Weights were assigned based on a consensus process in the survey development team, with higher weights given to items that had an evidence-base in the literature or were recognized as crucial in behavior change theories.

In the area of assessment, questions were asked about the wellness team, the team connections, corporate culture, evaluation, and focus statement development. In the area of capacity, questions were asked about budgets for wellness and benefit designs. To assess the planning stage, questions were asked about planning steps, the identification of participants, program coordination, and evaluation. Finally, in the implementation section, respondents answered questions about the steps they take to implement activities and evaluate them.

In general, worksites reported better behavior change practices for the Assessment and Capacity steps of the model than for the Planning and Implementation steps. Please see Figure 4.

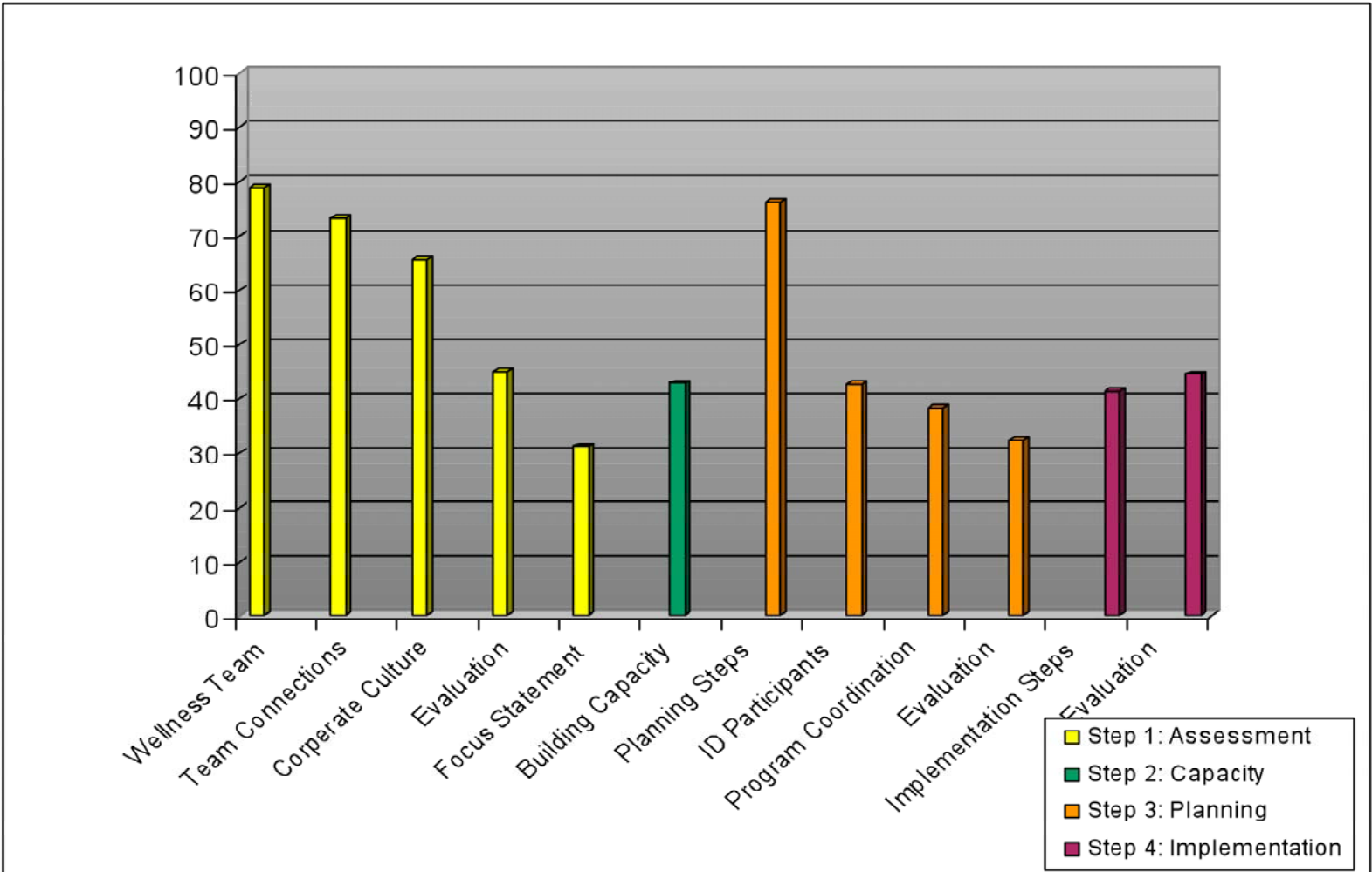


Figure 4: Management Scorecard results

In general, Worksites in the US had slightly higher scores than those internationally, while Europe generally came in second and Asia third. To answer the question if basic demographic factors affected the results of Management Scorecard, independent sample T-tests were performed to detect if there was a significant difference in mean scores. No significant differences were found in the location, size of worksite, or age of employees.

3.4 RELATIONSHIP BETWEEN THE PROGRAM INVENTORY AND MANAGEMENT SCORECARD

While the Program Inventory and Management Scorecard were presented to respondents together in one Excel file, they were two separate surveys. It was hypothesized that worksites with higher functioning wellness committees (as evidenced by higher scores on the Management Scorecard) would also have more resources and activities associated with wellness (as evidenced by higher scores on the Program Inventory). Scores from the Management Scorecard were dichotomized at the 50th percentile to create “high and “low” organizational functioning score. An independent T-test found that higher functioning worksites did also have higher scores on the Program Inventory in all areas except Nutrition Education, and that statistically significant differences existed for all but the nutrition and physical activity categories. See Table 10 for mean scores.

Table 10: Results from the PPG Program Inventory, by Organizational Functioning ((Low=<50th Percentile, High Functioning =>50th Percentile)

	Low (n=30)	High (n=33)
Average Scores, By Category		
Blood Pressure	64	86*
Glucose	51	69*
LDL Cholesterol	73	94*
Obesity/Overweight	46	70*
Tobacco	32	61*
Physical Activity Policy	36	39
Physical Activity Promotion	36	39
Physical Activity Environment	40	43
Nutrition Education	45	29*
Nutrition Environment	50	48
Cancer	29	69*
Muscle Bone Health	43	63*
Work/Life Balance	27	51*
Alcohol/Drugs	32	60*
Depression	17	56*

*Significant at the .05 level

3.4.1 Wellness efforts and health (via HRA)

PPG conducts an ongoing, on-line HRA available to all employees. It is heavily promoted and used at some sites, but hardly at all at others. HRA completion is one of PPG's stated wellness goals. HRA data is available in 3-year periods by worksite and is updated quarterly. We pulled the data that most closely matched the period the survey covered, and analyzed the data for the sites that had survey data.³ To answer the question if the worksites differed in basic demographic factors, risk factors, and health behaviors, independent sample T-

³ Four worksites were categorized differently on the HRA data than in the survey data, and at Dr. Colombi's advice they were combined to match the survey data we had.

tests were performed to detect if there was a significant difference in mean scores. In several categories, these were found to be different. US worksites had significantly more worksites with older employees (38% vs. 17%) and more employees who reported appropriate cancer and other biometric screenings. Non-US locations were much more likely to have employees reporting fewer than two risk factors (58% vs. 69%), as well as higher rates of smoking (6% vs. 15%). See Table 11 for results.

Table 11: Demographics of employees, from PPG HRA data, by location

		US (n=37)	Non-US (n=26)
Demographics of employees			
	% Employees Aged 50+	37.70	16.73*
Risk factors			
	% Employees with Low Risk (under 2 risk factors)	58.42	69.08*
	% Smokers	6.23	15.42*
	% Smokers Ready to Quit	20.62	13.92
	% Employees with no Physical Activity risks	35.97	38.35
Cancer Screenings			
	% Mammogram	83	38*
	% Pap smear	85	72*
	% PSA	45.50	42.46
	% Sigmoidoscopy/Colonoscopy	41.76	5.12*
“Know Your Numbers” biometric measures			
	% HDL Cholesterol	50.04	33.12*
	% LDL Cholesterol	41.85	15.38
	% Blood Pressure	75.58	58.04*
Other			
	% Depression	21.22	25.38

*Significant at the .05 level

Size of location was found to be significant only when it came to reports of cancer screenings. Larger worksites were more likely to have employees reporting mammograms (77%

vs. 50% $p=.00$) and PSA screenings (52% vs. 21%, $p=.01$). No other differences were significant.

Worksites with over 1/3 of the employees over the age of 50 were much less likely to have employees with low risk (67% vs. 58%, $p=.01$). Additionally, in the older worksites, the proportion of employees who were smokers was much lower (5% vs .15% $p=.00$) and those knowing their LDL cholesterol was higher (38% vs. 24%, $p=.03$). They were also much more likely to have had employees report mammogram, PSA and colonoscopy screening, but since those tests are only recommended for those over the age of 50, those results are not surprising. No other differences were significant.

To answer the question if worksites that had better functioning wellness teams also had healthier employees, the HRA data was analyzed by the results of the Management Scorecard. Worksites were dichotomized into high or low organizational functioning at the 50th percentile, and then an independent T-test was conducted on elements of the HRA data. With the exception of the number of male employees over the age of 50 reporting annual PSA screenings (48% vs. 26%, $p=.03$), and the number of employees who know their HDL cholesterol numbers, (50% vs. 36% $p=.00$), there were no significant differences. Better functioning worksites did have employees who scored consistently better on the “know your numbers” biometric markers, but with the exception of LDL cholesterol the differences were not significant. Interestingly, worksites with better run wellness programs actually had fewer low-risk employees (60% vs. 66%).

Table 12: Employee risk factors, from PPG HRA data, by level of organizational functioning ((Low= <50th Percentile, High Functioning >50th Percentile)

		Low (<50 th Percentile) (n=30)	High (>50 th Percentile) (n=33)
Demographics of employees			
	% Employees Aged 50+	29.42	28.69
Risk factors			
	%Employees with Low Risk (fewer than 2 risk factors)	65.74	59.98
	% Smokers	9.52	10.52
	%Smokers Ready to Quit	14.06	21.53
	% Employees with no Physical Activity risks	40.16	33.84
Cancer Screenings			
	% Mammogram	58	71
	% Pap smear	85	74
	% PSA	25.94	47.70*
	%Sigmoidoscopy/Colonoscopy	27.13	26.16
“Know Your Numbers” biometric measures			
	% HDL Cholesterol	35.77	50.11*
	% Employees who know their LDL Cholesterol	25.84	35.86
	% Employees who know their Blood Pressure	63.84	72.70
Other			
	% Employees screened for depression	23.55	22.34

To better understand how the age of employees affects health behaviors, we investigated the relationship between the proportion of employees over the age of 50 at each worksite with various health indicators. Having older employees was strongly associated with an increase in several key health behaviors, including cancer screenings and knowledge of lipid levels. Again, the relationship between older employees and less smoking was observed. Interestingly, there was also a negative relationship between having older employees and reporting actual lipid

levels, which may be due to an unwillingness to report risk factors to one’s employer. Please see Table 10 for correlations.

Table 13: Relationships between proportion of employee population age 50+ with other health behaviors, from the PPG HRA

	% Aged 50+
% Smoker	-.350
% Women (50+) Annual Mammogram	.556**
% Women (20+) Biennial Pap Smear	.293*
% Men (50+) Annual PSA	.363**
% All (50+) Triennial Sigmoid/Colonoscopy	.541**
LDL cholesterol Data available	-.269*
LDL Cholesterol Known	.389**

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

3.4.1.1 Know Your Numbers Biometric Markers

PPG, through the employee health and wellness program, has long conducted a “Know Your Numbers” campaign encouraging employees to become educated on their blood pressure, lipid, and glucose levels. Because this is a critical factor in their program, an analysis was conducted to see if there was a relationship between the knowledge of one or more of these factors and other health behaviors. As Tables 14-16 below show, there are significant relationships between awareness of one biometric marker and other health behaviors. Of particular note, worksites that have employees who know their blood pressure are highly correlated with worksites where employees also know their lipid levels and have had recommended cancer screenings.

Table 14: Relationships between employees knowing their blood pressure with other health behaviors, from the PPG HRA

	% Know BP
% Mammogram	.392**
% PSA	.320**
% HDL cholesterol Data Know	.769**
% LDL Cholesterol Know	.624**
% with No Physical Activity Risk Factors	-.409**
% screened for Depression	.368**

** Correlation is significant at the .01 level (2-tailed)

Table 15: Relationships between employees knowing total and/or HDL cholesterol numbers with other health behaviors, from the PPG HRA

	% Know Total and/or HDL Cholesterol
% Know BP	.769**
% Women (50+) Annual Mammogram	.347**
% Men (50+) Annual PSA	.307*
% Know LDL Cholesterol	.787**

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

Table 16: Relationships between employees knowing LDL cholesterol numbers with other health behaviors, from the PPG HRA

	% LDL Cholesterol known
% Employees 50+	.389**
% Know BP	.624**
% Women (50+) Annual Mammogram	.394**
% Women (20+) Biennial Pap Smear	.303*
% Men (50+) Annual PSA	.354**
% All (50+) Triennial Sigmoid/Colonoscopy	.272*
% Know Total and/or HDL Cholesterol	.787**

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

Worksites that scored better on blood pressure measure from the Program Inventory were also significantly more likely to have employees who knew their blood pressure ($r = .271, p < .05$).

The relationship was positive, but not significantly so, for LDL cholesterol. Glucose screening status was not reported on the HRA data.

3.4.1.2 Cancer Screenings

Because of the importance of cancer screenings to the early detection and treatment of disease, an analysis was conducted to see if there was a relationship between being screened for one or more cancers and other health behaviors. As Tables 14-17 show, there are significant relationships between at least one cancer screening and other prevention behaviors. It is important to consider that three of the four recommended cancer screenings only apply to employees over the age of 50, and thus may not have been appropriate for very many employees at some worksites.

Table 17: Relationships between eligible employees having annual mammograms with other health behaviors, from the PPG HRA

	% Women Aged 50+ Annual Mammogram
% Employees 50+	.566**
% Know BP	.392**
% Women (20+) Biennial Pap Smear	.599**
% Men (50+) Annual PSA	.402**
% All (50+) Triennial Sigmoid/Colonoscopy	.355**

** Correlation is significant at the .01 level (2-tailed)

Table 18: Relationships between eligible employees having biennial Pap Smears with other health behaviors, from the PPG HRA

	% Women Aged 20+ Biennial Pap Smear
% Employees 50+	.293*
% Mammogram	.599**
% PSA	.266*

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

Table 19: Relationships between eligible employees having annual PSA screenings with other health behaviors, from the PPG HRA

	% Men 50+ Annual PSA
% Employees 50+	.363**
% Know BP	.320*
% Mammogram	.402**
% Pap Smear	.266*

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

Table 20: Relationships between eligible employees having triennial sigmoidoscopy/colonoscopy with other health behaviors, from the PPG HRA

	% All Aged 50+ Triennial Sigmoidoscopy/ Colonoscopy
% Employees 50+	.541**
% Smokers Ready to Quit	.359**
% Mammogram	.355**
LDL Cholesterol Available	-.339**
% Know LDL Cholesterol	.272**

** Correlation is significant at the .01 level (2-tailed)

3.4.1.3 Relationship between Program Offerings and Low-Risk Employees

A bivariate correlation was run to see if programs that offered more products and services to employees had employees that were healthier (had fewer than 2 risk factors). While this was true in the areas of blood pressure and drug/alcohol prevention, it did not appear to be true for the other categories assessed in the program inventory. In fact, while not significant, these were negatively correlated across many categories. Table 18 shows these correlations.

Table 21: Correlation of Program Inventory Scores with Percentage of Employees who are low risk (from HRA)

% Employees who are Low Risk	
	r
Blood Pressure	-.306*
Glucose	-.154
LDL Cholesterol	-.163
Obesity/Overweight	-.116
Tobacco	-.089
Physical Activity Policy	.002
Physical Activity Promotion	.137
Physical Activity Environment	.050
Nutrition Education	.186
Nutrition Environment	.102
Cancer	-.154
Muscle Bone Health	-.110
Work/Life Balance	-.138
Alcohol/Drugs	-.295*
Depression	-.185

*Significant at the .05 level

3.5 AGE-ADJUSTED RELATIONSHIP BETWEEN ORGANIZATIONAL FUNCTIONING AND HEALTH OUTCOMES

When addressing chronic disease conditions in a population setting like a worksite, age is a factor which may confound the outcomes of other investigations. The significant results we observed in the differences between high and low organizational functioning worksites could possibly be influenced by differences in the ages of employees at those worksites. This is of particular concern when the health behaviors and health outcomes addressed are age-dependent, such as in the case of cancer screenings or cardiovascular disease prevention. To investigate how age factors into the role of organizational functioning, two-way ANOVA tests were conducted to see if significant differences occurred within select dependent measures.

Based on the above analyses, the strength of Organizational Functioning was found to be a significant predictor of only two health behaviors once age was controlled for: net of age, greater organizational functioning was associated with the proportion of people who know their total and/or HDL cholesterol ($F=7.108$, $p=.01$), and the proportion reporting PSA screenings ($F=4.156$, $p=.04$). Age was found to be the significant predictor of a number of health outcomes, as listed below in Table 19; however, when the age of employees was controlled for, differences in organizational functioning ceased to be statistically significant, with the exception of PSA testing, which was significant for both age and organizational functioning.

Table 22: Significant mean proportions (at or below .05 level) in health outcomes, by age and organizational functioning

Health Outcome	Younger		Older		Significant Factor
	Low	High	Low	High	
% Low Risk	.705	.635	.599	.565	Age
% Smokers	.125	.171	.059	.039	Age
% HDL Cholesterol	.342	.487	.376	.515	Organizational Functioning
% LDL Cholesterol	.229	.263	.294	.454	Age
Mammogram	.375	.583	.819	.832	Age
PSA	.125	.370	.423	.584	Age, Organizational Functioning
Colonoscopy	.178	.159	.384	.364	Age

With similar thinking, the relationship between age and location of worksite bore further investigation. We saw earlier that worksites in the US scored significantly higher than worksites outside the US on a number of factors, particularly in the areas of cancer screening and cardiovascular health (see Table 8), but worksites in the US also tended to have a much higher proportion of older workers than worksites outside the US. For example, outside the US, 75% of worksites had fewer than 33% older employees (age 50+), while only 32% of US worksites were so young; in the US 16% of worksites had more than 50% of their employees over the age of 50, as compared to only 7% outside the US. Two-way ANOVA tests were conducted to see if significant differences occurred within select dependent measures, and the results are summarized below in Table 23.

Table 23: Significant mean proportions (at or below .05 level) in health outcomes, by age and location

Health Outcome	Younger		Older		Significant Factor
	Non-US	US	Non-US	US	
% Blood Pressure	.568	.790	.634	.739	Location
% Smokers	.170	.090	.109	.040	Age
% HDL Cholesterol	.332	.553	.326	.475	Location
% LDL Cholesterol	.148	.417	.180	.419	Location
Mammogram	.282	.815	.80	.831	Age, Location, Interaction effect
Colonoscopy	.053	.372	.044	.439	Location

Depending on the analysis, there are some differences worth noting. When controlling for organizational functioning, age is a significant predictor of the percentage of employees who are low risk; however, when controlling for location, age ceases to be significant. Age is consistently a factor in the percentage of smokers, and those who receive mammography and PSA screenings. However, age obviously does not adequately explain all variation, since location and organizational factors are significant in a number of other health outcomes. It seems reasonable to assume, therefore, that the relative age of the workforce in each worksite is something that affects health outcomes. Location and organizational functioning also play roles in health outcomes, but the age of the worksite population is a critical consideration.

3.6 MULTIVARIABLE RELATIONSHIPS BETWEEN ORGANIZATIONAL FUNCTIONING, AGE, AND LOCATION AND HEALTH OUTCOMES

To further understand the relationship between organizational functioning, age, and location, all of which have been shown above to have an effect on health outcomes, some simple multivariable linear regressions were conducted. Health outcomes were regressed on the three independent variables. If the overall model was found to be significant, the beta values for each independent variable were inspected. Table 24 below contains the significant unadjusted Beta values.

Table 24: Significant Beta values from multivariable analysis between Organizational Functioning, Age, and Location and Health Outcomes

	Location	Age	Organizational Functioning
% Low Risk	-.075	Not Significant	Not Significant
% Blood Pressure	.171	Not Significant	Not Significant
%Smokers	-.060	-.072	Not Significant
%Mammogram	.344	.184	Not Significant
%Pap Smear	.128	Not Significant	-.125
%PSA	Not Significant	.238	.201
%Colonoscopy	.356	Not Significant	Not Significant
%HDL Cholesterol	.176	Not Significant	.121
%LDL Cholesterol	.249	Not Significant	Not Significant

Being located in the US is associated with having more employees who know their blood pressure, report colonoscopy/sigmoidoscopy screening, and know their LDL cholesterol, while being located outside the US is associated with being low risk, after age and organizational function were controlled for. Being in the US and being older increased the chances of worksites

having employees who reported mammograms and reduced the chances that employees were smokers. Interestingly, having high organizational function lowered the chances that employees would have had Pap smears; the reasons for that are unknown. Having older employees and higher organizational functioning increased the likelihood that employees were having PSA screenings, and the likelihood that employees know their HDL cholesterol is higher in US locations with higher functioning wellness committees.

The above table shows that for each health behavior, there are different independent factors that influence the outcome. In most cases the location of the worksite (inside or outside the US) is a significant factor. However, the age of the workforce at each location and/or the organizational functioning of the wellness committee influence the outcome in different ways for each health behavior. While it is clear that location, age, and organizational functioning are all important components that affect health outcomes, more research is needed to understand these relationships.

4.0 CHAPTER 4—DISCUSSION OF THE PROGRAM INVENTORY AND MANAGEMENT SCORECARD

4.1 PROGRAM INVENTORY

As discussed in Chapter 3, the Program Inventory was designed to serve as a checklist for possible WHP offerings across PPG worksites. This accounting was necessary so that PPG corporate had a better idea of what programs were being offered where, when, how often, to what degree, and what resources were necessary to present them. Besides capturing that information, it was a goal of the survey to provide worksites with an opportunity to share best practices with the corporate (Medical Director's) office and with other worksites. A final goal of the survey was to provide worksites with a description of an "ideal" program based around specific health topics so that they would have something to strive for as they planned their future projects. These considerable expectations were addressed in various sections throughout the survey.

The first section of the survey contained the instructions. Presenting the directions for the survey in a clear, motivating way was a necessity because of the complicated nature of the survey, as well as the desire for the survey to be used by the wellness committees as a tool for self-improvement. Ahead of the instructions, the survey asked for basic contact information for the worksite as well as basic demographic information, including the size of the worksite and

the size of the wellness committee. The instructions described 3 major sections of the survey: A, B, and C. Section A presented the 81 possible programs in 14 health topic areas.⁴ For each possible program, there was a space for the wellness committees to note if they did or did not offer that program (Yes or No) and then a space to quantify how complete the program offering was, compared to an ideal program, with a range from 0-5, with 0 being “no elements in place” and 5 being “100% of elements in place AND program represents an Best Practice for the Company.” If a wellness committee answered a ‘5’ in any place, they were prompted to answer questions in another tab on the Excel spreadsheet to describe the worksite’s “Best Practice” program to share with the larger company. Finally in Section A, respondents were asked to indicate whether a program required on-site medical services. At this company, on-site medical services were available at a significant number of factories/sites. Some programs, such as vaccination programs or programs that required blood-draws, would be more difficult if a site did not have on-site medical services. However, due to the poor wording of this question, the data gathered from that question was not analyzable. In Section A, the 14 topic areas were included : 1) Health Risk Assessment (dropped from this analysis), 2) Blood Pressure Control, 3) Blood glucose control, 4) LDL Cholesterol control, 5) Overweight and Obesity, 6) Tobacco Use, 7) Physical Activity (three sub-areas), 8) Nutrition (two sub-areas), 9) Selected Cancer Screening, 10) Immunizations (dropped from this analysis), 11) Muscle and Bone health, 12) Stress/Work-Life Balance, 13) Alcohol and Drugs, and 14) Depression.

Section B provided worksites with a description of comparison goals for each of the 15 health categories. Comparison goals were given so the worksite wellness committees had

⁴ For analysis, the Nutrition topic area was divided into two topics, and Physical Activity in to 3. The topic area of immunizations and HRA use was dropped from analysis due to a lack of sufficient responses. This leaves a total of 15 topic areas.

a reasonable idea of goals by which they could evaluate their programs. For example, for the area of Blood Pressure Control, the comparison goal was described as “Goal: at least 75% of participants have their BP checked, are aware of the reading and its meaning. To accomplish goals, try to include programs/policies listed at far left.,” which referred them to the step-by-step program elements in Section A of providing education, blood pressure screening equipment, on-site screenings, and hypertension management programs.

The final section, C, was a qualitative section modeled after PPG’s Workmen’s Compensation questionnaire. It asked “Looking forward, what is the plan to continue to improve? (Include barriers such as expected costs, needed policy changes, management support.)” To keep the formatting consistent with the Workmen’s Compensation questionnaire, and to eliminate the need to revise the section for the next iteration of the survey, another space was left to answer “What was done since last survey?” Since this was the first survey, it was left blank by respondents, but is available to be utilized in the future.

4.1.1 Results from the Program Inventory

The Program Inventory contains a wealth of information that will be analyzed by PPG, including the entire section C, as well as the portion of Section A which asked wellness committees to quantify how complete the program was. For this project, only the presence or absence of programs was analyzed (i.e., Section A’s Yes/No answer as to whether or not the program was offered). Not enough sites answered the more detailed portion of Section A, where they were asked the question about how complete each program was, and removing that question in future versions of the survey might be worthwhile. Given the binary nature of many of the

questions (e.g., either a blood pressure cuff is available at a worksite or it isn't), an analysis at the Yes/No level was deemed sufficient. These binary questions were used to formulate a composite score for each health topic area as an equally-weighted percent of the possible score. This percent of the total possible allows for an easily understandable comparison between topic areas and worksites. To demonstrate, the average score of each topic area across the all worksites at PPG who responded to the survey is represented below (N=71 worksites):

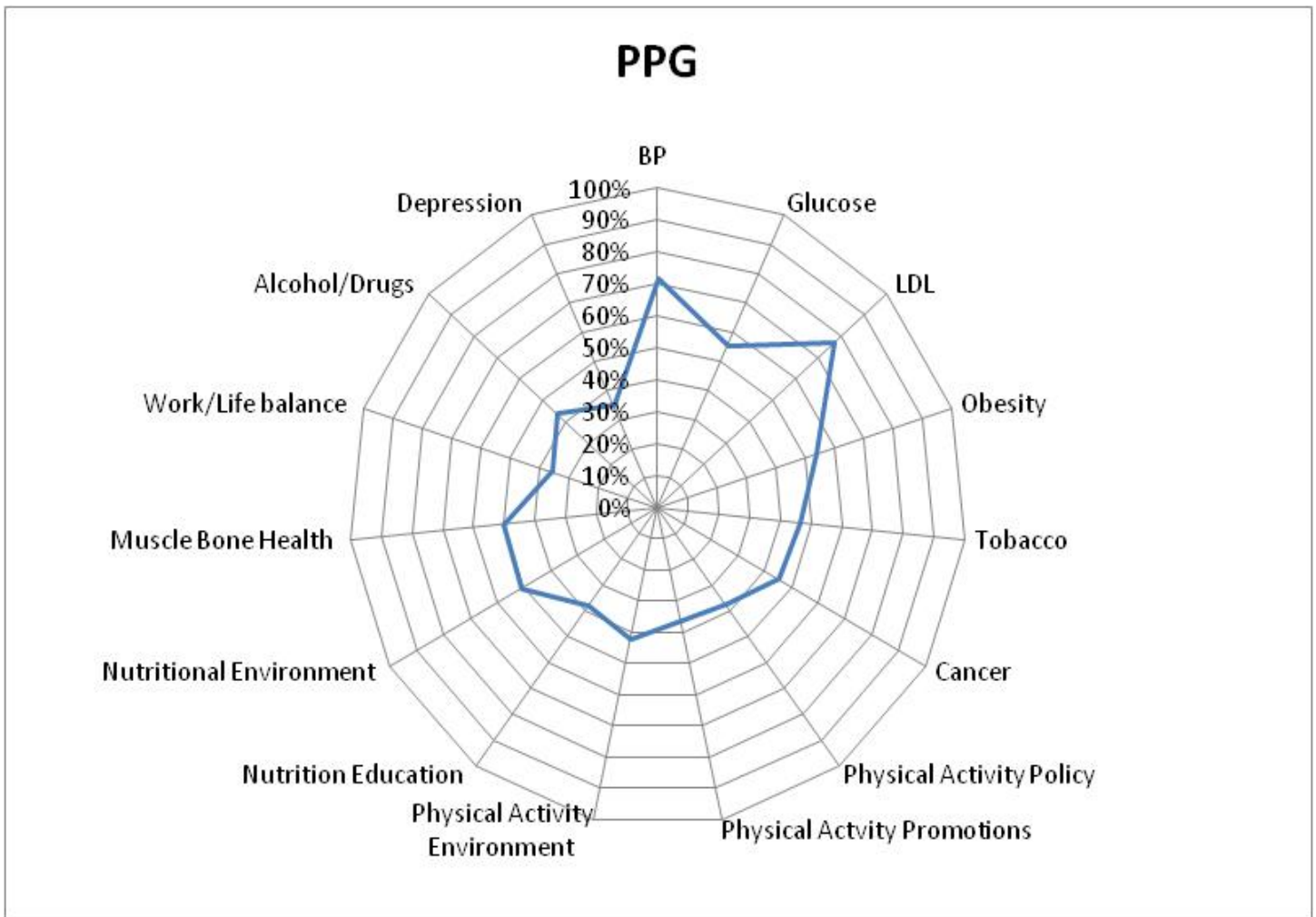


Figure 5: Program Inventory results for PPG

From the graph above, it is evident that PPG's "Know Your Numbers" campaign is having an effect across all the sites—the Blood Pressure, Glucose, and LDL cholesterol

categories show high amounts of activity within the worksites. Just over 70% of the possible blood pressure program offerings are available across worksites, about 55% for glucose, and nearly 80% for LDL cholesterol. As we move to other topic areas, however, the picture is not so rosy. Company-wide, there is a lot of work to be done, particularly in the areas of cancer screening, nutrition and physical activity, alcohol and drugs, work/life balance, and depression screening. The Program Inventory allows for individual worksites and the corporate office to get a sense of where wellness committees are placing their efforts.

Since location is known to be a factor in how worksites operate, locations in and outside the US were plotted as well.

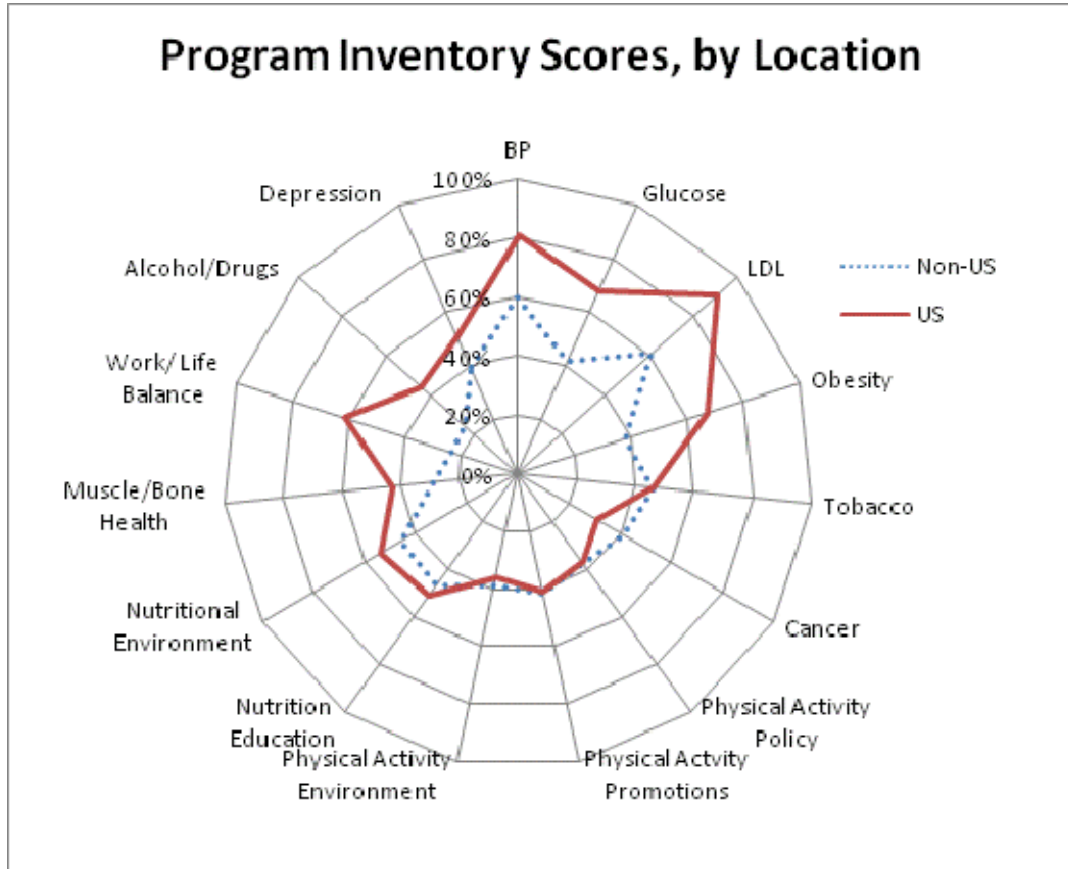


Figure 6: Program Inventory Scores, by Location

With the exception of Cancer screenings, the US worksites score considerably better on most Inventory categories. Graphing categorical data in this way makes it easy to understand how programs are being offered in different locations.

Another feature of the Program Inventory is the ability to compare worksites with each other or over time. Below is an example of one of the highest scoring worksite, “LMS”, compared to the PPG company-wide average seen above. “LMS” exceeds the PPG average in 14 of the 15 topic areas; however, there is room for improvement in many areas.

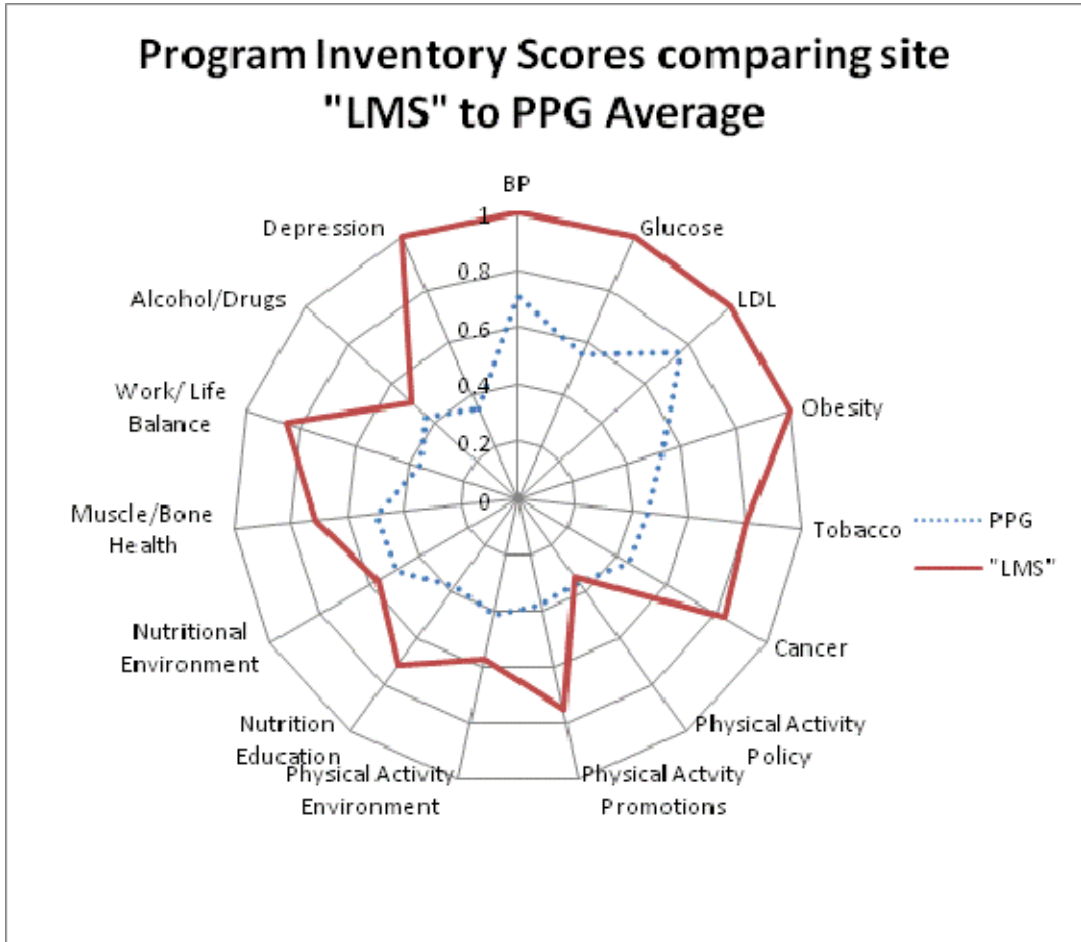


Figure 7: Comparing location “LMS” with PPG average scores for the Program Inventory

It is also possible to compare how worksites that perform at different levels across the Program Inventory offer specific programs. Worksites were divided into three categories based on their total Program Inventory score, and then plotted by category of offering. The results, below, show some interesting results.

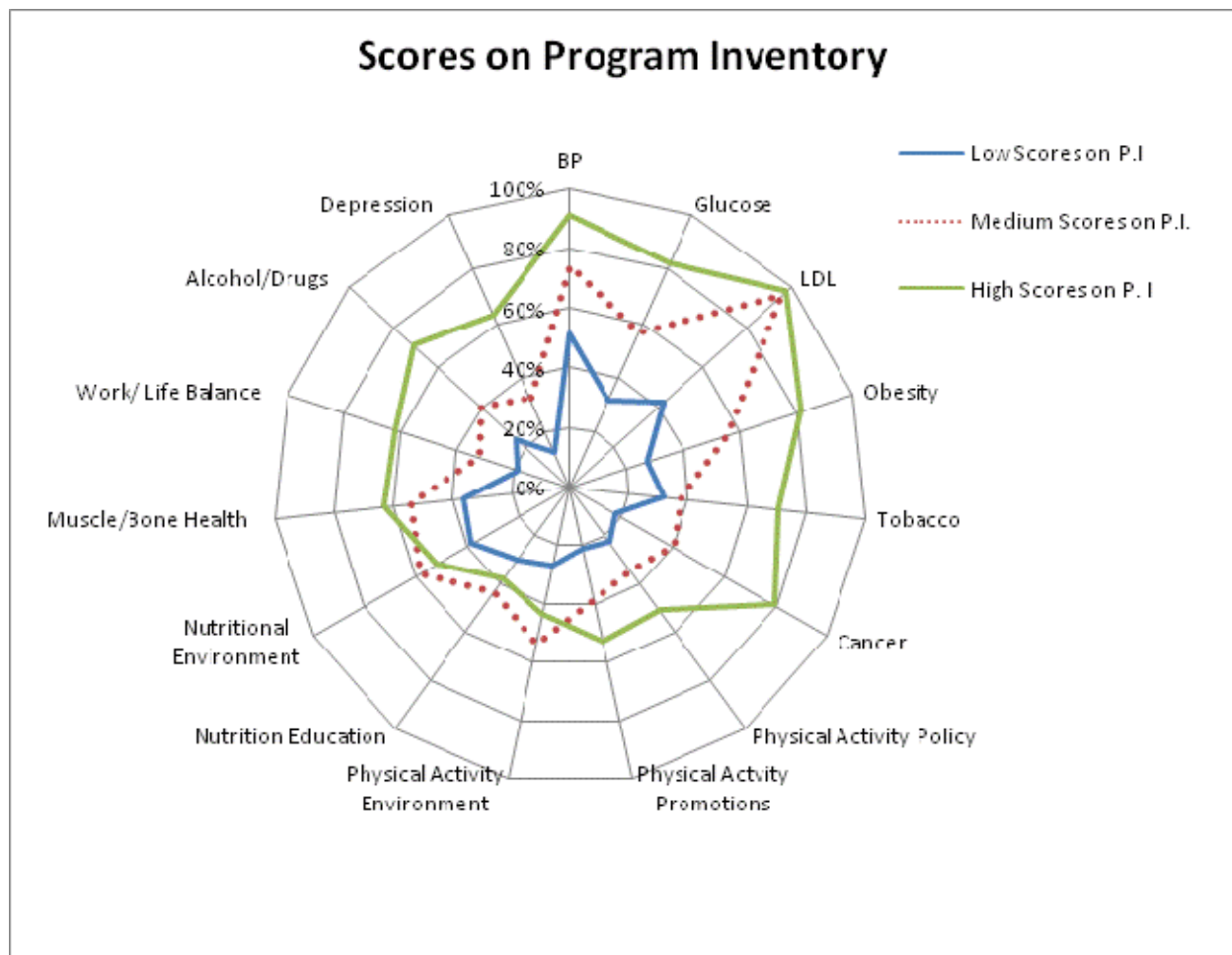


Figure 8: Scores on the Program Inventory by Low, Medium, and High functioning levels from the Management Scorecard.

The lowest-performing worksites uniformly score lower across all categories. Their efforts are concentrated in the “Know Your Numbers” areas and Nutrition, to the detriment of almost all else. The next group of worksites—those that score in the middle on the Program Inventory—are concentrating their efforts in largely the same areas, but are implementing more comprehensive programs, particularly in the area of blood pressure, lipids, and environmental changes. However, they are still largely ignoring other health categories. Only the top third of

worksites are reporting significant effort on a wider variety of health topics including obesity, tobacco, cancer, muscle/bone health, work/life balance and depression.

This information may provide decision-makers with some guidance on what could be expected from increased efforts in offering programs. As low-performing worksites improve their efforts the outcome may initially present as expanded programs within the “Know Your Numbers” and nutrition categories. Additionally, it may be unreasonable to expect relatively low-performing worksites to offer more than a few types of programming; this seems reasonable given the constraints of time and resources on worksite wellness teams. If PPG wishes to increase offerings across all worksites, specifically on a particular topic, it seems most likely to happen at the worksites that are already offering a significant amount of programming.

4.2 MANAGEMENT SCORECARD

The Management Scorecard represented a bit of a departure for PPG from their normal information-gathering metrics. The Evaluation Team considered it necessary to understand the processes by which the wellness activities at PPG happened, not simply the outcomes of those activities. Understanding the processes, not just the outcomes, of the wellness committee activities allows for the ability to support positive outcomes of the program and identify and improve deficits that may be hindering outcomes. It was deemed insufficient to know simply what worksites were (or were not) doing; rather, it was considered critical to understand how the wellness teams were operating, and thus implementing wellness programs. Some topics of interest were how committees were formed and functioned, how they decided what activities to engage in, whom they saw as their target audience(s), what health outcomes they wished to

effect, how (or if) they approached evaluation, and how they perceived their resources to accomplish their goals. The evaluation team hypothesized that if they could devise a measure to help the worksites track their progress toward implementation, it would also serve as a roadmap *to* implementation for the worksites.

Rather than reinvent the wheel, the Evaluation Team searched for an existing measure that would gather this kind of information. One instrument, the Health Enhancement Research Organization's Employee Health Management Best Practice Scorecard (HERO's Scorecard) (CITE) contained elements of process evaluation, but did not provide the level of detail in the process that could help identify and correct deficiencies. The Scorecard is intended by HERO to be an inventory, an indicator of program success, and a comparative tool to aide in vendor selection, none of which was necessary to PPG in the format. Furthermore, the scoring of the HERO Scorecard did not provide sufficient detail and weighting to specific process elements. However, the sections on the HERO scorecard that related to Corporate Culture and Leadership Commitment and Program Outcomes contained wording that was relevant and superior to that the Evaluation Team could create, and since HERO is available for the non-commercial use assessment and evaluation in the worksite, those sections were substantively recreated in the Management Scorecard, with credit given.

The driving influence behind the development of the Management Scorecard was to provide feedback to the wellness teams as they continued their maturation in workplace wellness, as well as feedback "upstream" to management at the corporate office. In many ways, this is a similar to the use of a HRA with feedback to the individual, only in this instance the "individual" was the wellness team and the "health" was the health of their behavior change processes by worksite. Because of the number of worksites involved and the lack of resources to provide

specific, reviewed feedback to the worksites, a way of automating the responses was sought. To be useful, the feedback needed to be strengths-based, specific, and prioritized. First, it was critical that the feedback be provided in a positive manner. The wellness teams were devoting considerable amounts of mostly-unpaid time to the WHP duties, and the feedback given needed to be seen as recognition and enhancement of their considerable efforts, not as criticism. Secondly, the feedback needed to be specific and directive. This was important because many of the wellness committees were staffed by those not versed in behavior-change theories and methods. By providing them with very specific questions, larger, more complex topics such as building capacity or identification of participants could be broken down in to executable steps. Finally, the feedback needed to be prioritized. The wellness committees and WHP activities in general do not have limitless financial or temporal resources—in fact, often just the opposite is true. To create the most utility, wellness committee members had to be given suggestions about the best ways to spend their precious hours and resources to effect the biggest change within their organizations.

With these needs in mind, the Management Scorecard was designed as a series of questions with “Yes” “No” or Don’t Know” answers. It was arranged according to the SPF as a linear model of behavior change (though it is recognized that such changes are a process and not entirely linear, one must start somewhere!), starting with Assessment, and then moving to Capacity, Planning and finally, Implementation. Each domain was then reduced to “steps” that were sequential within the domain, and questions were arranged within each step logically. Since each question was asked as a “yes or no” question, they were very specific and confined to one behavior per question. Next, the evaluation team assigned weights to each of the questions, providing the specific feedback. Because it was of particular concern to PPG that HRA data be a

guiding force in the selection of programs and participants, questions relating to the use of HRA data were given the highest point values. Questions of lesser importance were assigned lower point values. At the end of each step, a weighted score was calculated out of the points possible.

To facilitate the feedback to the worksites, the Microsoft Excel-based scorecard automatically generated a visual representation (a histogram) of their score on the Management Scorecard. Microsoft Excel was programmed to provide a graphical representation of the step results, with steps within a domain colored the same for ease of visual identification. This automatically-generated graph had the advantage of providing a worksite with real-time feedback on their WHP management processes, AND aided in the identification of areas of improvement. It also provided data “upstream” to managers and medical staff at PPG who could then identify areas for improvement to address by site. The ‘upstream’ data not only allowed the Medical Director’s office to identify areas of weakness across PPG sites and to intervene as appropriate, but also allowed the Medical Director’s office to provide technical assistance to worksites that are having specific challenges either directly or by identifying more mature worksites that could coach wellness teams towards improving their processes.

4.2.1 Results

In general, the WWCs’ processes should be improved across all the worksites that completed the Management Scorecard. Of the four domain-level scores, in only the first (Assessment) did worksites report taking even half the steps needed to ensure optimal service delivery in worksite health promotion. As evidenced by the chart below, as wellness committees

moved through the framework, scores decreased, falling to 38% of implementation steps being taken on average.

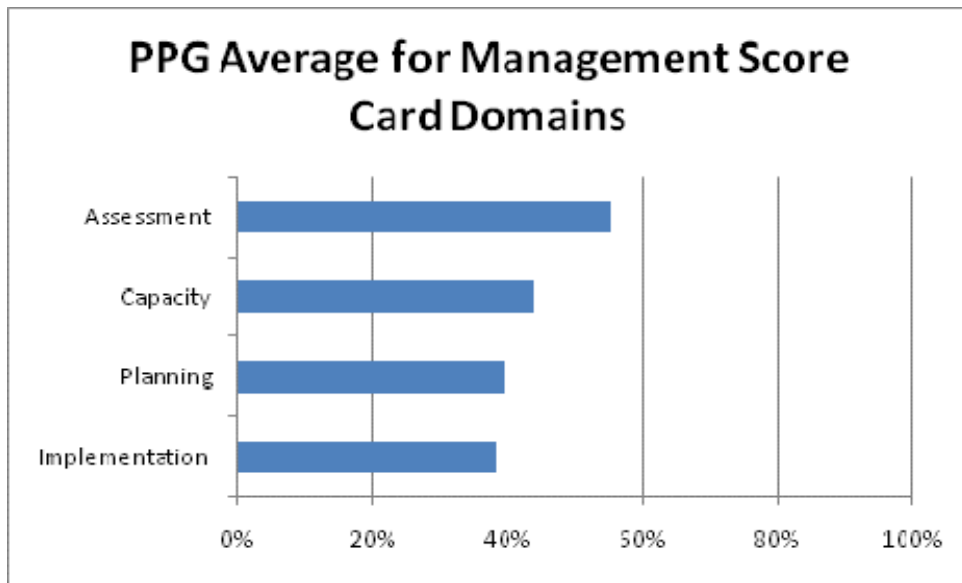


Figure 9: PPG Average scores for Management Scorecard Domains

A look at the more detailed step level shows a similar trend within each of the Scorecard domains. Within the first domain, Planning, the first step, Worksite Wellness Team, which related to the development and administrative functioning of the team, shows that 81% of the questions asked were answered positively. As the teams moved through the assessment process, scores fell. The same trend is seen in the Planning section, though the reverse is true in the Implementation section.

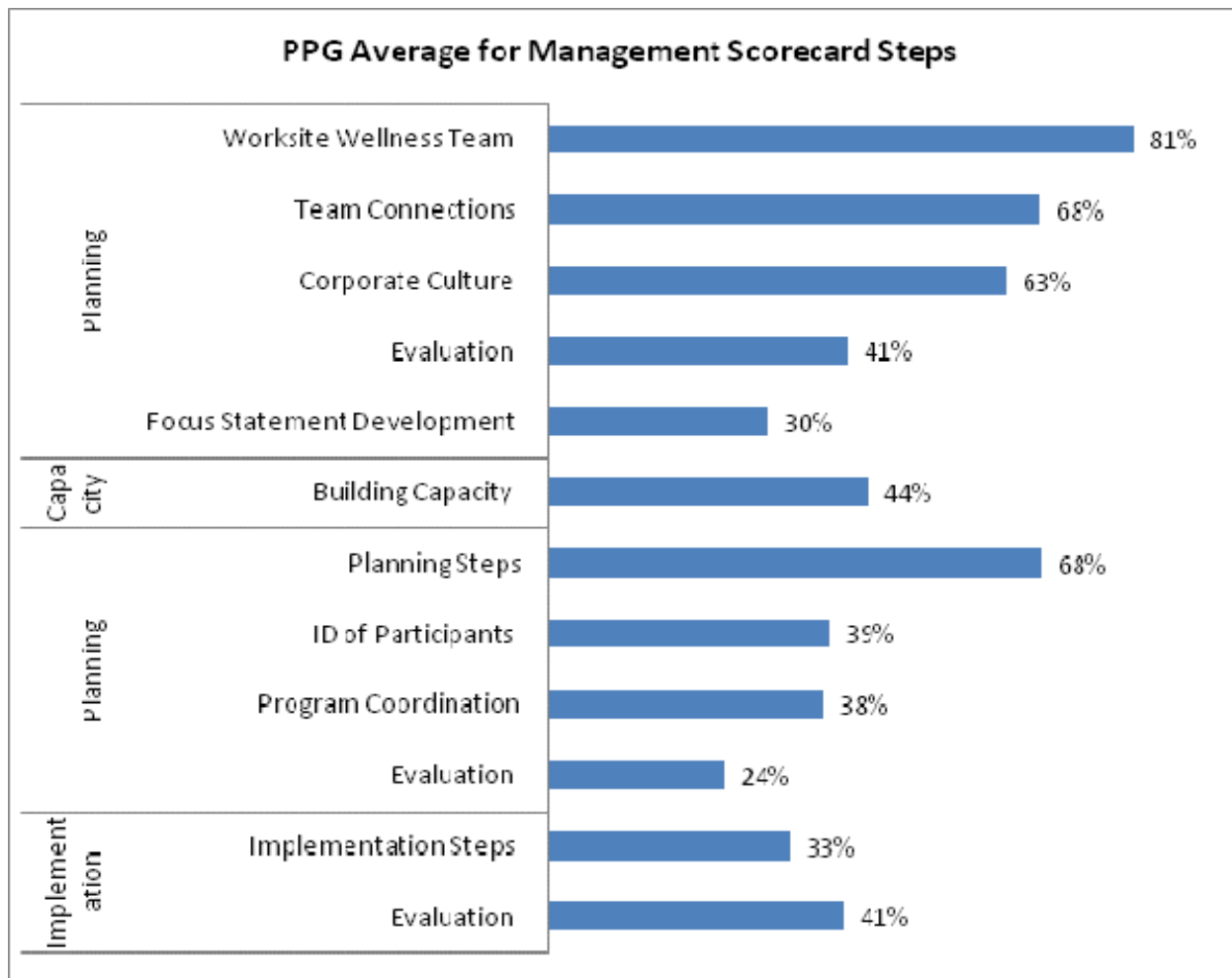


Figure 10: PPG Average for Management Scorecard Steps

Again, it is instructive to take a more detailed look at how different worksites perform on the metric. Looking at the domain-level, it is possible to make some observations about different worksites by location.

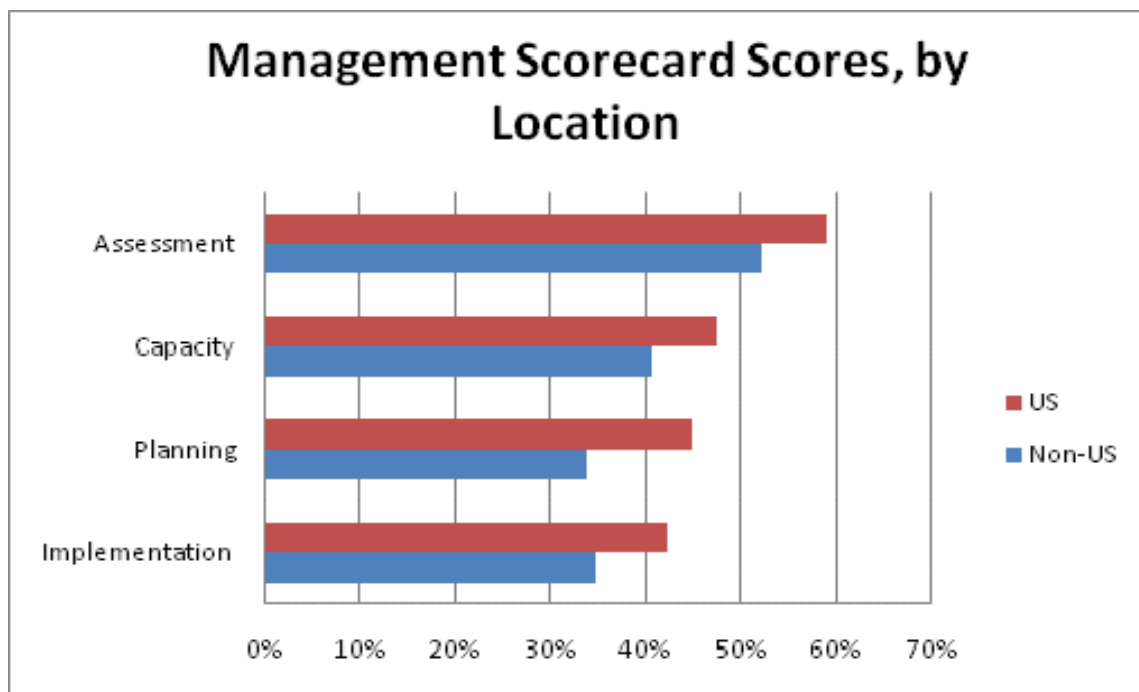


Figure 11: Management Scorecard Scores, by Location

On average, locations outside the US perform worse than domestic worksites in their processes. The trend noted above of declining scores across the four domains is evident; however, worksites outside the US show a slight improvement in the Implementation step, the difference is quite small and not significant. It seems that while there is considerable room for improvement across most worksites, particular attention should be paid outside the US to improve program processes.

As with the Program Inventory, the Management Scorecard data can be used to look at individual worksite performance with an eye towards improving processes. How worksites

behave varies on a number of factors, but as shown above, the patterns of performance across domains are relatively stable. Below are two examples of this pattern, first from a poorly-performing worksite and then from an exemplary worksite.

“UTW”⁵ is a location that scores in the bottom quartile of the Management Scorecard Scores.

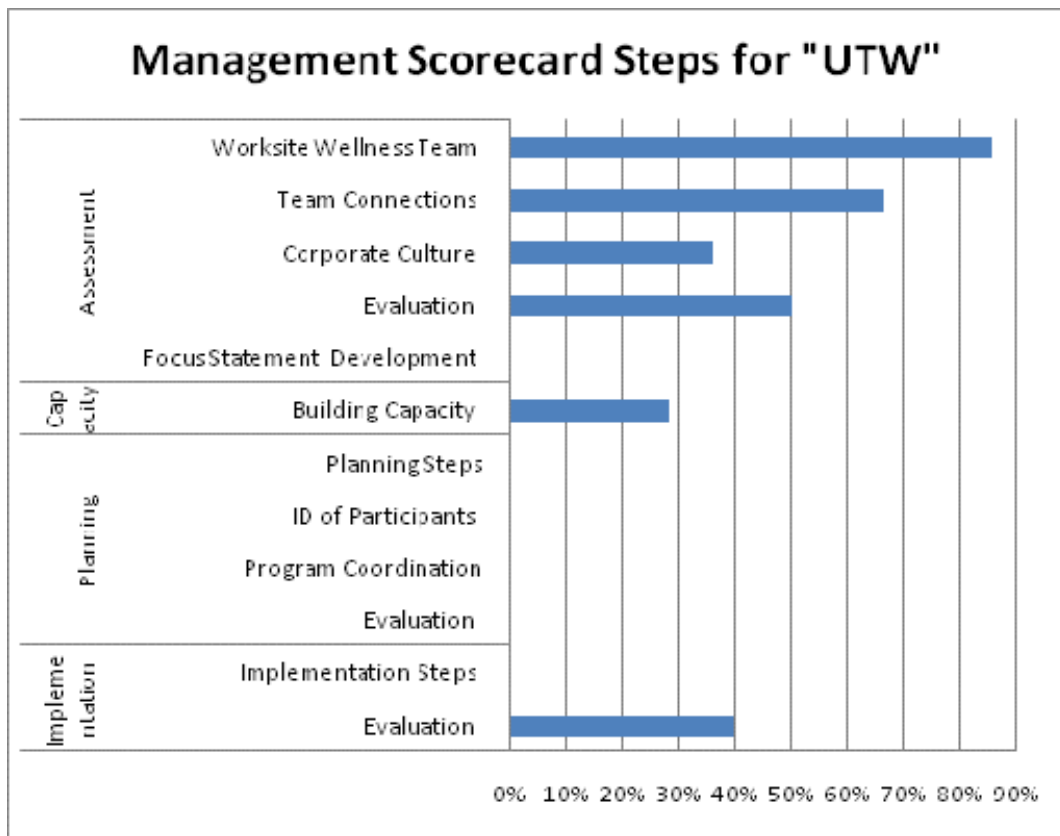


Figure 12: Management Scorecard Step Scores for “UTW”

Like most of the low-scoring worksites, “UTW” is doing an adequate-to-good job of assembling their worksite wellness team and making team connections. However, as they move to the corporate culture and evaluation portions of the Planning domain, the scores begin to fall

⁵ Individual worksite locations will be identified by PPG’s internal coding system, by Dr. Colombi’s request.

dramatically. By focusing on improving their scores in those domains, and beginning to develop focus statements and improving capacity, those scores will improve and provide them with better foundations for planning and implementing programs. By returning to the Management Scorecard, they can see that their wellness team does not know if management and employees are trained and educated on the value of WHP, and that their wellness teams are not collecting data (HRA or otherwise) to identify and prioritize employee health problems and health risk. These are important first steps for them to take on the road to improving their functioning.

For the most mature worksites, their efforts need not be concentrated in the first domains, but rather in the first steps within those domains that are showing sub-optimal performance. As we've seen above, more mature worksites don't show the disparity from the assessment domain to the implementation domain that less mature worksites do (though there is still some disparity). However, within those domains there is work to do from step-to-step. The worksite of "UWO" provides a good example.

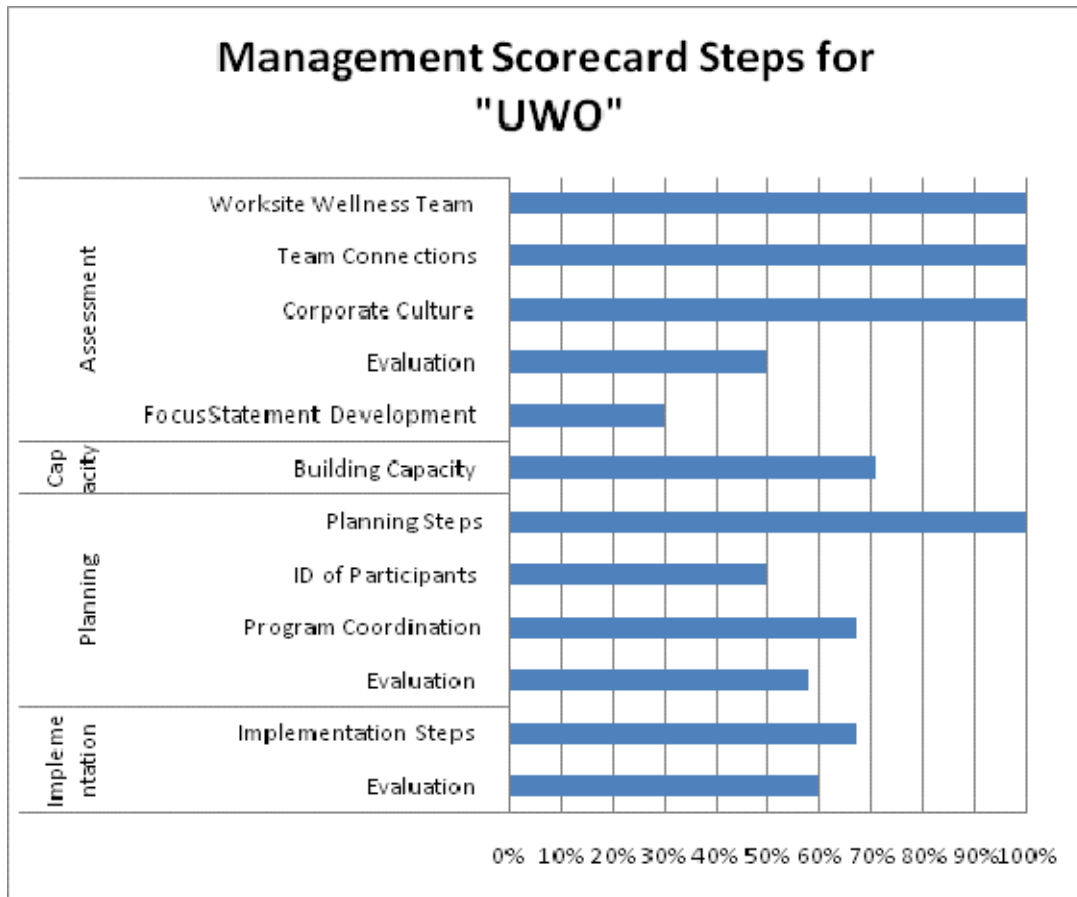


Figure 13: Management Scorecard Step Scores for “UWO”

“UWO” scores within the top third of all sites at PPG in the Management Scorecard. No one domain is particularly lacking; however, steps within each could improve significantly.

Within the Assessment domain, the wellness committee should focus on evaluation and focus statement development. Likewise, better identification of participants (in the Planning domain) is likely to improve their scores on program coordination and evaluation—by more accurately targeting their audience, they will see better results both in their processes and their outcomes. More mature worksites should be able to take the lessons they have learned across domains and to apply them in each step as appropriate with the guidance provided in the Management Scorecard.

4.3 EVIDENCE OF PROCESS INDICATORS LEADING TO OUTCOME INDICATORS

Besides the value to individual worksite wellness committees and to corporate medical management at PPG, the findings from these two instruments have a larger implication for WHP in general. The frameworks under which this evaluation was conceived possess a semi-linear format, which is to say that while it is recognized that ideally feedback and adjustment occur throughout the course of all WHP activities, there is to some degree a necessary and proper order for optimal program functioning. That relationship seems to be borne out in this evaluation. The worksites that showed the best processes, as demonstrated by the functioning of their wellness teams, also demonstrated some of the highest scores on the Program Inventory, an indicator of short- and medium-range outcomes. This is consistent with what was shown in Chapter 3: that better-functioning worksites also showed better health outcomes on the HRAs. With the Management Scorecard and the Program Inventory, the reverse also appears to be true: the poorest functioning worksites also showed the poorest outcomes on the Program Inventory. Please see Table 25 below for scores.

Table 25: Top 10 and Bottom 10 Scorers from the Management Scorecard (Process Measure) and their scores on the Program Inventory (Outcome Measure)

Top 10 Scorers on Management Scorecard	Total Score on Program Inventory
LMS	76%
UAL	69%
UO6	71%
EER	65%
EEV	65%
EED	65%
UC1	47%
UIZ	77%
UP3	63%

Bottom 10 Scorers on Management Scorecard	Total Score on Program Inventory
EFD	9%
EVV	15%
EUW	36%
UO5	15%
UP1	55%
UCT	28%
EIV	16%
UWV	81%
ERU	6%

*UWV returned only a partially completed Management Scorecard. Had they fully completed it, they likely would have had a much higher Management Scorecard score, more in keeping with their Program Inventory Score.

When graphed, the relationship is also observed. As scores increase on the X-axis, scores also rise on the Y-axis. While the direction is clear, there is considerable spread across the worksites.

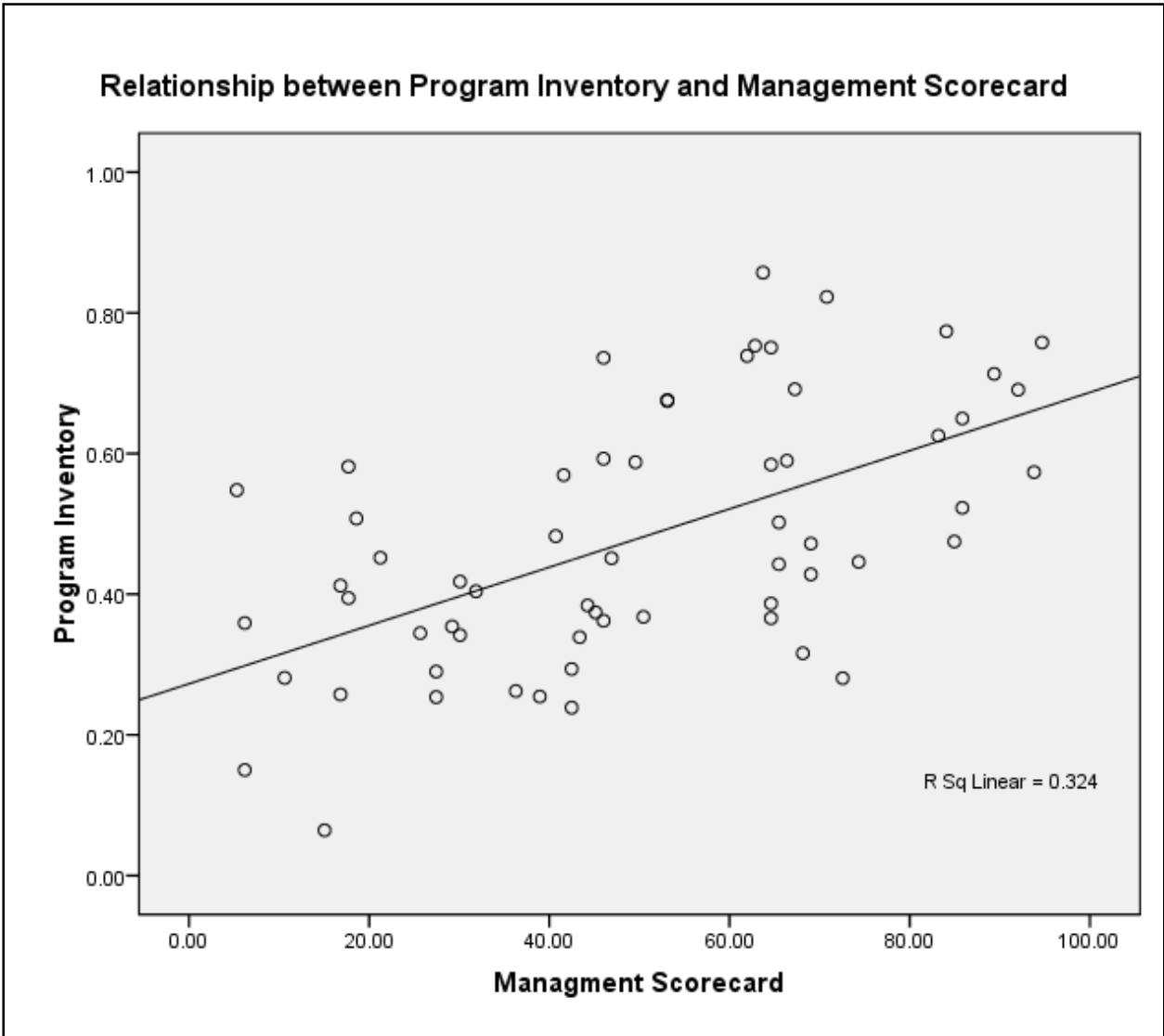


Figure 14: Relationship between Program Inventory and Management Scorecard

As discussed in Chapter 3, location of worksites is a possible factor in how wellness committees function. To see how location affects the relationship between the Management Scorecard and the Program Inventory, the worksites scores were plotted.

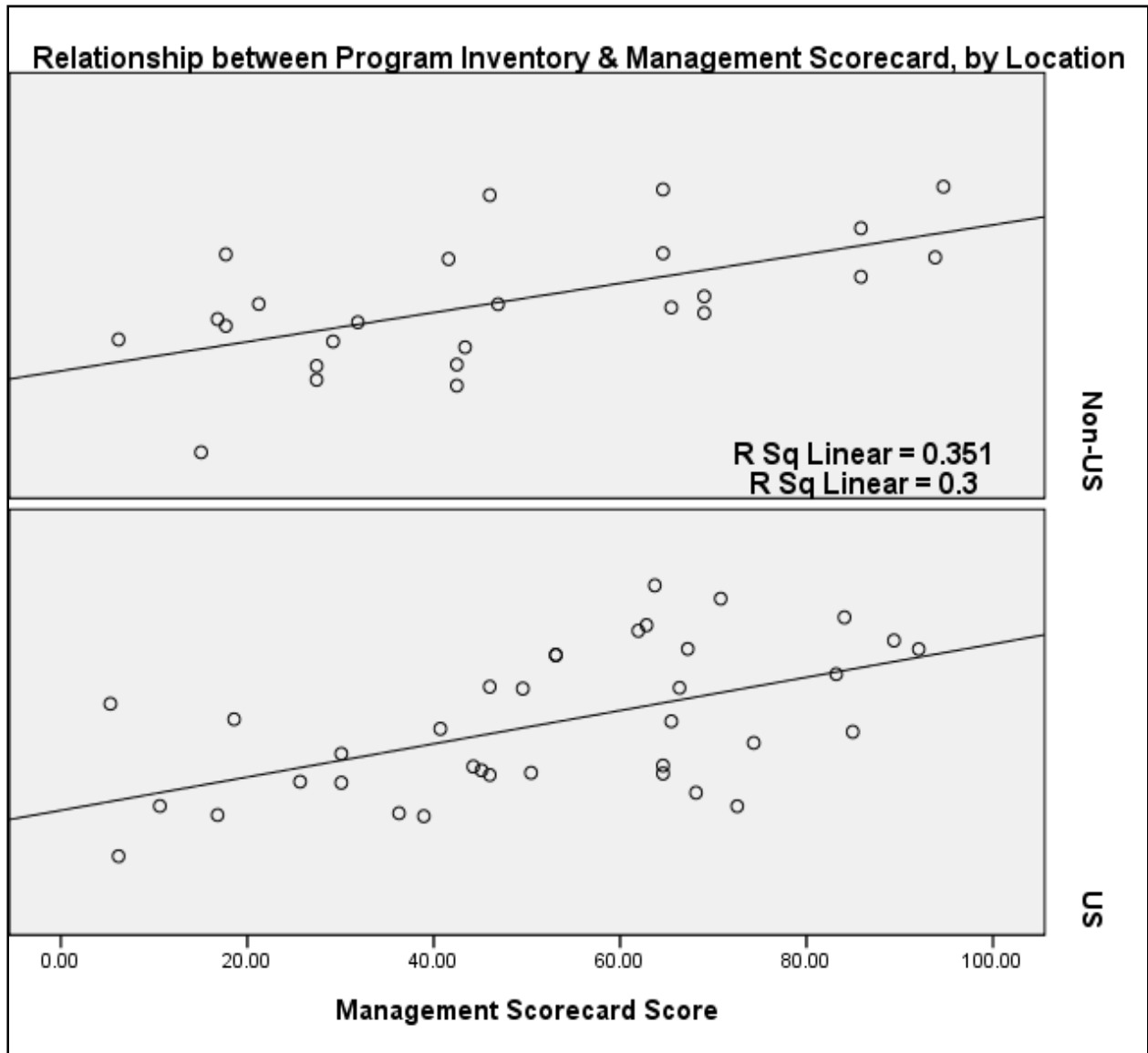


Figure 15: Relationship between Program Inventory and Management Scorecard, by Location

As we can see, the relationship between Management Scorecard Scores and Program Inventory Scores is strong for both locations of worksites, but particularly strong ($R Sq = .351$) for worksites outside the US.

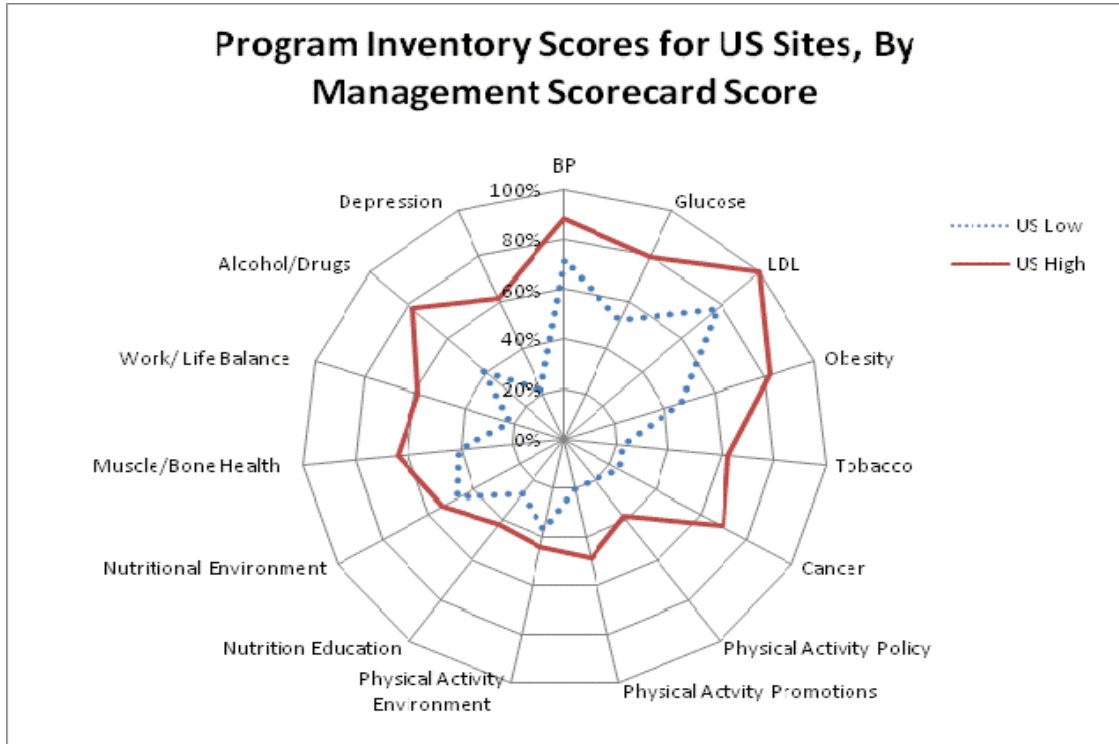


Figure 16: Program Inventory Scores by Low and High Functioning Scores on the Management Scorecard for US Sites

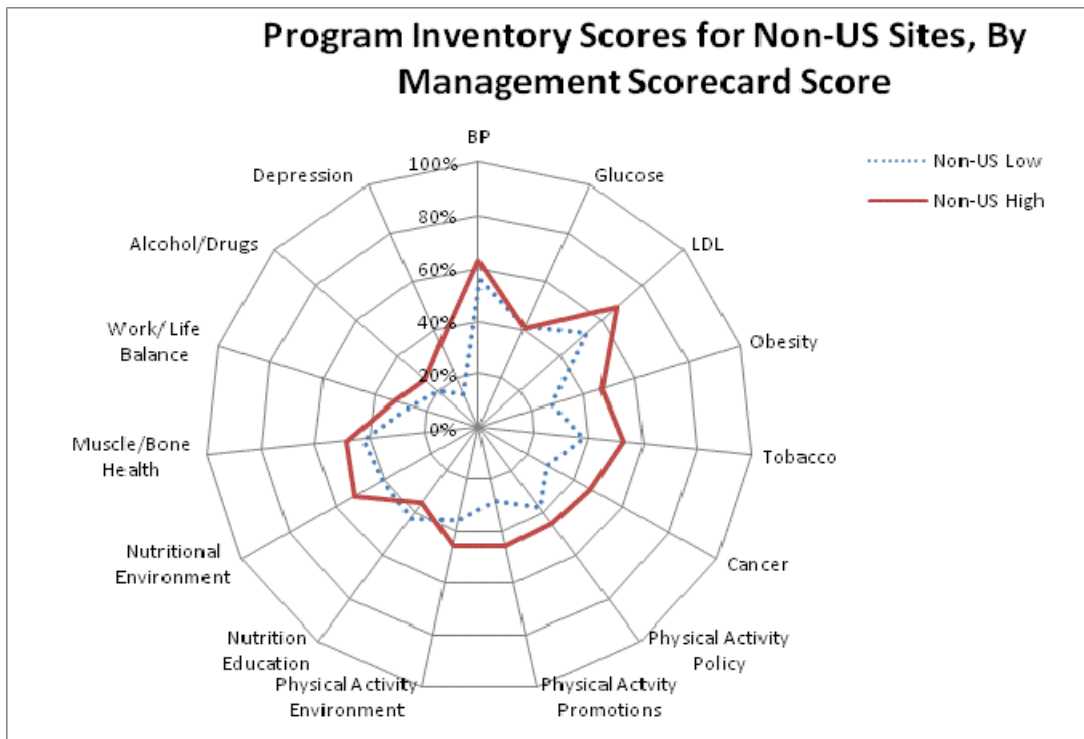


Figure 17: Program Inventory Scores by Low and High Functioning Scores on the Management Scorecard for Non-US sites

Another way to look at the relationship is to chart the Program Inventory (outcomes) scores based on the rankings of the Management Scorecard (process measure). In theory, as the process measure improves, there should be a corresponding improvement in the outcome measures. Dividing the worksites that completed the Management Scorecard into three equal groups and plotting their Program Inventory scores yield some evidence for this theory.

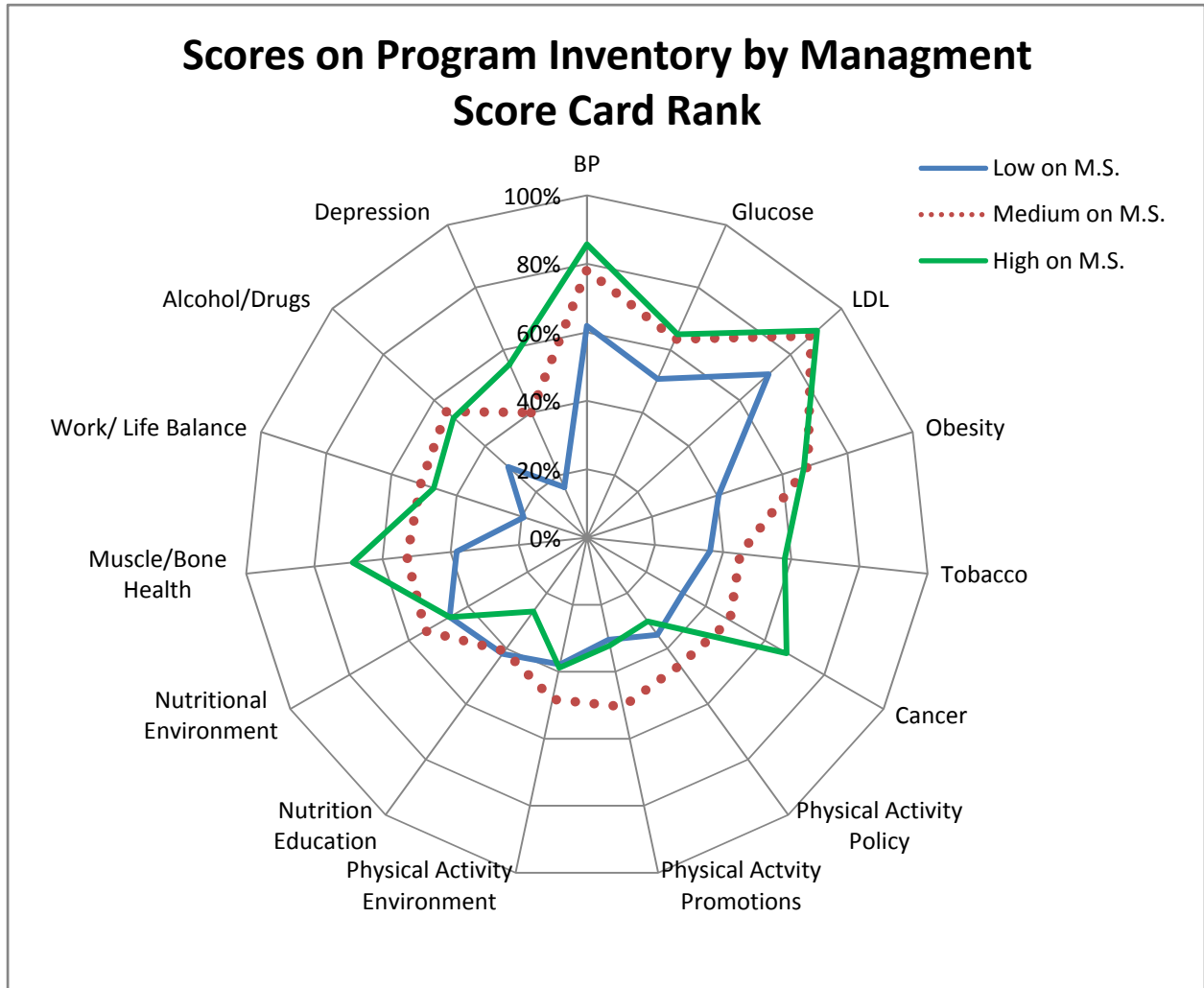


Figure 18: Scores on the Program Inventory by Management Scorecard Rank.

Excepting physical activity and nutrition programs, the worksites that scored the lowest on the Management Scorecard also are clearly sub-par on the remaining health activities.

Again, excepting nutrition and physical activity offerings, the mid-performing worksites are essentially similar to the best performing worksites on the “Know Your Numbers” health programs, obesity, tobacco, alcohol/drugs and work/life balance categories; the best worksites edge out the medium-performing worksites for tobacco, cancer, muscle/bone health and depression. In all but the nutrition and physical activity categories, the theory that greater organizational maturity leads to better program outcomes seems reasonable.

However, the theory does not seem to hold for nutrition and physical activity programming, where, across the board, the worksites of medium maturation have the advantage and the most mature worksites are sometimes offering the least number of activities. Part of this may be due to the low-levels of activity across the board in the areas of nutrition and physical activity—as discussed above, company-wide only about 30-40% of the items on the Program Inventory were being offered in those two categories. Possibly the inventory asks too many questions about nutrition and physical activity programs, and splitting them into the policy, programs, environment, and education categories did not accomplish the goal of weighting them equally with other health activity categories, especially since some of the split categories had more than twice the number of questions as some other categories. Because of the popularity of nutrition and physical activity programs, as well as the complicated nature of such programs, there was a wider variety of possible program offerings for wellness committees. Thus, nutrition and physical activity programs may not be as good of a reflection of WWC efforts as the other areas where there are fewer components of a comprehensive program. Or, it is possible that worksites tend to start their WHP programs with basic programs in nutrition and physical activity education and programs, and thus more mature worksites have reduced their emphasis on those issues to broaden their reach while less mature worksites continue to focus their efforts there.

This information serves to strengthen the value of both the Program Inventory and the Management Scorecard to PPG. Efficient and effective use of the wellness committees' time and efforts is of paramount concern within the WHP structure at PPG; it is a rare, if not unheard of, thing for wellness committees to have too much time and money to obtain their goals. Furthermore, the costs to the company, and to the employees, in terms of health care dollars, productivity, and quality of life are simply too high for anything other than maximum impact of WHP activities. Therefore, evidence of a relationship between the wellness committees' processes and the success of their outcomes is welcome.

5.0 DISCUSSION

5.1 OVERVIEW OF FINDINGS

The PPG evaluation took the unique perspective of evaluating individual worksites' wellness committees as a method of evaluating WHP efforts within the company. This represents a departure from the usual inquiries into WHP which have primarily focused on limited inventories of programming and services assessed at the corporate level or the financial impact of WHP. The current approach provided valuable information about the functioning of the individual WWC. Additionally, the project produced a method of evaluating these committees' processes and performance which may be an improvement over the most popular current assessments. The analysis of data begins to shed some light on the various factors that affect worksite health promotion (WHP) and worksite wellness committee (WWC) performance.

As noted in the overview of the literature, the notion that improved health and safety in the worksite has value to both the worker and the employer is millennia old, dating as far back as the first century BCE. Currently, nearly two-thirds of American adults are employed, and most spend a majority of their waking hours at work. The interest in the worksite as a setting for health promotion has increased substantially in the last half-century. However, many of those studies have either been prevalence surveys (e.g. the National Worksite Surveys), descriptions of a particular program (e.g. the Working Well studies or Treatwell) or analyses of the financial

impact of health promotion. Of late, the emphasis has been largely on the financial and productivity impact of WHP. All of these areas of inquiry are welcome and needed, however, they are not sufficient to achieve national goals of expanding and improving WHP.

This study took a different approach to WHP. When challenged by PPG to evaluate their WHP program, the evaluation team chose the worksite wellness committees as the unit of study. This may represent a unique—certainly a rare—perspective in published WHP evaluations. Nearly all published WHP studies to date use either the company or the individual employee as the unit of analysis. Studies of the former tend to be either survey of worksites, such as the 2004 National Worksite Health Promotion Survey, though they may be state- or topic- level surveys or studies of financial impact. Studies that focus on individual health knowledge, behavior, or outcomes also abound. However, very few studies assess the *method* by which WHP programs are delivered in the worksite. This represents a critical gap in the literature. In the first place, as noted in this evaluation, PPG sites have enormous variability in them in regards to the comprehensiveness of their offerings. While PPG would be considered by national standards to be one of the 7% of worksites that meet the definition of “comprehensive” WHP offerings (health education, supportive environments, linkages to related programs, integration, worksite screenings) at the corporate level, there are dozens of worksites within PPG that do not meet this standard (Linnan, et al, 2006). It seems likely that this is true at other large companies as well. In fact, it may be that the proper unit of analysis for all WHP programs is the worksite, and if so, the recent interest in WHP at small and medium-sized companies will be an important perspective to consider for research at even the largest corporations (Hersey, et al, 2008; Dunet et al, 2008). Regardless, certainly a more detailed look provides richer information about the state of WHP across PPG.

Furthermore, by focusing attention at the worksite level, through the lens of the WWC, this study was able to investigate how these committees function. There was wide variety in the maturity of the worksites in their organizational processes, but it was evident that the basic framework of organizational processes—assessment leads to planning, planning to implementation -- held here. Worksites that did not do an adequate job of assessing health problems and appropriate populations did not have strong planning and implementation processes; conversely, worksites that reported more mature assessment and planning behaviors had better implementation and evaluation (which was by design integrated throughout). While such relationships would seem obvious, we have not been able to identify prior studies that have actually documented the relationships between assessment, planning, implementation, and evaluation in the worksite setting.

The process by which organizational maturity is measured, the Management Scorecard, also represents a novel approach within the worksite, and a possible improvement to the existing measures. The approach is innovative in that it uses a self-administered assessment tool designed to provide feedback to the user and to interested parties in the organization not only on WHP activities, but on the functioning of the WWC. The Management Scorecard is designed to act in the way that the best HRAs do, that is, to provide instant feedback and assessment about the committee's processes, with recommendations for improvement. The use of a scorecard to provide feedback has been used in other instruments developed for the worksite (e.g. the HERO scorecard or the State of Texas' Worksite Wellness Index) however, the existing instruments have lacked a theory-driven approach to systematic process improvement.

Another important outcome from this research was confirmation that improved program processes do lead to improved program outcomes. Worksites that have better management

processes in place have more developed more comprehensive WHP programs. This finding highlights the importance of understanding and strengthening the processes by which WWC operate. Since so few worksites offer comprehensive WHP programs (even when “comprehensive” is most generously defined), improving the functioning of the WWCs may lead to the expansion of services to employees.

In this study, the ways that WWC functioning are related to employee outcomes perhaps raises more questions than are answered. First, at PPG, WWC functioning and its effect on employee health behaviors varied according to the location of the worksite and the relative age of worksite employees. This lends credence to localizing WHP activities and evaluations; clearly, differing employee populations have different needs and exist in unique environments. Yet, often WHP programs and policies are offered “out of the box” with little thought given to customization for specific populations. If the findings of this study are borne out in future research, it provides a glimpse of the complexity of making recommendations on program implementation—worksites that have younger employees and with lower organizational functioning may need more help getting their employees to have regular PSA screenings, but worksites with better organizational functioning may need more help with getting female employees to receive Pap smears. In general, however, it may be useful for large, multi-national corporations such as PPG to consider, at each worksite, whether the site is in or outside the US, whether it has older or younger workers, and how well the wellness committees function. These three variables should be useful in planning for successful programming.

Secondly, in answering the project’s research question “Do worksites that demonstrate higher levels of functioning WHP programs have healthier employees?” the answer seems to be “No.” As noted in Chapter 3, worksites that score better on the Management Scorecard were less

likely to have employees with fewer than two risk factors, and were also likely to have lower reported prevalence of some health-promoting behaviors. The reasons for this are not clear. One possibility is that the HRA data on which the conclusions about health are drawn from is not complete or accurate. However, given the general positive-skew that most HRA data has, it seems unlikely that more complete data would change the data to a healthier employee population. A more likely explanation is that the WHP were implemented in reaction to an unhealthy population. If that is true, WHP may not be the best response to quickly remediate health concerns and reduce costs. It is the nature of chronic diseases to be years or decades in the making, and changing complex health behaviors such as nutritious eating or appropriate physical activity is an uphill battle. It is important for all concerned, public health researchers and officials, corporate management, WWC, and employees to understand the limitations of what WHP can accomplish, especially in a sicker, older population. That is not to say that WHP is any less needed in such populations, but the true benefit of WHP may be, as Eddington (2001) suggests, on keeping the healthy employees healthy rather than curing the sick.

Finally, this study serves as a call to reexamine how WHP programs are evaluated generally. This project, which focused on WWC, discovered some truths that are applicable to the larger field of WHP. First, surveys of multi-site companies should have a way to reflect the individual differences of the locations; otherwise, the information they give may be grossly inaccurate and out of context. Secondly, the person filling out the survey should be a person intimately involved with the program; at a multi-site company, this may be nearly impossible. Thirdly, a careful look at program processes should be included. Without question, this is true at the WWC-level, but it may be valuable to look at the processes that relate to wellness through the corporation, including benefits and financial processes. It is encouraging to see more

comprehensive evaluation methodologies emerging such as those of SWAT (Swift Worksite Assessment and Translation), which combine surveys, site visits, capacity building, translation

5.2 LESSONS LEARNED

It may be valuable to state some of the lessons learned in this project. First, having an Evaluation Team consisting of staff and faculty from the University of Pittsburgh and staff from PPG was the best of both worlds. Finding the worker's compensation framework that was already institutionalized at PPG was extremely helpful, and would not have happened without the input of PPG staff. Having a liaison with the PPG Medical Director, to interface with all the worksites smoothed the process considerably and probably drastically increased the response rate. His office sent the introductory email with the instruments to each worksite, with the request that they be returned the Evaluation Team. He was also available to troubleshoot missing or conflicting responses. Identifying a similar gatekeeper would be a necessity for replicating this process.

Second, there are several changes to the instrument that should be considered before it is redeployed in the future. In an effort to gain a richer understanding of how managers? complete items in the Program Inventory, we asked respondents to quantify the completeness of their programs on a 1-5 scale. The Evaluation Team spent a considerable amount of time on the development of that scale, partly because PPG was interested in identifying best practices at the various worksites to share at their annual Wellness Conference. When it came to data analysis, however, it was decided to analyze only the Yes/No responses because that provided the best idea of what was happening at the worksites. It would be worth considering dropping the more

extensive question format from future versions of the questionnaire, at least until the worksites are offering more programs. Removing that section would also reduce the amount of time it takes for the WWC to complete the Inventory (a common complaint on the “Comments” section), and might encourage better response rates.

On the Management Scorecard, finding a way to lock the formula cells so that the respondents cannot over-ride the cell weighting would reduce the amount of time data cleaning takes. Also, it would be helpful if there was a way to generate advice back to the WWC beyond the feedback Scorecards.

5.3 LIMITATIONS

This study has a number of limitations. First, it was conducted only within one company, and therefore the results are not generalizable beyond PPG. Additionally, the completion rate was acceptable, but not ideal. Furthermore, it represents a single, cross-sectional look at a population. While the intention of the project was to begin a yearly assessment of WWC activities, no more than the first year’s data was available for analysis. Additional years’ data would help to strengthen conclusions drawn in this research.

The role that location may play in these findings is not entirely understood. Certainly, many of the sites that scored poorly on the Management Scorecard (as well as the Program Inventory) were outside North America. In the comment section of the instrument, the Wellness Spokesperson from site EFN commented, “Have a different survey based on the local status of development of Wellness programs. ... Also adapt questionnaire depending on whether employees’ health care costs are taken care of by the Company or by the State.” The issue of

what resources/activities are considered appropriate in the workplace in different locations clearly needs to be investigated further.

Adding a qualitative component would provide context for the quantitative findings. In particular, it would be useful to explore with the wellness committees how they used the tool and to explore the reasons why worksites with better WWC were actually healthier. Furthermore, such a study would help to understand what the ideal function, and functioning, of WWC would be. Without that input, it makes it impossible to contextualize the findings.

5.4 PUBLIC HEALTH SIGNIFICANCE

This research contributes to the public health literature in several ways. First, it heeds the call of Healthy People 2010 to focus on the worksite as a setting to improve the population's health. Regardless of how health care is delivered in the future, the worksite is going to remain a critical setting for the delivery of population-level health programs and services. And if the delivery of health insurance remains primarily in the hands of employers, the urgency to reduce those costs while simultaneously maintaining or improving employee health is likely to increase. Secondly, it highlights the benefits of a more comprehensive approach to WHP program evaluation by focusing on WWC. The literature is strangely silent on the processes and functions of WWC, who play such a key role in the development and delivery of WHP programs, and it is hoped that this study will provide insight into how those committees function. Thirdly, the development of the Program Inventory and the Management Scorecard may provide an improvement over tools that have been available to researchers and WHP managers before. The Program Inventory is certainly a more comprehensive inventory than those widely available in

the literature, and provides the benchmarks missing in many similar tools. The Management Scorecard is innovative in its theory-driven approach to provide instant, motivational feedback to wellness committees as well as other interested parties to remedial efforts can be made to improve processes at both the individual and company (or division, location, or other relevant sub-group) level. By focusing on the processes inherent to delivering WHP programs, committees and corporations can ensure better service delivery and better value for resources used. Finally, this dissertation serves as a call for more research and publication on how WWC work and how WHP is delivered. The gaps in the literature and the questions raised about the findings from this study ensure that researchers with an interest in WHP will be busy for some time to come.

5.5 FUTURE DIRECTIONS

As noted above, there are a number of directions in which future research could serve to strengthen knowledge about WHP. A partial list of questions and research topics this research raises includes:

- What are the relative costs and advantages of using the local, individual worksite as a unit of analysis for evaluating WHP in multi-site companies? Is it the most appropriate level of investigation or are multiple levels of investigation needed to present a clear picture?
- What is the appropriate level of balancing understanding and efficiency in evaluating WHP? What data is really necessary to improve outcomes?

- What is the best way to synthesize Management Scorecard, Program Inventory, HRA, cost data to get a true reflection of value of WHP and the state of the health of individual worksites?
- What are the best ways to evaluate WWC in a company that has many locations across the world?
- How were the tools implemented within each worksite? How much time was spent on them? How do WWC perceive their value?
- Do worksites' see their processes improve over several years of using these tools?
- Which process improvements help WWC improve their functioning the fastest and/or the most?
- Do both program outcomes and health outcomes improve over time?
- How can the seemingly counter-intuitive observation that the better run worksites have the worse health be explained? Are sicker worksites motivated to adopt better WHP practices because they are sicker (and more expensive)? How can public health researchers and practitioners help move resources to preventing illness, rather than trying to mitigate or cure it?

5.6 CONCLUSION

WHP will remain a critical area of research and program delivery in the foreseeable future. As the nation ages and obesity and other risk factors for chronic disease increase, the urgency to provide efficient, evidence-based health services and programs will only grow .

Employers and employees both stand to benefit from improvements in health both at and away from work. Careful evaluation of such programs will improve value to the employers and health to the employee. Because of this, WHP is an area of increasing interest to researchers and program evaluators alike. This dissertation provides evidence for the need to adopt a broader perspective in evaluating WHP programs. Focusing on company-wide metrics or individual health outcomes provides neither a complete picture of workers' health nor methods to improve processes for delivering assessing, planning, delivering, and evaluating needed services. Innovative research models and methods are needed to improve the research about WHP as well as the delivery of such programs. This dissertation represents an endeavor to move the field of WHP closer to HP 2010 objectives, and workers towards better health.

APPENDIX A

PROGRAM INVENTORY

1. PPG Health Promotion System/ PROGRAMS INVENTORY						
Plant/Site Name:						
Wellness Site Ambassador or Spokesperson:						
Location:			Country:			
Date:						
INSTRUCTIONS: The following questions are designed to help you identify workplace health promotion activities that you may be doing at your site. This can be filled out every few years, or as additional programs are added to keep track of the activities that have been tried. You can fill in the survey using this Excel spreadsheet : in this case you will e-mail your final product as an attachment to colombi@ppg.com; You can fill the survey directly online by connecting to the following links:						
PART1: http://sps.web.ppg.com/sites/ehs/wellness/Lists/PROGRAMS_INVENTORYWELLNESS_TEAMS_SURVEY/overview.aspx						
PART2: http://sps.web.ppg.com/sites/ehs/wellness/Lists/PROGRAMS_INVENTORYWELLNESS_TEAMS_SURVEY_PART_2/overview.aspx						
A) YES/NO For each category, please mark YES or NO if listed elements are in place SCORE Please Score overall presence of elements (from 0) in each category from lowest (0) to highest (5) as follows: 0 = elements not included 1= some elements included (25% of program/activities) 2= elements partially included (50% of program/activities) 3= most elements included (75% of program/activities) 4= all elements fully included with results evident (100% of program/activities) 5 = Your Site's Best Practice (NOTE: For all 5s, enter supporting information on the "Best Practice-Nomination" tab below) NA = Not Applicable						
On site Medical Needed: Please indicate whether the intervention/program requires On-site Medical to perform						
B) Comparison GOALS: Descriptions are based on ultimate achievement at sites to work toward with regard to Health Promotion, based on recommendations from Center for Disease Control, Healthy People 2010, and other reputable sources.						
C) Planning Column: State what has been done and what is planned to make progress						
CATEGORY	A			B	C	
	Y E S / N O	S C O R E	O n - s i t e M e d i c a l N e e d e d	Comparison on GOALS	What was done since last survey ?	Looking forward, what is the plan to continue to improve? (Include barriers such as expected costs, needed policy changes, management support)
PART 1						
1.- HRA Update and expansion of Know your Numbers Campaign	Y N	S M	M			
Desktop access to those without personal computers				Goal: Expand the "Know your Numbers" campaign to at least 2/3 of active employees, 50% of spouses, 30% retirees. To accomplish goals, try to include programs/policies listed at far left.		
Promotion programs in place to encourage continual use of HRA						
Provide counseling & follow up						
2.- Blood pressure control	Y N	S M	M			
Awareness/education campaign in place				Goal: at least 75% of participants have their BP checked, are aware of the reading and its meaning. To accomplish goals, try to include programs/policies listed at far left.		
BP equipment available						
Screenings offered at various events (e.g. Health Fairs)						
Hypertension management program in place						
3.- Blood glucose control	Y N	S M	M			
Awareness-education campaign in place				Goal: 75% of participants have blood glucose checked, are aware of their reading and its meaning. At least 80% of diabetics have annual retinal and foot exam and follow diabetes clinical testing guidelines. To accomplish goals, try to include programs/policies listed at far left.		
Glucose screenings offered (health fairs, physicals)						
Diabetes management program in place						
4.- LDL Cholesterol control	Y N	S M	M			
Awareness-education campaign in place				Goal: 75% of participants have cholesterol checked and are aware of reading value and its meaning. 75% of participants under the care of a primary care provider who initiate diet, exercise, and if needed, drug therapy. To accomplish goals, try to include programs/policies listed at far left.		
Screenings offered at various events (e.g. Health Fairs)						
5.- Overweight and Obesity	Y N	S M	M			

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Fresh fruit "snack basket" or "snack wagon."					<p>Goal: HRA summary information on nutrition risk level used as starting point. Intermediate goals are: reduce dietary fat intake to <30% average of calories and average saturated fat intake to less than 10% of calories. At least 50% of employees meet national Dietary guidelines. At least 50% of population consume complex carbohydrates and fiber-containing foods and average of 5 daily servings for vegetables, legumes and fruits. To accomplish goals, try to include programs/policies listed at far left.</p>
Sponsor employee healthy food cookbook (use proceeds for wellness programs)					
Educational Sessions at lunch on a variety of nutrition topics					
Onsite Healthy eating classes or counseling					
A cafeteria with healthy choices					
A healthy snack bar open all business hours					
Local produce purchase programs					
A place for employees to refrigerate and heat food					
Registered dietitians at work site (healthy eating/meal planning, weight control)					
9. Selected Cancer Screening	Y	N	S	M	
HRA data re: screening participation levels are analyzed					
Awareness-education campaign in place					
Local cancer community awareness resources					
Programs to promote pap test					
Programs to promote Mammography screening					
Programs to promote Colonoscopy screening					
10. - Vaccinations	Y	N	S	M	<p>Goals: 50% of employees and 20% of spouses/retirees receive flu shot. To accomplish goals, try to include programs/policies listed at far left.</p>
Vaccine clinics					
Flu shots campaign					
Pneumonia vaccination for retirees (awareness)					
Well baby vaccinations for dependents (awareness)					
Hepatitis shots for at-risk employees (business frequent travelers, food handlers, emergency responders, etc)					
11. - Muscle and Bone health	Y	N	S	M	<p>Goal: Less than 5% of employees with a limitation in major activity due to muscle-skeletal chronic conditions. Less than 2% of employees with activity limitation due to chronic back conditions. To accomplish goals, try to include programs/policies listed at far left.</p>
Promote community walks- fitness events					
5-10 min stretch breaks integrated into the work day					
Educational sessions on fitness to promote bone & soft tissue health					
Awareness campaigns on dangers of inactivity and bone density loss					
Peer support groups and mentoring opportunities on physical activity					
Ergonomic evaluation of workstations					
Disability prevention, early and safe return to work					
12. - Stress/Work-Life Balance	Y	N	S	M	<p>Goal: No more than 35% of population report adverse health effects from stress within past year. No more than 20% of population who seek support by Employee Assistance Program (EAP) in coping with personal/emotional stressful situations (including financial planning, childcare, parenting, elder care, alcohol misuse). To accomplish goals, try to include programs/policies listed at far left.</p>
Policies, work schedules, organizational stressors, are evaluated					
Referral to counseling is facilitated and confidential					
Education on work-life balance, caregiver stress					
Offer "well days" off for employees					
Workshops on stress mgmt at home and work					

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Mental health issues are destigmatized						
Provide lactation rooms/space for nursing mothers						
13. Alcohol and Drugs	Y	N	S	M		
Use EAP to provide education to all employees/families showing how to link needs with solutions						
Use EAP to educate nurses, supervisors, mgrs on org stressors, communication, importance of screening, connecting employees with resources					Goal: Screening, Brief Intervention and Referral to Treatment (SBIRT) in at least 80% of EAP encounters dealing with alcohol misuse. Review with employees/family the resources available to deal with identified problems and organize referrals as needed. To accomplish goals, try to include programs/policies listed at far left.	
Establish referral system to EAP for counseling for alcohol or drug related problems						
Use of Screening, Brief Intervention and Referral to Treatment (SBIRT)						
14. Depression	Y	N	S	M		
Offer worksite awareness & education to destigmatize depression						
Educate on partnering with physicians to screen/diagnose/manage depression						
Provide self-initiated depression screening opportunities					Goal: 60% of primary care providers routinely review with their patients cognitive, emotional and behavioral wellness, provide screening for depression, review with patients resources available, refer as needed. To accomplish goals, try to include programs/policies listed at far left.	
Facilitate access to confidential EAP services and referral for treatment						
Review the local EAP provider practices to ensure it is meeting employees needs						

Total Score 0%

APPENDIX B

MANAGEMENT SCORECARD

PPG Health Promotion System / MANAGEMENT SCORECARD

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2. PPG Health Promotion System/ MANAGEMENT SCORECARD

Plant/Site Name:

Wellness Site Ambassador or Spokesperson:

Location:

Country:

Date:

INSTRUCTIONS:

The following questions are designed to help you assess where your site is with regard to health promotion management. This scorecard can be used as a step-by-step guide to affect change.

Answer each question with Y, N, or DK (Yes, No, or Don't Know).

Entering another letter other than Y, N or DK will lead to incorrect scoring

Scores will show in the Calculation Tab

Step 1: ASSESSMENT

Worksite Wellness Team

	Y/N	Score
1-Plant has developed a team to address employee health and wellness issues?		0
2-Team meets regularly (at least quarterly or more)?		0
3-Team has a written description of its goal(s), objectives(s), vision and/or mission?		0
4-Team has a recognized chairperson who takes responsibility for scheduling and/or conducting meetings?		0
5-Usually, do most (over 60%) of the team members attend each meeting?		0
6- Does the team reflect functional (production and maintenance, human resources, health and safety, sales ,laboratory etc..) and demographic (age, gender, race, ethnicity, languages spoken, physical abilities, etc.) diversity of the population it represents?		0
Category Sub-Total		0

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Team Connections		
	Y/N	Score
7- Does the team maintains regular communication with plant/site employees via newsletters, emails, postings, mailings, etc.?		0
8- Does the team communicate its priorities and planned activities/programs to plant/site employees on at least an annual basis?		0
9- Does the team actively seek input from plant/site employees regarding its priorities and planned activities/programs?		0
10- Does the team maintain regular communication with union and other employee representative groups?		0
11- Does the team have an established and regular communication with management, including the plant or site manager?		0
12- Does the team have established and regular communication with the technical assistance resources at the Corporate Health and Wellness level?		0
Category Sub-Total		0
Corporate Culture		
	Y/N	Score
13- Does the Senior Leadership demonstrate a commitment to employee health and wellness as an imporant investment in human capital as exhibed by at least TWO of the following: Articulation of corporate health culture vision; Belief that organizational goals and value support employee health and well-being; Involvement in employee communications; Resource allocation; Active involvement as participants in wellness activities; Endorsement of plan to SBU leadership?		0
14- Are managers and supervisors actively educated about, and support, health and wellness programming?		0
15- Is training and resource information provided to managers/supervisors?		0
16- Can management effectively articulate the link between health, productivity and total economic value?		0
17- Does management actively encourage employee participation?		0
18-- Are employees educated about the true cost and total value of personal health and subsequent quality of life?		0
19-- Are employees provided information about their health care costs?		0

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20- Are there employees who (in addition to their company work role) communicate, participate, motivate, and/or support health promotion initiatives at the workplace?		0
Category Sub-Total		0
Evaluation		
	Y/N	Score
21- Does the team COLLECT any data, not including Health Risk Assessment (HRA) data (such as claims data, employee surveys, or other relevant data sources) to identify and prioritize employee health problems and health risk?		0
22- Does the team COLLECT HRA data to identify and prioritize employee health problems and health risk?		0
23- Does the team ANALYZE any data, not including HRA data (such as claims data, employee surveys, or other relevant data sources) to identify and prioritize employee health problems and health risk?		0
24- Does the team ANALYZE HRA data to identify and prioritize employee health problems and health risk?		0
Category Sub-Total		0
Focus Statement Development		

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	Y/N	Score
25- Does the team develop at least 2-3 focus statements that describe what health problems or risks are felt to be the most important to address within the plant/site? (Focus statements should include a phrase that 1) identifies the health problem or risk, 2) details of groups most affected, 3) why they have this problem/risk, and 4) suggested solutions for the problem/risk.)?		0
26- Does the team develop focus statements for a defined period of time (e.g. "This year" or "Within the next 6 months")?		0
27- Does the team use a specific, replicable, documented process to define the focus statements?		0
28- Does the team have a mechanism for <i>Employee/Union</i> stakeholders to review and comment on the focus statements?		0
29- Does the team have a mechanism for <i>Plant/Site Management</i> stakeholders to review and comment on the focus statements?		0
30- Does the team have a mechanism for Corporate Health and Wellness stakeholders to review and comment on the focus statements?		0
31- Are SMART goals (Specific, Measurable, Agreed Upon, Realistic, Time-bound) developed for program components based on the focus statements?		0
Category Sub-Total		0
Step Total		0
Step 2: CAPACITY		
Building Capacity		
	Y/N	Score
32- Has the team developed communication and/or training strategies that address organizational readiness with respect to implementation & for supporting wellness activities (as identified in the "Corporate Culture" section, #13-20)?		0
33- Does the plant have an annual budget for wellness initiatives?		0
34- Do you have a formal process to discuss resource allocation with management for wellness activities?		0
35- Has the team used Corporate education, training and/or technical assistance resources to help build your organization's readiness?		0

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36- Do health benefits cover preventive or risk reduction services and facilitate participation in such services (e.g., preventive exams, smoking cessation classes, weight reduction programs, physical activity programs, etc.)?		0
37- Does benefit design, communication and education support consumer accountability and informed health care decision making (i.e., design includes information and incentives for encouraging consumers to make wise and cost-effective health care decisions)?		0
38- Has the team developed communication and/or training strategies that address financial and/or benefit design needs?		0
Category Sub-Total		0
Step Total		0
Step 3: PLANNING		
Planning Steps		
	Y/N	Score
39- Does the team identify the specific evidence-based wellness activity(ies) that addresses the focus statement ?	Y	1
40- Does the team develop strategic goals, objectives and performance targets with regard to the wellness activity they selected?	Y	2
41- Does the team draft a written plan to execute the wellness activity they selected?	Y	2
42- Is an incentive program incorporated into overall program design to foster engagement, responsibility, and compliance (e.g., medical premium discounts, HSA/ HRA contributions, deductible credits, co-pay reductions, merchandise, raffles, gift cards, cash, etc.)?	Y	2
42-b Is the incentive : a benefit discount, a cash equivalent, a token, a prize draw , a variable pay system based on wellness points describe:.....		
Category Sub-Total		7
Identification of Participants		
	Y/N	Score

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43- Does the team identify different needs for different segments of the population reflecting the focus statement--see #25- which may include employees , family members, retirees AND/OR broad need categories based on demographics ?		0
44- Can the team justify specific programs offered to specific segments of the population based upon the relevant focus statement?		0
45- Do your programs address the needs of all employees across the entire health continuum including healthy, at-risk and chronic disease segments?		0
Category Sub-Total		0

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Program Coordination		
46- Does coordination of services regularly occur including joint planning, communication, cross-referral, data sharing, evaluation, and other coordination with two or more programs like Wellness and Risk Reduction, EAP/Behavioral Health, Occupational Health, Disease Management, Safety, Disability Management, Workers Compensation, and Benefits?		0
47- Is regular communication, joint planning, and data sharing conducted with health plans and vendors?		0
Category Sub-Total		0
Evaluation		
48- Does comprehensive data analysis and reporting support program planning and evaluation throughout the implementation process?		0
49- Are data shared between various stakeholders and used for joint planning and evaluation?		0
50- Are measures selected BEFORE program implementation to evaluate program effects?		0
51- Are health status measures (for both physical and mental health) considered to monitor health status improvements?		0
52- Are health care claims data considered in planning programs?		0
53- Are productivity measures considered to determine program impact on health-related lost work time, presenteeism, disability management, absenteeism and/or return-to-work tracking?		0
54- Are plans for evaluating health and wellness interventions routinely shared with program stakeholders to garner feedback and buy-in?		0
Category Sub-Total		0
Step Total		7
Step 4: IMPLEMENTATION		
Implementation Steps		
	Y/N	Score
55- Does the team identify the specific evidence-based wellness program(s) that addresses the focus statement (which may include employees and/or retirees, family members AND/OR employees of specific gender, ethnicity, health risk profiles, age, etc.)?		0
56- Is a full action plan developed for implementation of each evidence-based wellness activity?		0
57- Given the action plan and specific evidence-based wellness activity program selected, are the resources in place that are necessary to execute the action plan?		0

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		Category Sub-Total	0
Evaluation			
58- Does at least 50% of your target population participate in at least 1 core program element annually?			0
59- Has at least 80% of your target population taken the HRA during the last three years?			0
60- Based on feedback, are at least 90% of participants satisfied with core elements of the program?			0
61- Is management aware of the dollar investment per eligible employee in health and wellness (and, if applicable, other eligible population segments, such as spouses or retirees)?			0
62- Are frequency, duration, and type of participation captured for all programs and used for integrated reporting across collaborating program providers (e.g., internal departments or external vendors)?			0
63- Are data collected and analyzed as called for in the program plan?			0
64- Is an outcome evaluation (using a control group or comparison group; comparing follow-up data against baseline data and/or statistical methods control for demographics and baseline health care costs) conducted for the overall program and major program components?			0
		Category Sub-Total	0
		Step Total	0

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