

# Towards Effective Design and Evaluation of Workplace Wellness Programs

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## **Abstract**

In an effort to reduce chronic disease burden on the workforce, both public and private initiatives have promoted the rapid expansion of workplace wellness programs to encourage healthy behavior. Despite enthusiasm about these programs, evidence for their effectiveness remains mixed. The major reasons postulated for these mixed results include low participation rates, heterogeneity in program design and non-existent or poorly designed evaluations. In this dissertation, I attempted to address the gaps in the research on program components, their interactions and provide a method for evidence-based evaluation.

The first chapter focuses on incentives, which are often prescribed by guidance literature to increase participation. I examined the relationship of high-value and penalty-type incentives to participation rates in a nationwide sample of employers. Results suggested that increasing the value of an incentive may not yield much in terms of participation. Penalty-type incentives were associated with higher participation, but would require significant employee buy-in to implement.

The second chapter examines the relationship between program design and employee engagement. Much of the guidance literature recommends adding more components to achieve higher outcomes. However, based on analysis of data from employers and employees, it appears that there are interactions between program components and employee engagement. A program with an average number of services available may be better served by increasing the number of opportunities for employees to participate rather than increasing the number of services.

The final chapter synthesizes evidence from the other chapters, guidance from the literature and interviews with wellness program stakeholders in order to provide an evidence base for an interactive evaluation tool. This tool allows small-size employers or employers at the early stages of program implementation to include evidence-based evaluation as part of their program.

This dissertation addresses a need in the guidance for a rapidly-expanding wellness market. Researchers can use these findings to adapt guidance to the changing landscape and employers can use the evaluation tool to connect to the evolving guidance.



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## 1. Introduction

Noncommunicable diseases, also referred to as chronic disease, such as diabetes, asthma and heart disease account for the majority of deaths in developed countries.<sup>1</sup> In addition to mortality, these diseases are responsible for reduced productivity and high healthcare costs.<sup>2</sup> Current trends in chronic disease incidence will cost the global economy US\$ 63 trillion over the next two decades.<sup>2</sup>

Concerns about the impact of chronic disease on the workforce has motivated employers across the globe to begin adopting health promotion initiatives, usually referred to as “wellness programs”. These programs usually involve providing opportunities and encouragement for employees to engage in healthy behavior (e.g. exercise classes). Guidance literature has focused on four key elements:<sup>3-6</sup>

1. Services – The opportunities to engage in the program (e.g. classes)
2. Incentives – Rewards, monetary and non-monetary for participation or engagement
3. Promotion – Activities to advertise a program to employees
4. Leadership – Buy-in from various levels of management

These programs have experienced explosive growth. In the US, in 2006, less than half of employers had one of these programs.<sup>7</sup> By 2013, over 3/4<sup>ths</sup> of employers had instituted one.<sup>8</sup> In the UK, roughly half of all employers offer some type of wellness program.<sup>9</sup> Global organizations and national governments have encouraged this growth with published guidelines, policies and initiatives.<sup>4,10-12</sup>

This increased uptake has continued despite evaluation literature showing mixed results from wellness programs. Some studies have found increases in health behavior such as healthy eating<sup>13</sup> and exercise<sup>14</sup>, but others show small or non-significant effects on behavior.<sup>15-17</sup> In terms of economic outcomes (e.g. absenteeism and healthcare costs), results have also been mixed.<sup>18-20</sup>

There are various reasons suggested by the literature for why these programs show such a mixture of effects. One reason may be due to low participation rates, which are typically below 50% of eligible employees.<sup>21-23</sup> Incentives, one of the key components described above, are typically used to increase participation numbers. However, the level, type, and structure of incentives often vary across wellness programs and it remains unclear whether higher incentives lead to higher participation and whether alternative incentive structures like penalties for non-participation are useful for programs. Employers and health promotion practitioners generally would benefit from analysis focused on answering these lingering questions.

Another issue for mixed results may be heterogeneity in program design. Guidance literature has put forth the concept of a “comprehensive” wellness programs, which provides extensive offerings across the four components described above.<sup>5,24</sup> This literature suggests that more components indicate a more effective wellness program. However, there has been very little examination of how components relate to outcomes in the presence of other components. What preliminary analysis there has been suggests that there are significant interaction effects between components.<sup>25-27</sup>

A final issue that may be responsible for mixed results is that few programs include evaluation as part of their design and the ones that do are of varying quality.<sup>15-17</sup>

Though there are tools for measuring progress towards program “comprehensiveness”,<sup>24,28</sup> they tend to require programs already to be set up and resourced. This is particularly problematic for small and medium-sized employers as they tend to cite resource constraints as major barriers to initiating a program.<sup>29</sup> There is a need in the field for low-burden and flexible technologies for evidence-based and repeatable evaluation.

To address the three issues identified above, I present the results of two studies and the development of a program evaluation tool. In the first chapter, I address the need for a greater understanding of the relationship between incentives and participation by analyzing participation rates among employers with high-value incentives and employers with penalty-type incentives. In the second chapter, I analyze the relationship between program components and how these interactions relate to outcomes. In the third chapter, I outline the development of a wellness program evaluation tool to bridge the gap between the research on program design and evaluation in practice.

## 2. Understanding the relationship between incentive design and participation in US workplace wellness programs

### Background

Today, 60% of Americans get their health insurance from their employer, making it a worthwhile target for public health promotion efforts.<sup>30</sup> Wellness programs are also attractive to employers, as they have the potential to improve productivity and reduce healthcare costs.<sup>14,18–20,31,32</sup> Likely due to these perceived benefits, the number of employers offering wellness programs has increased from 27% in 2006 to over 75% in 2013.<sup>7,8</sup>

Though the popularity of wellness programs has increased in recent years, results from evaluations of their impact on employee behavior and healthcare costs have been mixed.<sup>16,17,33</sup> It has been suggested that these moderate and non-significant effects may be due to low participation rates, which are typically below 50% of eligible employees.<sup>21–23</sup> This issue of low participation rates has been recognized in the literature and guidance on wellness program design recommends attention whether a program is reaching a variety of employees.<sup>4</sup> Typically, evaluators of wellness programs include employee participation as a central metric on which evaluations are based.<sup>3</sup>

In order to encourage participation in wellness programs, research recommends the use of financial incentives. A 2007 Centers for Disease Control benchmarking study on health and productivity management identified incentives as a key element of encouraging participation.<sup>34</sup> This suggestion has been borne out by research that has shown that incentives can have a significant impact on participation.<sup>17,27,29,35,36</sup>

Incentives typically take the form of financial rewards such as discounts on gym memberships or cash payments for participation. Recently, employers have begun to

utilize financial penalties to encourage participation.<sup>37</sup> These penalties can take the form of higher contributions to health plans, wherein employees who choose not to participate in a program are required to pay higher premiums for coverage. Penalties appear to be effective,<sup>38</sup> but some have raised concerns over their use to discriminate against certain populations<sup>39,40</sup> and their legal permissibility.<sup>41</sup> The Equal Opportunity Employment Commission has begun to challenge the legality of using penalties on the basis that they may be discriminatory.<sup>42</sup>

Despite these ethical and legal concerns, there is limited understanding of whether use of penalties is related to higher employee participation. The economic theory of loss-aversion suggests that people should be more responsive to penalties than rewards.<sup>43</sup> Volpp et. al. suggests that penalties are promising strategies for increasing participation, but expresses concern that data on the effectiveness of penalties remains scarce.<sup>44</sup>

Another issue facing employers seeking to increase participation in their wellness programs through the use of reward incentives is the appropriate amount of reward to offer. Some suggest that the relationship between reward amount and participation is linear or nearly linear; that the higher the reward, the more participation an employer can expect.<sup>27,45</sup> Others suggest that rewards only increase participation levels to a point and may, at higher amounts, replace an employee's own motivation to engage in healthy activities.<sup>24,46</sup>

The passage of the Affordable Care Act has raised the limit on incentive levels for wellness programs from 20% to 30% of the cost of coverage, leading to increased attention to the use of incentives in wellness programs. Thus, there is a pressing need for national-level data on incentives and their relationship to participation. In this paper, we

present the results of a nationally representative survey of employer wellness programs, which included questions on the use of incentives and their magnitude. We will analyze the relationship of employer characteristics and incentive structures and how these structures relate to reported employee participation rates. This analysis provides a better understanding of the use of incentives in wellness programs, as well as information for employers and program managers on the effectiveness of incentives on participation rates in wellness programs.

## **Methods**

### *Design*

The research design is a cross-sectional analysis is based on two datasets: The RAND Employer Survey (RAND survey) and the Dun and Bradstreet Employer Database. The Dun and Bradstreet (D&B) database contains a complete list of private and public companies and organizations in the US. This analysis used information from the 2011 database, which had records on 72.4 million businesses and government agencies. Specifically, we extracted details on average salary, number of employees, region (i.e. North, South, East, West), years in business and industry type. Industry type in the D&B data is based on North American Industry Classification System (NAICS) codes, which we separated into four groups (government, heavy industry, trade, and service).

The RAND survey<sup>29</sup> was conducted in 2012 and used random sampling based on strata created from the D&B data for number of employees (i.e. employer size) and industry. The reason this stratification was used is due to evidence suggesting that these two employer characteristics are associated with offering wellness programs.<sup>17</sup> Further details on the development of the survey and stratification are provided in a 2013 report.

### *Measures*

The survey includes questions about an employer's use of wellness programs, employee participation rate, and which types of incentives, if any, the employer uses to encourage participation in the wellness program. The survey also asked about the gender composition of employees (i.e. percent female).

The survey question on incentive type listed 9 types of monetary incentives (listed below) and allowed respondents to check all incentive types that they used. For this study, incentives were categorized as either rewards (e.g. cash payments) or penalties (e.g. higher premiums). Rewards included merchandise, gift cards, discounted gym membership, cash payments and lower employee contribution to health plan premiums, lower cost sharing requirements for services covered by health plans and higher Health Reimbursement Accounts (HRA) or Health Savings Accounts (HSA) contribution. Penalties included higher employee contribution to health plan premium, higher cost sharing requirements for services covered by health plans and lower HRA/HSA contributions. Employers were also asked to provide the maximum amount an employee could be rewarded/penalized per year.

### *Sample*

Of the 3,000 employers in the final sample, 589 (19%) returned completed surveys. To correct for uneven response rates by strata and to allow for generalizability to the national level, analytic weights were computed and applied to all analyses. Details on the computation of these weights are contained in Appendix A of the 2013 RAND Workplace Wellness Report.<sup>29</sup>

### *Analysis*

The three incentive structures we analyze in this paper are the use of rewards generally (any rewards), the use of rewards which have a maximum value per year of over \$100 (high-value rewards) and the use of penalties along with rewards (penalty and reward). As only 11 employers in our sample (3% of total employers offering wellness programs) use only penalty incentives, we were not able to analyze the use of penalties independent of rewards.

For our models we controlled for the following employer characteristics: Industry, number of employees (henceforth referred to as “size”), region, years in business, gender composition (percent female) and salary bands. In order to have roughly equal strata, we split size into three categories (i.e.  $\geq 50$  and  $\leq 100$  employees,  $> 100$  and  $\leq 1,000$  employees,  $>1,000$  employees) and employed an indicator for whether average employee salary was  $> \$50,000$ . We also added two interaction terms that accounted for the relationship between industry and gender composition and the relationship between size and years in business.

First, we aimed to explore the relationship between employer characteristics and incentive structure using logistic regressions. We developed three models using the three incentive structures as dependent variables and the employer characteristics described above as independent variables. Interaction terms were not significantly associated with offering any rewards or high-value rewards. However, the interaction between industry and percentage female was significantly associated with the use of penalties, so we included the term in the third logistic regression.

To assess the relationship between incentive structure and employee participation, we used incentive structure as independent variables in two generalized linear models

(GLM). Employee participation was used as the dependent variable and the models controlled for the same variables as the logistic models. We used GLM because it may be more appropriate for fractional dependent variables (i.e. percent of employees participating) in order to ensure there are no fitted values greater than one or less than zero.<sup>47</sup>

In the first GLM, we looked at the relationship of rewards generally with employee participation using the indicator for any reward incentive. This was to confirm whether our results matched guidance recommending the use of reward incentives to increase participation. In the second GLM, instead of the “any reward” indicator, we used two indicators; one for high-value rewards and one for penalties incentives. This second GLM expands on previous research by allowing us to test whether use of penalties is related to higher employee participation and compare this relationship with another possible incentive structure (i.e. high-value rewards).

## **Results**

Of the employers that responded to the survey, 69% offer a wellness program. Among those that offer a wellness program, 68% use monetary incentives to encourage participation. Over a third (39%) of these programs use monetary rewards with yearly maximum value greater than \$100. Penalties are used in addition to rewards in 15% of programs offering incentives. Additional descriptive statistics are listed in Table 1. When not controlled for other characteristics, there are no significant differences in types of incentives used across employers.

Table 1: Descriptive statistics

<b>Employer Characteristics</b>	<b>Overall (N=407)</b>
<b><i>INDUSTRY (%)</i></b>	
<b>Government</b>	144 (35)
<b>Heavy Industry</b>	74 (18)
<b>Trade</b>	86 (21)
<b>Services</b>	103 (25)
<b><i>REGION (%)</i></b>	
<b>Northeast</b>	75 (18)
<b>Midwest</b>	102 (25)
<b>South</b>	141 (35)
<b>West</b>	89 (22)
<b><i>EMPLOYER SIZE (%)</i></b>	
<b>50 - 100 Employees</b>	67 (16)
<b>101 - 1000 Employees</b>	126 (31)
<b>&gt;1000 Employees</b>	214 (53)
<b><i>Salary &gt;\$50k (%)</i></b>	121 (30)
<b><i>Years in Business (SD)</i></b>	54 (42)
<b><i>Percent Female (SD)</i></b>	49 (25)
<b><i>Incentive structure (%)</i></b>	
<b>Any reward</b>	277 (68)
<b>High-value reward</b>	160 (39)
<b>Penalty and reward</b>	57 (14)

Table 3 presents results from the logistic regressions which controlled for the employer characteristics mentioned above (i.e. industry, size, region, years in business, gender composition and salary bands). Use of rewards varies based on the location of an employer, with the Northeast being most likely to offer rewards, followed by the Midwest, South and West. This pattern of regional variation is the same for the other incentive structures, but the differences are not significant. These results suggest that where an employer is located is a factor in their decision to offer incentives.

**Table 2: Odds ratios of incentive structure by employer characteristic**

<b>Employer Characteristics</b>	<b>Incentive structure</b>		
	<b>Any reward (SE)</b>	<b>High-value reward (SE)</b>	<b>Penalty and reward (SE)</b>
<b>INDUSTRY (Ref = Government)</b>			
<b>Heavy Industry</b>	1.34 (1.10)	2.93 (3.01)	2.12 (1.90)
<b>Trade</b>	1.88 (1.32)	4.68 (5.29)	1.00 (1.10)
<b>Services</b>	0.64 (0.47)	5.86 (5.69)	12.73 (17.48)
<b>REGION (Ref= Northeast)</b>			
<b>Midwest</b>	0.20* (0.14)	6.34** (4.93)	8.38 (9.87)
<b>South</b>	0.16* (0.12)	2.59 (1.67)	5.52 (6.11)
<b>West</b>	0.15* (0.11)	0.50 (0.39)	0.30 (0.33)
<b>EMPLOYER SIZE (Ref = 50-100)</b>			
<b>101 - 1000 Employees</b>	2.16 (1.29)	0.77 (0.60)	1.05 (0.83)
<b>&gt;1000 Employees</b>	2.07 (1.37)	1.77 (1.52)	4.62* (4.31)
<b>Years in Business</b>	1.00 (0.01)	0.98** (0.01)	0.97* (0.02)
<b>Percent Female</b>	1.03** (0.01)	0.99 (0.02)	1.00 (0.02)
<b>Salary &gt;\$50k</b>	1.61	0.33	0.30

	0.89	(0.20)	(0.24)
<b>Industry*Percent Female (Ref = Government)</b>			
<b>Heavy Industry</b>	N.S.	N.S.	1.09* (0.03)
<b>Trade</b>	N.S.	N.S.	1.08* (0.03)
<b>Services</b>	N.S.	N.S.	1.05 (0.03)

\*  $p < .05$ , \*\*  $p < .01$ , N.S. = Not Significant, removed from model

Large employers (>1,000 employees) are more likely to use penalties when compared to small employers (50-100 employees). Large employers also appeared to be more likely to use penalties than medium employers (101-1000 employees), but this difference was not significant ( $p = .07$ ).

Employers involved in government operations are much more likely to use penalties than other industries, however this effect is moderated by an employer's gender composition. Employers with high numbers of female employees are more likely to use penalties than government employers with similar numbers of female employees.

Gender composition itself has a complex relationship to incentive structure. Employers in all industries with higher numbers of female employees are more likely to offer some type of reward, independent of industry. Highly female gender composition was also associated with use of penalties, except in the government sector, as described above.

In our GLM model of employee participation rate on any type of reward, use of a reward is associated with 18% higher participation. In our second model, which examines the relationship between use of large rewards and the use of penalties with participation rate, both incentive structures are associated higher participation rates, 52%

and 68% respectively. Both differences were significant, but if the model is used on a subsample of employers that offer rewards (n=277), then large rewards are no longer associated with a significant difference in participation. The use of penalties, however, remains associated with significantly higher participation. Observed and predicted participation rates based on our models are listed in Table 3.

**Table 3: Participation rates by incentive structure**

<b>Incentive structure</b>	<b>Observed participation rate (SD)</b>	<b>Predicted participation rate (SE)</b>
<b><i>Any reward</i></b>	49% (0.04)	50%** (0.03)
<b><i>High-value reward</i></b>	56% (0.04)	53% (0.04)
<b>Penalty and reward</b>	71% (0.05)	70%** (0.06)

\* p<.05, \*\* p<.01

## **Discussion**

The purpose of this study was to examine how an employer's characteristics relate to incentive structures they use for their wellness programs and how these structures relate to employee participation. Results of this nationally representative survey suggest that where an employer is located is associated with offering incentives for participation. The Northeast appears to be the most likely to offer incentives while the West is the least likely. Additionally, large employers and employers in the government sector are more likely to use penalties than small employers or employers in other sectors.

Employers with high numbers of female employees are more likely to use rewards and penalties. This finding is not entirely surprising, as research suggests that women

tend to have higher medical utilization and costs and that employer-provided health risk assessments tend to place them in a higher risk category. (Musich, Adams, & Edington, 2000; Owens, 2008; Wolfe et al., 1994) As a result, employers with higher numbers of female employees may be more concerned about health care costs and thus more likely to incentivize their employees' participation in wellness programs.

Interestingly, the relationship between gender composition and use of penalties is reversed among government employers. This may potentially be related to concerns about discrimination in the use of penalties. With the EEOC paying close attention to the use of incentives, employers in the government sector may be less likely to use this potentially controversial incentive structure.

According to our results, use of penalties is associated with much higher employee participation rates, even beyond the effect of high-value rewards (68% versus 52%). This is in accordance with the economic principle of loss-aversion, which maintains that individuals react more strongly to potential losses than potential gains.<sup>43</sup> Therefore, the addition of penalties to a wellness program's incentive structure may be worthwhile for employers considering strategies to increase participation. However, penalties remain extremely controversial and employers would likely need employee buy-in to implement them.<sup>40-42</sup>

The major limitation of this study is sample size. The survey response rate is 19%, which is lower than similar surveys of US employers (Kaiser/HRET). Of these respondents, 69% offered a wellness program and of those offering a wellness program, only 14% used penalties in addition to rewards. We addressed these non-response issues with post-stratification weights in order to allow for generalizability to the national level.

Another limitation is the use of self-reported data to examine issues of incentive magnitude and employee participation. It is possible that respondents estimated the answers to questions related to our dependent variables. Without verified data, we are unable to confirm the reported participation rates. Future studies should make use of direct measurement of employee participation rates and incentive levels. This could be achieved by instituting requirements for employers to report their programs' participation, as suggested in a recent article by Madison et. al.<sup>48</sup>

This study is the first of its kind to examine wellness program incentive structures on a national level, and to explore the association between incentives and employee participation rates. The results suggest that the use of penalties may increase participation and that it is therefore a strategy worth further exploration. There also appears to be regional and industry variation in incentive structures offered, which may reflect the different needs and attitudes towards wellness programs. Employers with higher numbers of female employees appear to be more likely to encourage their employees to participate, which may suggest a higher willingness to adopt employee health promotion strategies. Future research should investigate strategies designed to increase employee participation in greater depth.

### **3. Is more always better when it comes to workplace wellness program design?**

#### **Background**

In 2012, noncommunicable diseases such as diabetes, asthma and heart disease accounted for 68% of deaths globally.<sup>1</sup> Economists estimate that, if chronic trends continue as-is, the global economy will experience a loss of US\$ 63 trillion over the next two decades.<sup>2</sup> These economic costs of noncommunicable disease have not escaped the notice of business leaders. The World Economic Forum's Executive Opinion Survey found that over one-half of world business leaders expect that chronic disease will have a moderate to serious impact on their businesses.<sup>2</sup>

Employer concerns about the price tag of health-related losses to productivity and about their employees' welfare has led many to institute wellness programs. These programs have experienced a large spread in the US, from a little less than half of employers in 2006 to over 3/4ths in 2013.<sup>7,8</sup> In the UK, roughly half of all employers offer some type of wellness program.<sup>9</sup> The growth has been encouraged by global organizations and national governments. The WHO has published guidelines for employers to develop comprehensive designs and implement them effectively.<sup>12</sup> In the US, the Affordable Care Act raised the cap on the value of incentives for wellness programs and the Centers for Disease Control has released guidance similar to the WHO's.<sup>4,49</sup> The UK's National Health Service initiated the Health, Work and Wellbeing initiative in 2013, which aims to create healthier worksites through partnerships with employers.<sup>10</sup>

Despite the popularity of wellness programs, the scientific community has not reached a consensus on whether they are effective. Research has yielded mixed results, with some studies reporting increases in health behavior such as exercise<sup>14</sup> and fruit and vegetable consumption,<sup>13</sup> while others find small or non-significant effects on health behavior.<sup>16,17,33</sup> Results of wellness program impact on economic outcomes (e.g. absenteeism and healthcare costs) have been similarly mixed.<sup>18-20</sup>

Two related reasons for programs' mixed effects on health behavior and economic outcomes are low participation rates and employee perceptions. Participation rates for workplace wellness programs tend to be below 50% of eligible employees,<sup>21,22</sup> which may be at the root of small or insignificant changes in health behavior.<sup>23</sup> Indeed, achieving high participation is a key part of guidance on developing effective workplace wellness programs.<sup>6,34</sup> Similarly, employee perceptions of the effectiveness of a program have been identified as drivers of outcomes<sup>50,51</sup> and indicators of the program's fit within the organizational climate.<sup>52</sup> This suggests that there is promise in using employee perceptions of programs as an outcome measure.

To drive these outcomes, guidance for wellness programs focuses on four key elements: Services, incentives, promotion and leadership.<sup>5,6,53,54</sup> A variety of services are important in order to provide employees at all levels of risk and with a number of conditions to engage with the program.<sup>6</sup> Research suggests that programs offering a broad array of programs had higher participation<sup>55</sup> and are more likely to have an effect on employee health behavior.<sup>56</sup>

Additionally, having leadership engaged in health promotion efforts is essential to bringing about change. Much of the guidance literature emphasizes leadership as one of the major components for building effective wellness programs.<sup>3,6</sup> By training middle-management or supervisors in the importance of health promotion, programs may achieve better reach among employees.

In order to encourage participation in wellness programs, research recommends the use of financial incentives.<sup>34</sup> Financial incentives typically target participation; rewarding an employee for signing up. In some cases, they are based on actual outcomes (e.g. quitting smoking). Research has indicated that incentives can have a significant impact on participation.<sup>17,27,29,35,36</sup>

Related, but separate from incentives are promotion efforts such as health fairs and regular notifications of service availability. In an evaluation of a worksite obesity prevention program, Goetzel et al. randomized worksites to one of three types of programs, each with different levels of promotion.<sup>57</sup> Reductions in BMI and cholesterol were only significant among the programs with higher levels promotion activities.

A wellness program that incorporates the components described above can be considered “comprehensive”. Wellness program evaluation tools like HERO Scorecard and WELCOA’s 7 Benchmarks for Success combine elements from these different components.<sup>5,24</sup> These measures are based on the assumption that more components indicates a more effective wellness program, which may result in the allocation of program resources to a single strategy; more of everything. However, intuitively, these components do not act in isolation. There is evidence in the literature that the

relationship between incentives and participation rates differs by program design<sup>25</sup> and program communication strategy.<sup>26</sup> In one study, the authors that programs need different levels of incentives depending on their organization's characteristics.<sup>27</sup>

In this study, we aim to analyze how different components relate to employee outcomes and to one another. We anticipate that, while presence of each component will be individually related to participation and perceptions of effectiveness, the relationships will change in the presence of other components, suggesting key elements of wellness programs that can help drive up participation rates. Using these results, we will be able to make recommendations for programs at different levels of "comprehensiveness".

## **Methods**

### *Data sources*

Data comes from a survey administered in 2014 as part of the Britain's Healthiest Company (BHC) contest. The BHC contest invited employers across the UK to enter and see how their workplace health promotion efforts compare to other employers.

Employers that sign up receive a survey that asks about the characteristics of their wellness program, which includes questions on services offered, incentives, promotion and leadership engagement. Services offered was assessed using a series of 37 checkboxes for common wellness program services (e.g. clinical screenings, nutrition education), which employers were asked to check if the service was part of their program. Incentives and promotion activities were also assessed using checkboxes. Leadership engagement in health promotion activities was assessed using yes/no questions or 5-point Likert scales from strongly disagree to strongly agree. Additional information about the questions included in analysis is provided below.

Employers were also asked to distribute a version of the survey to their employees. The employee survey contained questions about individual characteristics (e.g. age, gender, education, income, presence of chronic conditions). Additionally, checkboxes for the same 37 services in the employer survey were included. Employees were asked to check a box if they used a service and, if they did, whether they perceived the service to be effective in changing their behavior.

#### *Cluster analysis on service offering*

In order to determine “typical” service configurations we used hierarchical cluster analysis to explore patterns of service provision within wellness programs. Cluster analysis is an exploratory technique that assigns individuals to groups based on their similarity over a number of different variables.<sup>58,59</sup> In this case, the cluster method assigned employers to groups based on similar patterns of services offered.

Services that were offered by more than 80% of employers (Support for returning to work after illness, bicycle storage facilities, offsite gym facilities) or less than 20% of employers (Discounted/free nicotine patches or medication, alcohol support group) were removed from analysis, as they reduced the ability of the cluster method to create clusters with interpretable differences. There are numerous methods available for selecting variables that contribute important information to the clustering process,<sup>60</sup> and this method of excluding the most and least frequent was decided to be acceptable.

The analysis split employers into three groups corresponding to level of service offering: Low, medium and high. Employers classified as having high levels of services offered many of the 32 services included in the analysis (on average, 21), while employers classified as having low levels of services offered an average of 6 services.

*Leading By Example (LBE) scale as basis for measuring leadership*

In order to measure the leadership component of the wellness programs of BHC participants, we used as a basis the Leading By Example (LBE) scale.<sup>61</sup> This scale was developed for use measuring leadership in workplace wellness programs. The BHC survey included questions similar to those of Factor 2 (Awareness of the link between health and worker productivity) and 4 (Leadership support for health promotion) of the scale. Questions were scored by employers on a 5-point Likert scale from “Strongly disagree” to “Strongly Agree”. The questions and their mappings are included in Table 4.

**Table 4: Leading By Example (LBE) mappings to Britain’s Healthiest Company**

<b>LBE Scale Question</b>	<b>LBE Factor</b>	<b>BHC Question</b>
Employees educated regarding the true cost of health care	Factor 2	All levels of employees are informed about the importance of staff health and well-being
Site provides site leaders training on importance of employee health	Factor 4	Our organisation provides line managers with training on staff health and wellbeing
Leaders view the level of employee health as one important indicator of success	Factor 4	Our leaders view the level of employee health and well-being as one important indicator of the organisation’s success.

*Incentives and Promotion*

For measuring incentives and promotion, we used checkboxes from the BHC employer survey that ascertained whether an employer’s program offered incentives or engaged in promotion activities typically seen in other wellness programs. For incentives, we used the checkbox for “providing incentives for participation” and “recognizing or rewarding employees for healthy behavior and health improvement”, referred to as participation-based and results-based incentives respectively. This split

was based on the suggestion in the literature that incentives for participation and results-based incentives have different effects on participation and effectiveness.<sup>24</sup>

For promotion, we classified employers that checked any of six possible promotion strategies (e.g. “newsletters or emails to promote programme or campaigns”) as engaging in active promotion. We also included as a “promotion activity” a question whether employers offered participation in activities/events during worktime. The literature recommends opportunities to participate during the workday as a possible method for increasing participation.<sup>5,35</sup>

### *Outcome measures*

Our two outcome measures of interest were employee-level data on participation and perceptions of program effectiveness. As explained above, both have been used in evaluations of program impact. Increasing participation is a key component of guidance literature on program design, while employee perceptions of program effectiveness have been identified as a separate and promising outcome measure. We measured participation and perceptions of program effectiveness using the employee version of the program services checkboxes. The employee survey contained the same checkboxes for services as the employer survey, except the employee version asked whether an employee made use of each service. If an employee reported having participated in the service, they were then asked whether they perceive their participation as having changed their behavior. Employees were classified as having participated if they reported participating in any of the services listed. They were classified as having perceived the program to be effective if they reported that any of the services they used had changed their behavior.

### *Analyses*

Analyses were conducted at the employee level using employee and employer-level variables. The employer-level variables were the program component variables (i.e. service cluster, incentives/promotion, leadership). The outcome variables, participation and perceived effectiveness, were at the employee level, as were the employee characteristics (i.e. age, gender, presence of chronic conditions, education and income).

We used logistic regressions to model the relationship between program components and employee participation and perceived effectiveness, controlling for employee characteristics. We first modeled each program component separately with employee characteristics to examine the relationship regardless of other components. We then combined all components into a final model to test the effects of some components while controlling for others. We used the sandwich estimator of variance to account for the non-independence between employees within the same employer.

This model was used to calculate the marginal effects for each component in order to estimate the potential effect of adding additional elements to a baseline program with a low level of services offered, no promotion or incentive efforts and limited leadership engagement. Analyses were conducted in R (R Core Team, Vienna Austria) and STATA (StataCorp, College Station, TX).

The final model is below:

$$\text{logit}(\text{outcome}_{ij}) = B_0 + B_1 * \text{cluster}_j + B_2 * \text{leadership}_j + B_3 * \text{incentive}_j + B_4 * \text{promotion}_j + B_5 * \text{employee characteristic}_{ij}$$

Where:

$outcome_{ij}$  is an indicator for whether an employee  $i$  of employer  $j$  participated in the wellness program in the first model and whether they perceived the program to be effective in the second model

$cluster_j$  is a categorical variable for program configuration for employer  $j$

$leadership_j$  is a vector of leadership indicators for employer  $j$

$incentive_j$  is a vector of incentive indicators for employer  $j$

$promotion_j$  is a vector of promotion indicators for employer  $j$

$employee\ characteristic_{ij}$  is a vector of employee characteristics (i.e. gender, age, health conditions, education and salary) for employee  $i$  of employer  $j$

## Results

In total, 81 employers participated in the contest and returned surveys. Between the 81 employers, 24,393 employees responded to the survey. Employee characteristics of the sample to be used as covariates in regression models presented in Table 5.

Participants were more likely to have higher education attainment, higher salaries and some type of chronic condition. Among participants, those perceiving their employer's program to be effective were more likely to be young, male and also of higher education attainment and salary than those perceiving the program not to be effective.

**Table 5: Employee characteristics**

	<b>Overall (N=24,393)</b>	<b>Participants (N=13,909)</b>	<b>Perceive program to be effective (N=10,200)</b>
<i>Average age (SD)</i>	39.0 (10.5)	38.9 (10.3)	38.8 (10.2)*

<i>Gender composition (% female)</i>	50.6	50.7	49.8*
<i>Have chronic condition (%)</i>	35.0	35.6*	34.6
<i>Education (%)</i>			
No college	26.5	23.4***	21.9***
Vocational training	19.4	18.2	17.3
Undergraduate	35.8	38.0	39.1
Postgraduate	18.3	20.5	21.7
<i>Salary (in £)</i>			
<10k-19k	16.4	12.9***	12.1***
20k-29k	25.7	23.9	22.6
30-39k	18.6	19.0	18.6
40-59k	20.2	21.5	21.6
60k+	19.1	22.7	25.1

P-values of F-test and T-tests for significant differences from overall sample are reported as follows (\* p<.05, \*\* p<.01, \*\*\* p<.001)

Results from the hierarchical clustering on services offered demonstrated that there were three clear patterns of program configuration. Programs in each cluster were most similar in the total number of services offered, which lead to us classifying them as “service levels”. In the “Low” service level, programs offered on average 7 of the 32 services, in the “Medium” level programs offered 16 services and in the “High” level programs offered 24 services. Program-level characteristics (i.e. service cluster, leadership, incentives and promotion) are presented in Table 6.

**Table 6: Employer characteristics**

<b>Components</b>	<b>% of employers</b>
<i>Services component</i>	
Low cluster	39.5
Medium cluster	32.1
High cluster	28.4
<i>Leadership component</i>	
Managers provided training on health	
<i>Strongly Disagree</i>	5.2

<i>Disagree</i>	41.6
<i>Neutral</i>	24.7
<i>Agree</i>	23.4
<i>Strongly Agree</i>	5.2
Employees informed about health importance	
<i>Strongly Disagree</i>	1.3
<i>Disagree</i>	16.5
<i>Neutral</i>	19.0
<i>Agree</i>	22.8
<i>Strongly Agree</i>	40.5
Employee wellbeing is an indicator of success	
<i>Strongly Disagree</i>	1.3
<i>Disagree</i>	9.2
<i>Neutral</i>	17.1
<i>Agree</i>	38.2
<i>Strongly Agree</i>	34.2
<b><i>Incentives component</i></b>	
Participation-based	30.9
Results-based	28.4
<b><i>Promotion component</i></b>	
Opportunities to participate during worktime	64.2
Promotional materials	85.2

The first set of models estimated the relationship between each component and participation/perceived effectiveness controlling for employee-level characteristics (Table 3). Results indicate that linear combinations of each components' variables are significantly associated with higher likelihood of participation (from 1.51 for leadership to 7.63 for service cluster) and perceived effectiveness (from 1.51 for leadership to 6.80 for service cluster). The variables themselves were significant for service clusters, promotion activities and one item within the leadership component (i.e. All employees informed about the importance of health). The other variables had non-significant associations with the outcomes.

In the full model, linear combinations of each of the components, it appeared that all components except incentives had some impact on both outcomes. The linear combination of incentives approached significance for perceived effectiveness ( $p=.06$ ), but was far from significant for participation ( $p=.22$ ). Among individual variables, opportunities for program participation during worktime and service cluster were significantly associated with participation and only participation during worktime was associated with perceived effectiveness. Regression results are presented in Table 7.

**Table 7: Odds Ratios of each variable for single-component and all-component models**

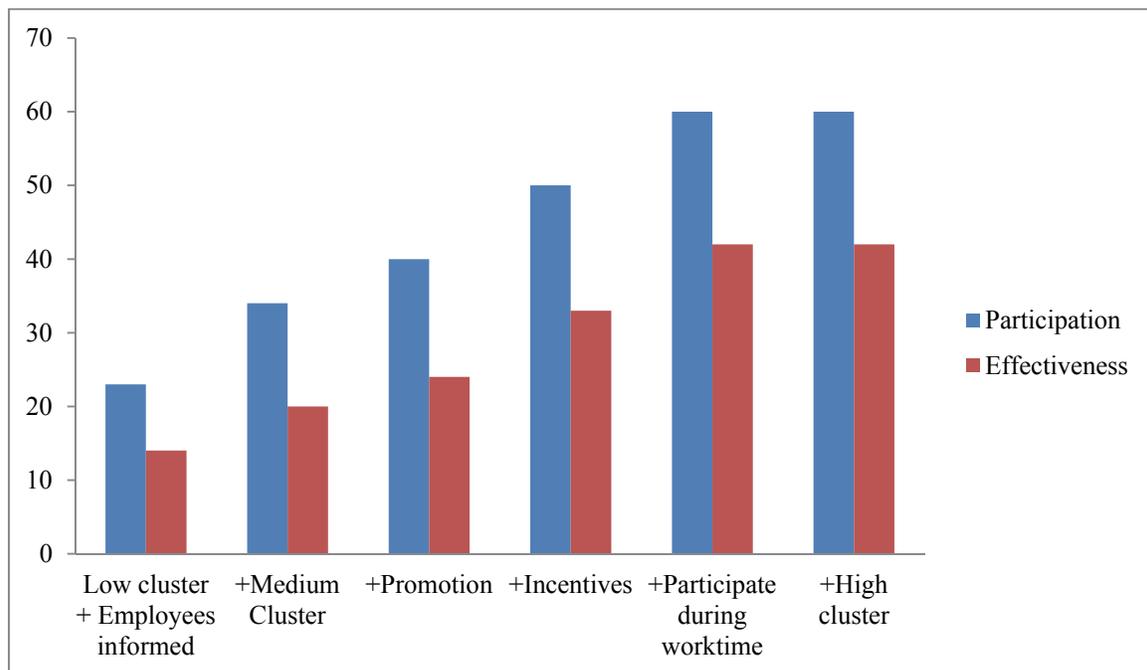
		Participation		Perceived effectiveness	
		Single component	All components	Single component	All components
<b><i>Service cluster (REF = Low)</i></b>					
	Medium	2.42**	1.69*	2.33***	1.49
	High	3.15**	1.65	2.91***	1.47
<b><i>Incentives</i></b>					
	Participation-based	1.56	.85	1.56	.97
	Results-based	1.69	1.54	1.71	1.51
<b><i>Promotion</i></b>					
	Promotional activities	2.42**	1.32	2.36**	1.31
	Worktime participation	2.28**	1.57*	2.31**	1.59*
<b><i>Leadership</i></b>					
	Line manager training	1.06	1.15	1.05	1.11
	All employees informed about health	1.46**	1.06	1.50**	1.11
	Wellbeing indicator of organization success	.97	1.03	.96	1.00
<b><i>Linear combinations</i></b>					
	All service clusters	7.63***	2.79*	6.80***	2.18*
	All promotion	5.51***	2.07*	5.44***	2.08*
	All incentives	2.63***	1.32	2.68***	1.47
	All leadership	1.51***	1.26***	1.51**	1.23**

All models controlled for employee characteristics (i.e. age, gender, income, education, presence of chronic conditions). Significance levels are as follows: (\*  $p<.05$ , \*\*  $p<.01$ , \*\*\*  $p<.001$ )

The marginal effect of moving from the baseline program described in the methods section to a program with a medium-level of services offered is a 10% increase in participation and 5% more participants perceiving the program to be effective. Adding promotion activities increased participation and perceived effectiveness by 6% and 4%, respectively. Adding results-based incentives and opportunities to participate during worktime would each increase participation by roughly 10% and perceived effectiveness by 9%. Together, our model predicts they could result in a gain of almost 20% and 18% in participation and perceived effectiveness, respectively.

Interestingly, once a program adds the above components, the move from the medium service cluster to the high service cluster does not result in any significant change in outcome. The difference is, in fact, negative, but only a fraction of a percent. The results of marginal effect analyses are illustrated in Figure 1.

**Figure 1: Marginal effects of additional program components**



**Discussion**

In this paper, we analyzed the results from a voluntary survey of employers and their employees about the characteristics of and engagement in workplace health promotion efforts. The comprehensive nature of the survey allowed us to operationalize various components of wellness programs identified in the literature and examine their relationships with participation in and perceived effectiveness of a program. The purpose was to add to the discussion of best practices by analyzing the relationship of individual components and components in combination with outcomes.

The party line on workplace wellness program guidance has mostly focused on a “more of everything” approach.<sup>5,6,53,54</sup> This is likely due to an evidence base that has focused on the effectiveness of individual components. Our results are in line with existing evidence, suggesting that each component individually is related to participation rates. In addition, the results suggest that the individual components are also associated with employee perceptions of program effectiveness.

The only component for which there was less convincing evidence of this relationship was incentives. Neither incentives for participation nor results-based incentives as operationalized for this paper were individually associated with participation or perceived effectiveness. Only their combination was associated with outcomes. Some researchers have called for a shift away from the focus on incentives in wellness guidance literature.<sup>24,29</sup> Our results support that shift and suggest that incentives for participation alone may not be enough to influence behavior. Incorporating

incentives that target results into programs may yield more substantial gains in engagement.

In the presence of other components, the magnitude of each components' individual relationship with outcomes was greatly reduced. Of the individual elements of each component, only participation during worktime remained significantly associated with outcomes. This supports existing evidence that opportunities to participate during work time is associated with immediate outcomes like participation<sup>62</sup> and downstream outcomes such as behavior and well-being.<sup>63</sup> Our results suggest that no matter how complex or simple a program is, providing opportunities for employees to participate in a program during worktime can yield large dividends in terms of participation and perceptions of effectiveness.

What do these results mean for the concept of a “comprehensive” program as espoused by the wellness literature? The more comprehensive a program is, the more engagement it will have. However, the “more of everything” model does not appear to be the best approach. This is most clearly illustrated by our finding that moving from a medium level to a high level of service offering does not relate to better outcomes. Instead, an employer may be better served by providing opportunities for employees to participate in during worktime. This could results in a boost by as much as 20% in outcomes. This is a new finding for the field of workplace wellness and it is supported by organizational change theory, which suggests that there must be a match between employers' efforts and employees' desires in order to change behavior.<sup>64</sup>

One major limitation of these findings is that the results are not generalizable to all employers in the UK or wellness programs generally. The survey was part of a voluntary competition into which employers entered, likely because they felt they had some chance of winning the competition. This means that the programs represented in the survey may have been, on average, more comprehensive than wellness programs generally. Performing this sort of comparative analysis would be extremely useful on a more representative sample.

Another major limitation is that our operationalization of the different program components was based on the information available in the survey. There are a variety of ways that these components could be operationalized, which would likely affect their relative effect. Particularly, leadership is a difficult construct to measure. Our measure included elements of a validated scale for wellness program leadership, but the full scale was not included in the survey. Further research should examine different components of leadership and their relationship to outcomes.

Finally, this analysis was entirely based on self-report at the employer and employee-level. We did not verify whether employees actually participated or whether and employer actually offered the services they reported. Future research would benefit from direct measurement of outcomes and program components.

While components recommended by the guidance literature are associated with employee participation and perspectives, any single component's association changes in the presence of other components. This supports other studies that have shown the size of incentive effect on participation to be dependent on program design<sup>25</sup>,

communication<sup>26</sup> and organizational characteristics.<sup>27</sup> Programs can potentially improve outcomes if they incorporate a moderate number of services, supported by education of employees and management of the importance of health and well-being, promotion strategies and opportunities for employees to participate during the work day.

Research on the different components and the relationships between them is important to understanding the most effective configurations of wellness programs. With appropriate program design, employers could reduce healthcare costs and productivity losses by reducing incidence of chronic disease and improvement management of existing conditions.

## 4. Development of the Wellness Program Evaluation Tool

### Background

Two major causes for unconvincing results from wellness programs are heterogeneity in design and evaluation. In studies of multiple employers, programs have been shown to have different levels of services<sup>65</sup>, cover different areas of health promotion (e.g. disease management, health screening)<sup>29</sup> and use different strategies for engaging employee populations.<sup>25,27</sup> This heterogeneity is likely due to heterogeneity between workplaces. Research suggests that small employers (less than 100 employees) are less likely to offer wellness programs than large employers (more than 1,000 employees).<sup>29</sup> Small employers are also typically less likely to offer programs with a large array of services due, in part, to resource constraints.

Generally, small and medium employers have been targeted by vendors and governments as a population that can benefit from adoption of programs or improvements in their current program's design. For example, the Department of Work and Pensions in the UK specifically targets small and medium employers for taking on health promotion programs.<sup>10</sup> In the US, the Affordable Care Act allocates \$200 million in grants for small employers to offer wellness programs.<sup>49</sup> Additionally, companies in blue-collar industries such as manufacturing are less likely to offer health promotion programs focused on preventing and managing chronic disease.<sup>29,66</sup> This is problematic, as workers in these industries tend to be at higher risk for cardiovascular disease.<sup>67</sup>

Even among programs that are well-resourced, evaluation is either not done or done with varying quality. Several meta-analyses have found mixed effects of wellness programs on employee outcomes and pointed to design flaws in evaluations as potential reasons for these effects.<sup>15-17</sup> Most of the evaluations these articles examined were

observational and, even when there was a comparison group, there was limited randomization or matching based on demographics.

Even when resources have been available for evaluation and randomized controlled trials (the gold standard for evaluation) have been conducted, there are issues with the specification of outcomes and mixed results.<sup>56</sup> Many studies focus on participation in the program, which can be measured as the number of sign-ups or the number of people completing a course of engagement (e.g. a smoking cessation course), with different results.<sup>68</sup> Others focus on return on investment (ROI), the results of which may be influenced by the design of the evaluation. A study in 2014 found that observational evaluations had higher ROIs than high-quality experimental evaluations.<sup>69</sup>

To encourage more standardized and complete evaluations of wellness programs, several organizations have released guidance for program design to direct employers towards effective program and evaluation designs. The Wellness Councils of America (WELCOA) provides the 7 Benchmarks towards a results-oriented program.<sup>5</sup> The Centers for Disease Control and Prevention has a list of essential elements of a workplace health promotion campaign.<sup>4</sup> The Health Enhancement Research Organization (HERO) has made an evaluation tool to track progress towards a best-practices-guided program available free-to-use by employers.<sup>24,28</sup>

However, all of these guidance tools are based on driving employers towards large-scale comprehensive wellness programs and thus target employers with ample resources already available for design and evaluation. The guidelines focus on understanding the path towards a certain type of program, but provide little for companies still in the process of building support or in the early stages of a program. There is a need

to understand the considerations of these employers and whether these guidelines are applicable across settings.

In order to address this need, I developed the Wellness Program Evaluation Tool (WPET), a low-burden, flexible tool for employers of all stripes to examine their programs and compare them to best practices. This paper describes the theoretical and practice grounding for the development of WPET.

### **The concept of “comprehensiveness” in program design**

In order to establish the theoretical grounding for WPET, the first step was to review existing guidance for wellness programs. Guidance focuses on four key elements of program design: Services, incentives, promotion and leadership.<sup>3,5,6,54</sup> A properly designed program, also referred to in the literature as a “comprehensive” program will typically include the following:

1. A variety of services with broad appeal to the employee population
2. Targeted and results-oriented incentives
3. A communication and promotion strategy targeting all employees
4. Engagement of leadership at all levels to support implementation and promote participation

The following sections outline the evidence behind these recommendations.

#### *A variety of services with broad appeal to the employee population*

In deciding what services a program will offer, employers are best served by services that match their employee population. An examination of organizational factors that influence the effectiveness of wellness programs suggested that employees are likely to participate only when they perceive a match between their values and those of the

“innovation” (in this case, the wellness program).<sup>70</sup> When services are arbitrary or enforced without employee buy-in, organizational culture literature suggests that a conflict may occur resulting in resistance or sporadic compliance.<sup>52</sup>

Additionally, deciding which services to offer involves considering the needs of a diverse group of employees. Studies have indicated participation rates in workplace health promotion programs differ by gender<sup>71</sup> and socioeconomic status.<sup>72,73</sup> Female employees were more reactive to environmental changes (e.g. snacks offered in cafeterias) and blue-collar employees perceived less emphasis on health in the workplace. Surveys of employees have found that they prefer programs with a variety of services and ones that allow them to involve their families (e.g. health fairs).<sup>35,74</sup> The evaluation literature supports this self-reported preference, showing that programs with a large array of services and components were more likely to have higher participation and show greater effect on employee health behavior.<sup>6,55,56</sup> However, this relationship does not appear to be linear, so programs seeking high participation may want to consider expanding other components along with increasing the level of services.<sup>75</sup>

#### *Targeted and results-oriented incentives*

In an effort to engage employees in wellness programs, employers typically use incentives. Incentives can be monetary (e.g. change in contribution to health plan) or non-monetary (e.g. trophies) and monetary incentives can be rewards (e.g. lower contribution to health plan) or penalties (e.g. higher contribution to health plan). The use of incentives to encourage participation has been recommended by much of the guidance on wellness program design.<sup>5,6,53,54</sup> In one study, incentive value and participation were

suggested to have an almost linear relationship; the higher the incentive value, the more participation an employer could expect.<sup>45</sup>

However, exploration of proper incentive design is lacking. Osilla et al. in their systematic review of wellness program evaluations found that 70% of the programs used incentives, but none evaluated the effectiveness of their chosen incentives.<sup>17</sup> Another study suggested that incentives may be the component most weakly associated with participation rates.<sup>65</sup> Generally, though incentives have been shown to increase participation rates, there are design elements that may make them more or less effective. The American College of Occupational and Environmental Medicine (ACOEM) recommends that employers consider an incentive that matches the amount of effort an employee is expected to exert.<sup>24</sup> The ACOEM also identified the potential of outcomes-based incentives; incentives tied to some “ideal” performance indicator (e.g. cholesterol less than 200 mg/dL).<sup>24</sup> These types of incentives are frequently in use for smoking cessation programs, where employees must reach a certain participation level (e.g. number of sessions with a counselor) or actually reduce the amount they smoke in order to receive an incentive.<sup>76</sup>

#### *Extensive communication and promotion strategy targeting all employees*

Related, but separate from incentives are promotion efforts such as health fairs, newsletters and providing ample opportunities for participation. There is ample evidence from the health promotion literature of the effectiveness of environmental changes such as informational posters and educational materials.<sup>77-79</sup> Additionally, employees list having opportunities to participate in a program during worktime as one of the most

desirable elements of a wellness program.<sup>35</sup> Accordingly, many of the best practices guidance recommends extensive communication strategies and multiple opportunities to engage in a program.<sup>4,6</sup>

These recommendations have been supported by the evaluation literature. In an evaluation of a worksite obesity prevention program, Goetzel et al. randomized worksites to one of three types of programs, each with different levels of promotion.<sup>57</sup> Low-level promotion activities included email newsletters and posters. Medium-level promotion activities added point-of-choice messaging and other environmental prompts. High-level promotion activities added management training and health objectives as management goals. Reductions in BMI and cholesterol were only significant among the programs with high-level promotion activities.

*Engagement of leadership at all levels to support implementation and promote participation*

Generally, leadership is often recognized as one of the most important drivers of organizational change.<sup>80</sup> Having management involved in health promotion efforts has been linked with increased impact in terms of self-reported health and absenteeism.<sup>81</sup> And while much of management is aware of the impact of health issues on worker productivity and acknowledge the role of the workplace as a setting for health promotion, these values are not necessarily held by all levels of management.<sup>2,23</sup>

A qualitative study of three Canadian companies implementing interventions to manage musculoskeletal conditions found that while senior management was supportive of the interventions, middle-management was apathetic or, in one case, resistant to

change.<sup>82</sup> Indeed, in a survey of management support for worksite health promotion, line managers were less likely to see health promotion as an important activity for employers to carry out.<sup>52</sup>

Apathy or, worse, resistance to a wellness program by management can lead to issues convincing employees of the sincerity of the goals of the program to improve their health. Concerns over sincerity are cited as a main barrier to employee participation.<sup>74</sup> Blue-collar workers may be especially sensitive to this, as one survey found blue-collar workers more likely than white-collar workers to perceive a lack of concern for health among their supervisors.<sup>72</sup>

Berry et. al. has the engagement of multiple levels of leadership as its first pillar of an effectiveness wellness program.<sup>53</sup> Research has suggested the idea of the wellness “champion”, or a local leader that promotes engagement with the wellness program among coworkers.<sup>83</sup> By engaging middle-management or supervisors as champions or training them in the importance of health promotion, programs may achieve better reach among employees

### **Evidence-based evaluation tools**

One cross-cutting component included in the guidance literature is repeated evaluation whose results are used to drive improvement in the program. This may be one of the most important elements of a program, as studies have suggested that poor evaluation designs may be responsible for the mixed effects of wellness programs.<sup>15-17</sup> In order to standardize and facilitate evaluations, organizations such as WELCOA, National Institute for Occupational Safety and Health (NIOSH) and Partnership for Prevention have released benchmarks for “comprehensive” wellness programs:

- WELCOA: Characteristics of a comprehensive or results-oriented wellness programs organized under seven benchmarks (i.e., Capturing CEO Support, Creating Cohesive Wellness Teams, Collecting Data To Drive Health Efforts, Carefully Crafting An Operating Plan, Choosing Appropriate Interventions, Creating A Supportive Environment, and Carefully Evaluating Outcomes).<sup>5</sup>

- NIOSH Essential Elements: Twenty key considerations organized under the headings Organizational Culture and Leadership, Program Design, Program Implementation and Resources and Program Evaluation.<sup>4</sup>

- Partnership for Prevention: Resources for employers considering implementing wellness programs and examples of optimal levels of service provision for wellness programs.<sup>6</sup>

Each of these pieces of guidance helpfully synthesize years of research and provide a series of goals for employers to aim for in designing and revising their programs. However, as with all guidelines, an employer can tell whether they are or are not meeting them, but cannot use them to quantify their progress towards the ideal comprehensive program. To fill that need, the Centers for Disease Control and Prevention (CDC) and the Health Enhancement Research Organization (HERO) released scorecards that allow repeatable, standardized evaluation.

- HERO Scorecard: An online interactive tool that tracks progress towards best practices. Employers progress through the tool, providing information about employee populations and promotion efforts.<sup>24</sup>

- CDC Worksite Health ScoreCard: A checklist of 124 elements that include each of the above three components as well as other organization-wide policies (e.g., emergency response plans). Each element is worth a number of points, which are summed up at the end. These scores can be compared to a benchmarking study of 93 US employers.<sup>84</sup>

Both of these tools are free and easy to use. The elements included are based in the literature on “comprehensive” programs and have been validated by researchers. A completed scorecard quantifies progress and allows employers to compare their programs to benchmarks and other programs. A summary of the features of the guidelines and tools is presented in Table 8.

Table 8: Guidelines and tools for program design

	<i>Guidelines</i>			<i>Tools</i>	
	<b>WELCO A</b>	<b>NIOS H</b>	<b>Partnership for Prevention</b>	<b>HERO</b>	<b>CDC</b>
Items related to:					
Services	x	x	x	x	x
Incentives	x	x	x	x	x
Promotion	x	x	x	x	x
Leadership	x	x	x	x	x
Interactive				x	
Measures progress				x	x
Compares similar				x	
Requires data:					
Employee				x	x
Program				x	x
Adaptable template					
Validated		x	x	x	x
Updated	x			x	

From Table 8, one can see that both guidance and tools measure an employer's program against the "comprehensive" standard established by the literature and thus allow for little flexibility. In the case of the HERO scorecard, employers are asked for extensive information about their employee population (e.g. turnover rate, average age), which may not be readily accessible to smaller employers. While these scorecards are useful for employers on track to create comprehensive programs, they offer little to small employers or employers just getting started with wellness.

In designing the WPET, I aimed to fill that missing element connecting smaller and early-stage employers to the guidance in the literature by providing a flexible framework for measurement. But in order to understand how evaluation was being undertaken in the field, I decided to connect with wellness program managers and proponents to understand what was taking place outside the academic sphere. This would provide the practice-based grounding for the WPET tool.

## **Practice grounding**

### *Methods*

Over the course of 2016, I conducted semi-structured interviews with a convenience sample of 2 program managers, 3 vendors and 4 business group leaders (i.e., individuals who organize and moderate discussions among business leaders) attempting to gather their views on program uptake, design and evaluation. I decided on these three aspects as they cover the thinking behind the initiation of programs, the design of programs and

how evaluation is currently being used. The key semi-structured questions used to guide the discussion are listed in Table 9 below.

Table 9: Semi-structured interview questions

<b>Program uptake</b>	<b>Program Design</b>	<b>Evaluation</b>
What is the general wellness strategy?	What are the key aspects of a successful component or program?	Do programs typically or does your program include evaluation?
Why do employers take up these programs?	What are the components that can cause problems or act as barriers to success?	How do you or other employers use evaluation results?
What do you think are the barriers to taking up these programs?		What could help facilitate or improve evaluation of wellness programs?
What does employee engagement look like?		

Program uptake focused on the motivation and strategic vision of wellness programs. I sought to understand through conversations with stakeholders the barriers and facilitators to program uptake. I also asked what “engagement” looked like to these stakeholders. As described above, participation can be measured in various ways and so I sought to understand how people involved in practice were envisioning it.

To understand program design, I asked interviewees to describe some effective and less effective elements of wellness programs. In this, I was looking to understand how much overlap, if any, there was between wellness program practice and theory.

Within evaluation, I asked about what strategies interviewees had used or seen used for evaluation, how results are incorporated into the program and key elements on which an evaluation tool such as WPET would need to focus.

## Results

### *Program uptake*

In explaining why wellness programs are taken up, interviewees almost unanimously mentioned health insurance costs as a motivator, but made the point that concerns about employee wellbeing were also top-of-mind for employers. A business group leader suggested that the programs picked up where health plans left off; health plans did not do enough for health promotion so programs are implemented to fill the gap. Interviewees agreed that wellness programs paid dividends in terms of worker productivity and increasing satisfaction with the work environment.

Even so, reducing healthcare costs were mentioned across the board by interviewees. One vendor pointed out that personnel costs made up the biggest expense on the budget line and that many employers were eager to find some way to control these costs. This desire to reduce costs sometimes led to unrealistic expectations in terms of ROI from wellness programs. One vendor mentioned that only recently have employers begun to accept other measures of outcomes (e.g. productivity and satisfaction).

Barriers to employer taking up wellness programs mainly revolved around budgetary concerns. Interviewees pointed out that many of the employers receiving attention for their programs were larger employers with extensive resources for providing services and promoting change. Employers and business group leaders referred to the importance of making a solid business case for programs. One program manager for a large employer explained that they had on-site health clinics, but that was because there were enough employees on-site to make this kind of service worthwhile. For smaller employers or employers with many employees off-site, this would make less business sense.

The business case acts as a particularly large barrier for employers in the United Kingdom because of its National Health Service (NHS), which offers free entry health provision to the general population. One vendor from the UK pointed out that private insurance is only available to a fraction of the population, and thus wellness programs are less likely to have a significant impact on healthcare costs. Similar issues were suggested to impact employers in the US with few employees on company insurance policies.

Generally, interviewees suggested that the business case for programs was most likely to have impact if leadership valued health. One vendor mentioned that one of the first questions they ask when speaking with employers is whether the CEO values employee wellness. All interviewees pointed to the importance of engaging leadership in any health promotion strategy.

According to interviewees, programs typically begin with employee surveys to gauge what elements of a health promotion strategy most appealed to employees. One program manager of a medium-size employer found that many employees supported the idea of a wellness program. The manager of a large-size employer's program said the survey came out of a smaller initiative of corporate challenges targeted at employees of the main office.

There was some degree of consensus on using Health Risk Assessments (HRAs). Employers used HRAs to understand the current risk profile of employees and guide the design of the program. One medium-size employer presented the results of HRAs to participants to see how they compared to other employees. They saw the HRA as both a service provided by the program and input from participants on program design.

When asked about wellness strategies, interviewees' answers varied. One medium-sized employer stressed the importance of giving participants a snapshot of their health risks and their participation details at the moment of participation. A large-sized employer described their strategy as easing employees into participation, with low-burden activities at first and moving on to a results-oriented structure. Vendors proposed a comprehensive approach that focusing on changing culture and educating not just employees, but leadership as well. This nebulosity in these answers seemed to be reflective of a loose definition of what wellness means. One vendor suggested that wellness doesn't have a definition. Business group leaders suggested that employers are all doing something different in their approaches.

A similarly nebulous concept for interviewees was engagement. Interviewees had specific ideas of what engagement meant with only slight overlap. One vendor in the UK defined engagement as emotional attachment to one's health. A business group leader suggested the more succinct definition of "benefits literacy". There was more agreement on how best to encourage and measure engagement. Vendors perceived that participation rates across services were viable measures of engagement. One vendor was focused on tracking the progress of employees through the course of engagement in the program. Business group leaders and employers suggested that the best way to achieve engagement was to create a warm, welcoming environment. Generally, this appeared to entail a rejection of penalties and a focus instead on reaching more employees.

#### *Program design*

When asked about the key components of a successful program, interviewees mentioned many of the same components identified in the guidance literature (i.e.

services, leadership, incentives). Business group leaders and employers stressed the importance of having engaged leadership. One business group leader suggested that employers will take cues from other employers and a program with extensive offerings and engaged leadership will encourage other employers to create similar programs.

Though interviewees were not asked about what offerings appear most effective, a few suggested that Health Risk Assessments and healthy activity challenges could be good introductory methods for engaging employees. They also agreed opportunities at all levels of effort were important. Vendors recommended encouraging employees into the program with incentives, structured to be commensurate with the amount of effort required. Program managers appeared focused on making interactions convenient and getting the most out of those interactions. One large employer recommended allowing participation during work time, but warned that without leadership support, this kind of initiative wouldn't be possible.

However, interviewees mentioned that it wasn't enough to just stand up all these elements; they have to be properly implemented. A medium-sized employer made the point that it is not enough to simply track health, there needs to be challenges to drive employees to make changes. Vendors agreed that challenges are key and that incentives need to be structured in such a way to encourage repeat and increasing involvement in a program.

One of the major barriers to successful programs identified by interviewees is poor or incomplete communication strategies. One large employer gave as an example a segment of their employee population that had limited access to email or low proficiency with English. To reach that population the employer suggested communication strategies

outside of email and in the languages of their employee population. Vendors and business group leaders mentioned that these populations may also not be used to being engaged by the employer and may be skeptical of the motives of programs.

Communication strategies also include lines of communication between employers and their vendors. One business group leader mentioned that some employers did not regularly communicate and evaluate their vendors. Employers we interviewed again brought up leadership engagement as an important component of an effective communication strategy.

### **Evaluation**

When asked about evaluation strategies, interviewees all discussed health risk assessments as easily quantifiable early-stage evaluations. Employers and vendors both used these measures mainly because they gave an idea of the health of the employee population and therefore could help guide the development of a program. One medium employer mentioned both surveys and biometric measures pointed to as a major concern for their employees and, based on that, began offering stress management services.

However, interviewees also agreed that tracking health risk was not enough to measure program effectiveness. Vendors explained that it was difficult to measure the “success” of a program and that employers typically looked for changes to health insurance costs rather than productivity or employee perceptions. Adding to this difficulty for vendors is that outcomes like productivity are less easily operationalized than biometrics.

Business leaders and vendors expressed concern about program evaluation generally. One business leader mentioned that among the few employers who were doing

any sort of evaluation and even smaller proportion were doing quality or comprehensive evaluations. Another business leader was concerned about the quality of data being collected and whether liability concerns were keeping employers from more in-depth evaluation.

Generally, interviewees felt there was a need for more evaluation tools to be placed in the hands of employers and more standardization in those tools. Vendors felt employers needed to be aware of what their employee population looked like and whether their program was designed to match that population. Business leaders insisted tools needed to be easy-to-use so program managers were able to present design strategies to leadership. Interviewees insisted that communication was being left by the wayside in evaluation and needed to be included in any tools being developed.

### **Discussion**

In this practice grounding for the development of WPET, I conducted nine semi-structured interviews with relevant stakeholders who had experience with design, implementation and evaluation of wellness programs. Generally, interviewees supported the four component model established in the literature. Having leadership buy-in is a key component of an employer adopting a program and that programs' eventual success. Promotion activities like allowing participation during worktime are only able to be adopted in programs with solid leadership buy-in. In order to achieve that buy-in, it is essential to continually make a business case, showing how the program supports the goals of reducing costs and improving employee wellbeing.

Components and services such as incentives and HRAs are important, but with the caveat that simply setting them up and leaving them is not be enough. These

initiatives need to be part of a comprehensive strategy and viewed in the context of the program generally.

Poor or incomplete communication strategies are one of the major barriers to a program's success. Program managers need to be aware of the employee population with which they are communicating in order to account for language barriers and other hard-to-reach segments. Also, communication needs to involve the various vendors a company may use so that the employer is aware of what services they are offering and who they target.

This inventory of services is particularly important when ensuring that there are opportunities for employees to participate at all levels of effort. One possible design would be to encourage employees with incentives commensurate with their engagement in the program.

This gradualist approach appears to be a popular strategy in wellness program development. Easing both employees and leadership into the program can help build engagement and better structure additional components to meet the needs of both parties. As part of this strategy, regular evaluation was recommended, with the results informing changes to the program.

Generally, it appeared that a tool that would be most useful to employers would be low-burden and repeatable with a low barrier to entry. Since program roll-out strategies seem to take a gradualist approach that slowly build buy-in among employees and employers, it is important that a tool be adaptable to gradual implementation. Again, this appears to support the need for a tool that serves as a bridge between the more intensive scorecards (e.g. HERO and CDC) and the smaller, developing programs.

### **Developing the Wellness Program Evaluation Tool (WPET)**

The WPET was designed to bridge the gap between early-stage programs and more extensive evaluation tools. Across all guidelines and scorecards, the four components are included (i.e., leadership, incentives, promotion and services). Similarly, WPET has these four components. The existing guidelines, however, are not interactive and do not provide scores for quantifying progress. Scorecards address this gap, but are not adaptable to smaller companies or early-stage programs. The WPET is an attempt to fill that gap by allowing users to decide what components are measured and still providing visuals that yield actionable insights.

The tool is designed using the Shiny package for the R statistical programming language. Shiny allows fully interactive applications to be deployed locally or over the internet. Employers can upload information and run the WPET on the website. Alternatively, employers would be able to download versions of the code and run it themselves after installing some prerequisites. Once installed, the application could be run locally and employers could use the tool to produce visuals of their program components. Please refer to the Appendix for a complete user manual.

In order to provide this flexibility to be run by employers just starting out with their wellness program, the tool allows employers to either use a standard template for filling out information on their program or upload their own data into the tool. The output of the tool is a series of visuals that can be a basis for thinking strategically about program development and for communicating with employees and leadership. These visuals can also be compared to comprehensive programs or programs with similar characteristics.

**Example case: A barebones program**

An illustrative use-case for the WPET is for an employer who has just started their wellness program and has only implemented the following:

- The wellness program is now discussed at the board level (Leadership)
- Management is aware of the program and provides funds for the implementation (Leadership)
- There are promotional posters for the program at the worksite (Promotion)
- Monetary incentives are offered for participation (Incentives)
- Health Risk Assessments are being performed (Services)
- There are discounts on gym membership being offered (Services)
- Healthy food options are available in the canteen (Services)

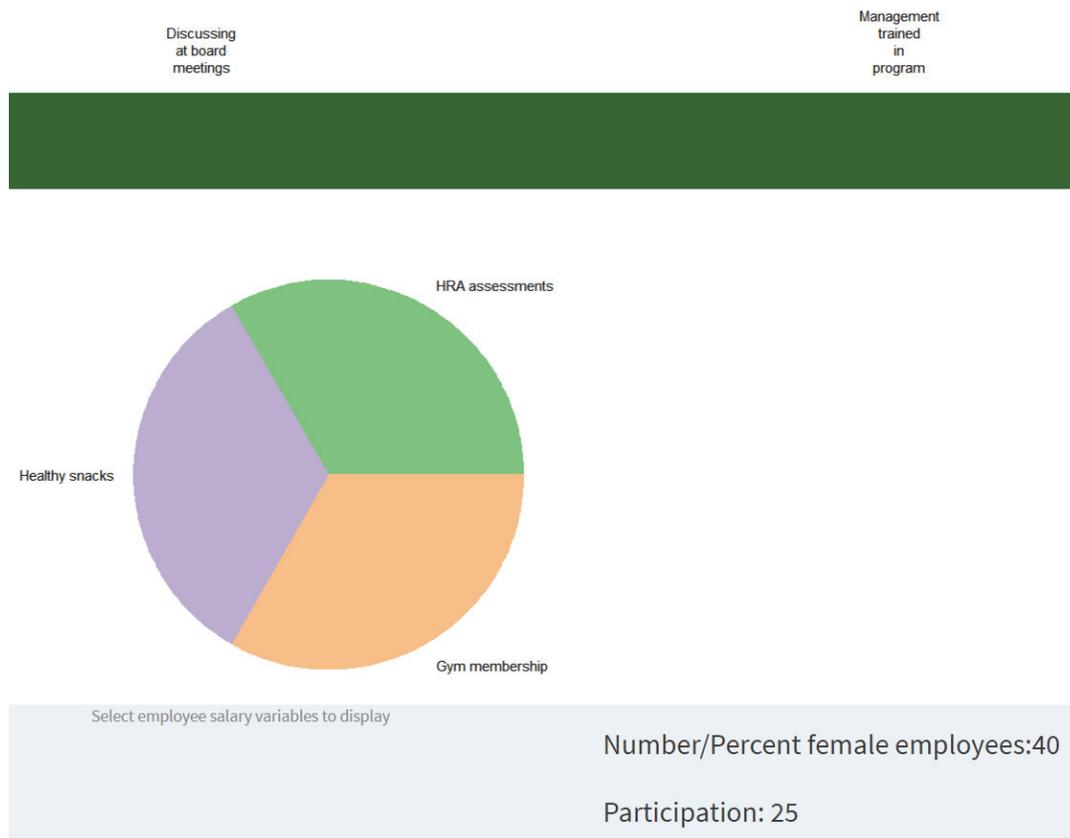
Additionally, the employer has information on the participation rate and the number of female employees. For the employer's first interaction with the tool, it is decided not to use the template, but rather to input these items in an excel spreadsheet to be read into the tool. Once it has been read in, the employer then goes through the components, checking off an item if it falls under the description of the component. For example, Figure 2 displays the leadership component, with each of the named rows from the data able to be checked if they are part of the leadership component.

**Figure 2: WPET leadership component**

<p><b>Which columns describe "leadership"?</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Discussing at board meetings</li> <li><input checked="" type="checkbox"/> Management trained in program</li> <li><input type="checkbox"/> Posters</li> <li><input type="checkbox"/> Incentives</li> <li><input type="checkbox"/> Percent female</li> <li><input type="checkbox"/> Participation</li> <li><input type="checkbox"/> HRA assessments</li> <li><input type="checkbox"/> Healthy snacks</li> <li><input type="checkbox"/> Gym membership</li> </ul>	<p><i>Leadership</i> is often recognized as one of the most important drivers of organizational change.<sup>[1]</sup> Much of the guidance literature emphasizes leadership as one of the major components for building effective wellness programs.<sup>[2][3]</sup> Having management involved in health promotion efforts has been linked with increased impact in terms of self-reported health and absenteeism.<sup>[4]</sup> Berry et. al. has the engagement of multiple levels of leadership as its first pillar of an effectiveness wellness program.<sup>[5]</sup> Research has suggested the idea of the wellness “champion”, or a local leader that promotes engagement with the wellness program among coworkers.<sup>[6]</sup> By engaging middle-management or supervisors as champions or training them in the importance of health promotion, programs may achieve better reach among employees. Some key components of leadership engagement are contained in the Leading By Example scale.<sup>[7]</sup></p> <p>1. Martins EC, Terblanche F. Building organisational culture that stimulates creativity and innovation. Eur J Innov Manag 2003;6:64–74. ↵</p> <p>2. Berry LL, Mirabito AM, Baun WB. What's the hard return on employee wellness programs? Harv Bus Rev 2011;89:20–1.  <a href="http://www.ncbi.nlm.nih.gov/pubmed/21513264">http://www.ncbi.nlm.nih.gov/pubmed/21513264</a> ↵</p>
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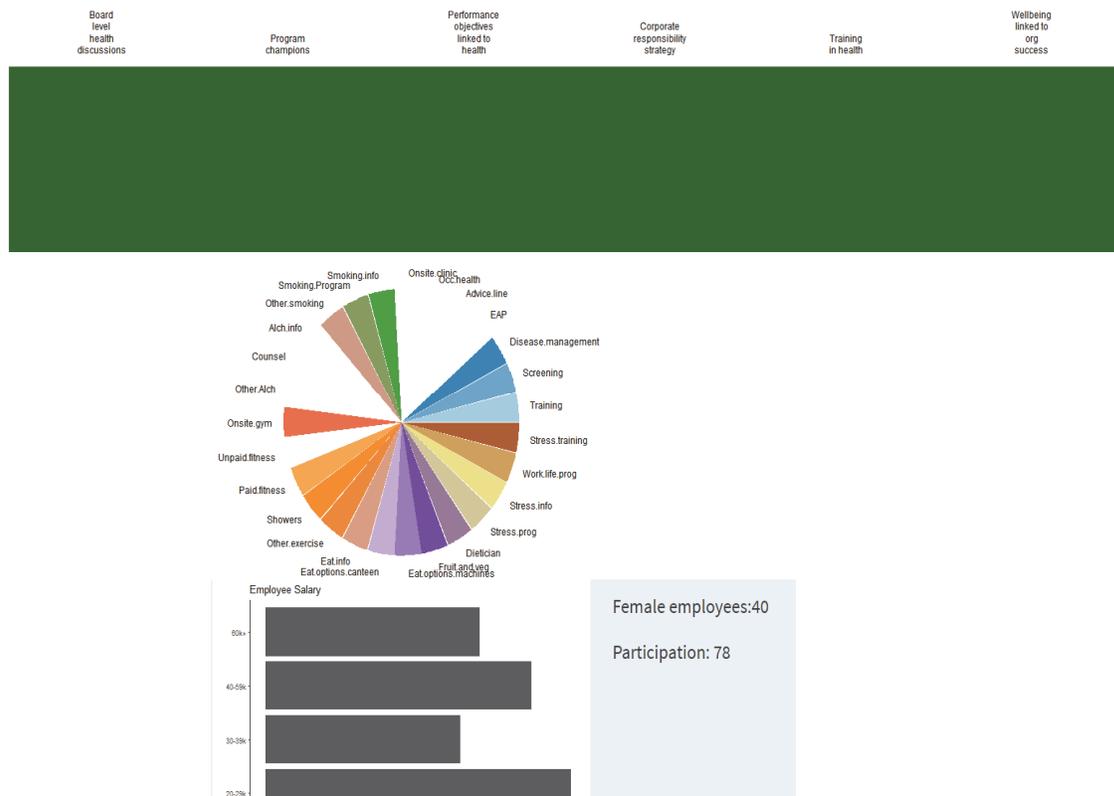
After each of the components has been filled out, the employer can then access the dashboard (Figure 3). The dashboard shows the leadership and services component, along with employee information. The leadership component shows the two leadership elements with green bars under them, as they are marked as being provided in the data. As the employer adds in more information, more components will be displayed.

Figure 3: Program dashboard



The employer also is able to look at the dashboard for a company with similar demographics in their employee population, but with higher participation rate (Figure 4)

Figure 4: Dashboard for a similar company



Using this dashboard, the employer would be able to understand that a company with a similar employee population was able to achieve higher participation rates by having extensive leadership support and a variety of services. This may give the employer some short-term goals for increasing participation.

For long-term goals, the employer can also compare their program versus a comprehensive benchmark. The comprehensive example comes from the Britain's Healthiest Company contest and includes all of the components discussed above. This example provides a long-term goal for employers to target.

## Conclusion

In this paper, I aimed to address the issue of poorly designed or non-existent evaluation of wellness programs. I reviewed the literature in order to establish evidence-

based benchmarks for evaluation (i.e. the concept of a “comprehensive” wellness program) and vetted the benchmarks through semi-structured interviews with employers, wellness program vendors and business leaders. I identified guidance literature and scorecards structured to guide employers towards these benchmarks, and identified a lack of flexibility and ease-of-use for early-stage or small employers who more often had a gradual approach to program rollout.

With the wellness program market expanding as it has in the past few years, allowing for variation in data availability and program design in developing program evaluation tools is essential. Towards that end, I developed the Wellness Program Evaluation Tool (WPET), which provides employers of all shapes and sizes a way to connect with the guidance for program design.

The WPET is not designed to be a replacement for existing measurement tools. The HERO and CDC Scorecards are regularly updated and validated by experts, but they are limited in their flexibility, which makes it difficult for small or early-stage employers to connect with them. The WPET is designed to fill that gap and aid program managers to get to the point that they can use the CDC or HERO Scorecards.

The reason an employer may want to transition from WPET to more complex scorecards is that the comparison measures in WPET (i.e. Similar/Comprehensive dashboards) do not offer the detail of the other scorecards. The comparison measures in WPET appear to advocate a “more of everything” approach which, as mentioned in the previous chapter, may not be the right way to improve outcomes. However, once an employer is able to connect with the CDC and HERO scorecards, they will have access to

a more detailed picture of where their program stands versus other programs. This will allow for more informed strategic planning than the WPET will allow.

The WPET is open-source, which means it can be downloaded, used and, importantly, edited. Researchers or practitioners who would like to personalize the WPET or contribute to the project will be able to, which allows for even greater flexibility. Future development on WPET could focus on building in more detailed comparison measures, which may make it an even better complement to existing measurement. As of now, the similar program is based on employee characteristics and participation rates. However, additional development could match based on industry and regional/country context.

Employers can now make use of WPET, which provides descriptive visualizations of their programs and allows them to compare these visuals to similar programs and programs that meet research benchmarks. With this, an additional segment of the wellness program market now is equipped with the tools that will enable them to better engage their employees in wellness initiatives. In future versions of the tool, more comprehensive visuals and more granular comparisons could lead to better strategic insights and stronger business case presentations. If these initiatives are able to achieve the returns suggested in some of the evaluation literature, they provide an excellent opportunity for public-private partnership to reduce the incidence and severity of chronic illness.

## 5. Conclusion

The rapid expansion of workplace wellness programs and support for them by government policies are promising signs of a private-partnership to combat chronic illness. However, policymakers, researchers and program designers should consider the program context as it is clear that characteristics of the program and the employer relate to employee outcomes. Results from these programs have been mixed due in part to low participation rates, heterogeneity in design and non-existent or improperly designed evaluations.

A number of organizations and government departments have taken steps towards defining an ideal standard for program design (i.e. the comprehensive program) and providing employers with tools to track progress towards that standard. However, just as the expansion of programs has outpaced the evidence, the guidance for program design has outpaced the programs. Much of the guidance is targeted towards large employers or employers with substantial resources already dedicated to program design and expansion. As a result, small employers and employers just getting started with wellness programs are in need of a bridge between them and the existing guidance.

The previous three chapters addressed three major needs in the wellness program literature. Chapter 1, “Understanding the relationship between incentive design and participation in US workplace wellness programs”, analyzes incentive use across 589 companies and shows that use varies by employer characteristics. The structure of the incentive itself plays a role in its effectiveness, with any reward-type incentive showing association with higher participation, and penalty-type incentives having a strong association. However, penalty-type incentives are extremely controversial and require

buy-in from various company stakeholders. Thus, when considering incentive structure, the program design context needs to be considered.

The program design context is discussed in Chapter 2, “Is more always better when it comes to workplace wellness program design?”, which analyzes the relationship between program components and employee outcomes. The relationship between components and outcomes appears to be attenuated by the presence of other components, and specific elements (e.g. opportunities to participate during worktime) appear to be strongly related to better outcomes.

The results of the study suggest that more components do not necessarily mean better outcomes. Instead, program designers are better served by understanding the needs of the employees and adapting their programs accordingly. An employer in the early phases of program rollout may want to focus on improving access to services rather than expanding the number of them.

In order to adapt guidance standards to early-stage programs, Chapter 3, “Development of the Wellness Program Evaluation Tool (WPET)”, outlines the development of an evaluation tool flexible enough to be applied across contexts. Though researchers and employers agree on the importance of comprehensive program design, none of the existing tools accommodate a gradual rollout of program components. The WPET is an attempt to reconcile the research with the needs of employers and bridge the gap between early-stage programs and more extensive evaluation tools.

One issue worth considering in making use of this research is that the first and second chapter use data from different contexts (i.e. the US and the UK). In the US, 50% of people obtain their health insurance through their employer.<sup>85</sup> In the UK, this number

is 11%, with the other 89% covered by the National Health Service.<sup>86</sup> Typically, the population with employer-sponsored health insurance in the UK are working-age and likely to have higher socio-economic status.<sup>87</sup> This suggests a difference in the population targeted by employer-sponsored wellness programs.

Due to these differences, the employer incentives for implementing and expanding wellness programs are different in the different contexts. Employers in the US have the incentive of reducing healthcare costs by driving uptake of wellness programs and there is an extensive regulatory structure with which they must work to design the programs.<sup>88</sup> In the UK, where the burden of medical costs is shifted away from employers, the business case for wellness programs is not quite as clear.<sup>89</sup> Likely related to this, there are few regulations on the design or implementation of programs.

However, the goal of wellness programs remains the same; to reduce incidence and severity of chronic illness. Since guidance is designed to help achieve this goal, it is useful across contexts. The critique this research presents of the current guidance approach (i.e. the focus on incentives beyond what the evidence supports and a “more of everything” approach to achieving comprehensiveness) will help support the achievement of that goal across contexts.

But, as mentioned throughout these findings, guidance always needs to be adapted to employer and employee considerations (e.g. resource constraints for employers, time constraints for employees). Findings on the effectiveness of penalty-type incentives need to be considered in the context of a country’s anti-discrimination regulation (e.g. the Americans with Disabilities Act). Additionally, leadership engagement is important

across contexts, but in countries where there is public health insurance, building the business case for comprehensive wellness programs may be more difficult. As suggested throughout this research, context of both program and employer are important considerations in design and evaluation.

With the rapid expansion of wellness programs, it is unsurprising that a multitude of contexts and practitioners leads to heterogeneity in design and evaluation. But with increasing resources and attention being focused on these programs, the guidance literature needs to adapt to this market just as the market needs to connect to the guidance. Both guidance literature and employers appear to focus on a “more of everything” approach; implementing higher incentives and more services. However, the research presented here suggests that program designs need to be context-aware and that guidance and design need to be adaptable. Employers of all sizes need to be provided with the tools and research to think strategically about their programs, rather than cherry-picking individual components (e.g. incentives) or adding services of little appeal to their employees.

To improve population health and reduce the burden of chronic disease, policymakers, researchers and employers need to work together to ensure they're implementing the most effective strategies. Policymakers should seek to encourage uptake of programs by providing services for small employers that may be having difficulty in starting their wellness programs. This could take the form of providing health assessment referral services for employers such as the UK's Fit for Work program.<sup>90</sup> A public-private partnership like this one would not only encourage program uptake, but also link program design to best practices established in the research.

Researchers should support the policy effort by endeavoring to understand where and why best practices are not being followed in program design. With the comprehensive model established, the next step is to draw out pathways towards comprehensiveness and establish the most effective elements of each component (e.g. opportunities to participate during worktime).

Employers should communicate with their employees to understand what they would like to see in a wellness program. This should be incorporated into an evaluation component that can provide data for quality improvement grounded in the actual needs of the employee population. It is only through this evidence-based partnership that we can hope to achieve the promise of a healthier public that has brought the private and public spheres together in designing effective wellness programs.

## Appendix A: WPET user manual

(available at: <https://github.com/bpben/wellness>)

### WPET User Guide

#### *Installing WPET*

To use WPET, you will need to install the R statistical package (the program that runs the application) and the application scripts.

You can download R from this website: <https://www.r-project.org/>

The WPET script repository is here: <https://github.com/bpben/wellness>

To install the scripts, you will need to click on "Clone or Download" and then "Download Zip". You will then be able to unzip the archive to the location of your choice.

#### *Formatting your data*

To prepare your data for use in the tool, you can either use the template (in the data directory of the downloaded WPET scripts) or create an excel file that has your program data. If you choose not to use the template, it may still be useful to refer to the template for proper formatting of your data. The excel file should have one column with the names of each item and a second column with the values.

For example, if you have a company with 1,000 employees that provides smoking cessation programs, has leadership buy-in and provides email newsletters, your excel file should look something like this:

Number of employees	1000
Smoking cessation program	1
Leadership buy-in	1
Email newsletters	1

Here "1" indicates that the program has each of the three elements, but you could also use "yes". If there are particular elements your program does not have that you'd like to display in the dashboard, add that element and put either "0" or "no".

If you use the template, refer to the instructions included in the file. It should look similar to the example above, but the elements are pre-defined.

### *Running the tool*

The WPET runs locally on your computer. To start it, go into the directory with the WPET scripts and double-click on global.R. R will open and you will be presented with a terminal, which looks like this:

```

R Console
~/Docu Source script or load data in R Help Search

R version 3.3.1 (2016-06-21) -- "Bug in Your Hair"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin13.4.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.68 (7238) x86_64-apple-darwin13.4.0]
[History restored from /Users/B/Documents/wellnesstool/.Rapp.history]
> |

```

Type in `install.packages("shiny")`

This will install the shiny package for R, which is necessary to run the application.

Once it's installed type: `library("shiny")`

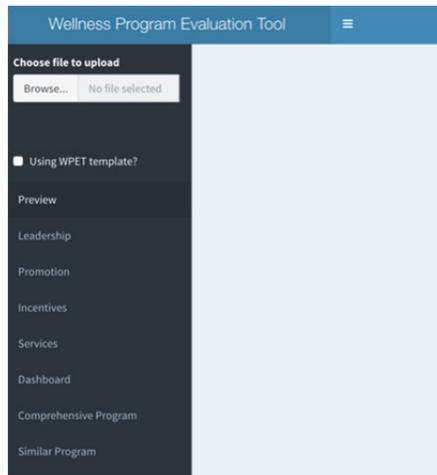
This will load the package.

One it's loaded, type: `runApp()`

The WPET application will now open.

### *Uploading*

Upon opening the application, you will see a screen like this:



Browse to the location of the completed template or custom excel file and click "open". Also, indicate whether the file uses the WPET template. A preview of your data will appear in the panel to the right. Here is an example:



### *Customizing the four components*

**If you used the WPET template, skip this section.**

Each of the tabs at the top of the tool correspond to the four components of a "comprehensive" wellness program described in the white paper (i.e. Services, Leadership, Promotion and Incentives). Clicking on one of the tabs, for example:

Leadership, will bring up a list of all the variables in your data and a brief description of what the Leadership component means. See the screenshot below:

<p><b>Which columns describe "leadership"?</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Board level health discussions</li> <li><input checked="" type="checkbox"/> Program champions</li> <li><input type="checkbox"/> Performance objectives linked to health</li> <li><input type="checkbox"/> Corporate responsibility strategy</li> <li><input type="checkbox"/> Training in health</li> <li><input type="checkbox"/> Wellbeing linked to org success</li> <li><input type="checkbox"/> Program branding</li> <li><input type="checkbox"/> Health feedback</li> </ul>	<p><i>Leadership</i> is often recognized as one of the most important drivers of organizational change.<sup>[1]</sup> Much of the guidance literature emphasizes leadership as one of the major components for building effective wellness programs.<sup>[2][3]</sup> Having management involved in health promotion efforts has been linked with increased impact in terms of self-reported health and absenteeism.<sup>[4]</sup> Berry et. al. has the engagement of multiple levels of leadership as its first pillar of an effectiveness wellness program.<sup>[5]</sup> Research has suggested the idea of the wellness "champion", or a local leader that promotes engagement with the wellness program among coworkers.<sup>[6]</sup> By engaging middle-management or supervisors as champions or training them in the importance of health promotion, programs may achieve better reach among employees. Some key components of leadership engagement are contained in the Leading By Example scale.<sup>[7]</sup></p>
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You can click on one or many of the variables to indicate which correspond to the Leadership component. In this example, the values "Board level health discussions" and "Program champions" are checked. All variables that are checked will show up in your dashboard.

### *Employee information*

This tab corresponds to various employee information that will be included in visuals produced by the tool. If you used the template as-is, variables will already be selected. Make sure to check that these are the correct variables. For example, if "Participation percent" is chosen under "Employee age", you will either receive an error or misrepresented results

### *Your dashboard*

Displayed on the dashboard will be all the information you selected in the previous tabs or entered into the template. Under the Leadership, Promotion and Incentives headings are indicators for whether a component is (green rectangle) or is not included (gray rectangle). Under services, a star chart will be displayed showing differently-colored wedges for each of the services included. Employee age and salary distribution will be displayed as horizontal bar charts. Text fields display participation percent and female percent.

If any of these components are missing, go back to the tab that corresponds to the section and check that the correct values are selected.

### *Comprehensive program dashboard*

This tab will display the information of the program that won the [Britain's Healthiest Company contest in 2014](#). This program, according to the contest's standards, can be considered an example of a "comprehensive program". If you used the template, it should be easy to compare your program to this

comprehensive program. If not, it may provide some features worth implementing in your program as you aim to increase comprehensiveness.

### *Similar program dashboard*

Recognizing that companies vary by sector and, within sector, by demographics and size, the tool will also display the dashboard of a program from a company with similar characteristics to yours. In the "Similar" tab, you will find this dashboard, so that you are able to compare your program to one operated by a company similar to yours. Again, the similar company's information comes from the template, so if you used the template you will be more easily able to make comparisons.

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