Promoting health among vulnerable workers: Disentangling context and implementation

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Abstract

Promoting health among vulnerable workers: Disentangling context and implementation

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Despite a wealth of knowledge of what works in workplace health promotion, successful implementation of evidence-based interventions is often challenging and unsuccessful. The complexity of many health promotion programs necessitates an improved understanding of implementation processes and contextual factors that can influence success. Workplace Health Promotion Programs (WHPP) can be one effective health promotion approach to addressing chronic disease. However, most studies of WHPP focus on large worksites (≥750 employees) and WHPP effectiveness varies across worksites of all sizes. Small businesses are more likely to report that at least half of their employees are low-wage workers. This dissertation utilized longitudinal, multi-level, and qualitative data to provide a robust examination of the role contexts and implementation processes play in individual, organizational, and local health department-level WHPP outcomes for small businesses in low-wage industries. *Aim 1* developed an index of implementation of workplace wellness committees (WCs) and tested this index's association with the implementation of evidence-based practices (EBP) among small worksites in low-wage industries over a two-year period. *Aim 2* tested whether employee race/ethnicity moderates the relationship between WHPPs and employees' perceived employer support for health. *Aim 3* examined local health department (LHD) contexts, capacity for, and interest in partnering with employers on workplace health promotion programs (WHPPs) for chronic disease prevention. The generalizable knowledge produced by this research can contribute to the identification of WHPP implementation strategies that are adaptable to differing contexts, or conversely, contexts that are amenable to WHPP intervention approaches.

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Chapter 1: Introduction

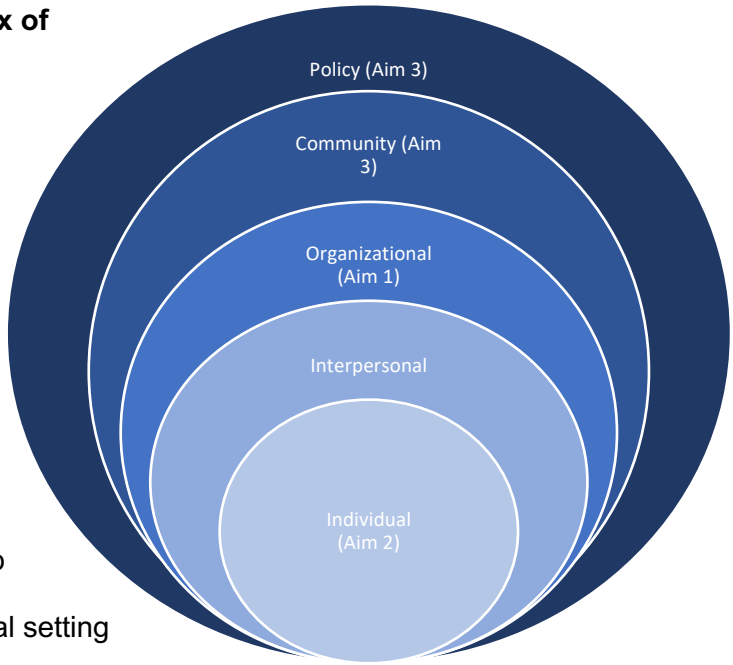
Half of all adults in the United States have one or more chronic conditions, while one in four have two or more.[1-3] The public health impact of these largely preventable diseases is undeniable; chronic conditions are responsible for seven of the top 10 causes of death and 86% of the $2.7 trillion in annual health care expenditures in the United States.[1,4] Health disparities in chronic disease incidence and outcomes also exist, with rural populations, low-wage workers and racial and ethnic minorities disproportionately bearing the burden of these conditions.[5-7] Three modifiable health risk behaviors - unhealthy diet, physical inactivity, and tobacco use - drive much of the development of chronic disease in the United States.[1,5,7] Effective health promotion programs can enable individuals to modify these behaviors and reduce their risk of chronic disease, reducing overall morbidity, mortality and health care costs.[5-7]

Despite a wealth of knowledge of what works in health promotion, implementation of evidence-based interventions is often challenging and unsuccessful.[8,9] Failure to improve our understanding of how programs work in real-world settings can lead to ineffective implementation that is unsustainable and wastes limited resources.[8] The complexity and context-specific nature of many programs necessitates an improved understanding of the implementation processes and contextual factors that influence intervention success.[8]

Evidence suggests comprehensive and evidence-based workplace health promotion programs (WHPP) can improve employee health outcomes.[5-7] However, much of the current WHPP research is limited to large worksites (≥750 employees).[10] WHPP in small and mid-sized worksites are understudied, even though these businesses are more likely to report that the majority of their employees are low-wage workers, a population more likely to engage in unhealthy risk behaviors and develop chronic disease than their higher-wage counterparts.[6,10,11] Low-wage workers are also more likely to be racial/ethnic minorities, leading to a potentially

synergistic interaction resulting in additive vulnerability and a greater burden of disease.[6,12] This dissertation utilized longitudinal, multi-level, and qualitative data to disentangle relationships between implementation factors (e.g., wellness committees); WHPP contexts; and WHPP outcomes such as evidence-based practice (EBP) implementation, perceived employer support, and local health department (LHD) capacity for partnering with employers on WHPP EBI implementation.[13-17]

Figure 1: Social-Ecological Model and Associated Aim Level



Specific Aim 1 **Developed an index of implementation of workplace wellness committees and tested the measure's association with the implementation of EBIs among small worksites in low-wage industries over a two-year period.** We developed a wellness committee implementation index assessing wellness committee composition; leadership support; engagement; and planning and goal setting among companies assigned to the wellness committee arm of the *HealthLinks*/*Connect to Wellness* (*CtW*) randomized controlled trial (In 2018 *HealthLinks* rebranded to *CtW*; in each Aim we use the name used at the time of data collection). EBI implementation assessed the degree to which EBI communications, programs, and policies are implemented at a worksite on a 0-100 scale. Generalized estimating equations were used to account for repeated measurement of worksites over time.

Specific Aim 2 **Tested whether employee race/ethnicity moderated the relationship between *HealthLinks* study arm and employees' perceived employer support for health**. This study compared the difference in employees' perceived employer support for health among employees in the *HealthLinks* standard arm, *HealthLinks* plus wellness committees, and the

delayed control arm. Individual racial/ethnic identity was measured using self-reported employee race/ethnicity. Generalized estimating equations were used to account for clustering of observations at the worksite level.

Specific Aim 3 **examined LHDs contexts, capacity for, and interest in partnering with employers on WHPPs for chronic disease prevention.** This study used qualitative interviews with 21 LHD directors from ten states and paired data from the *2016 National Profile of Local Health Departments* administered by the National Association of County and City Health Officials to assess existing partnerships, decision-making, funding, data needs, and organizational capacity for WHPP partnerships with employers.

The generalizable knowledge produced by this research can lead to the identification of new WHPP implementation strategies that meet the needs of vulnerable worker populations and are responsive to varying organizational contexts.[14] Additionally, the translation of these recommendations to practice can improve the design, adoption, adaptation, integration, scale-up, and sustainability of WHPPs across small businesses in low-wage industries, such as those in education, social services, and retail sectors.[18]

Chapter 2: Wellness Committees in Workplace Health Promotion: An Opportunity to Improve Evidence-Based Intervention Implementation among Small Businesses

Abstract

Purpose: To construct a wellness committee implementation index and determine whether this index was associated with evidence-based intervention (EBI) implementation in a workplace health promotion program.

Design: Secondary data analysis of the *HealthLinks* randomized controlled trial.

Setting: Small businesses assigned to the *HealthLinks* plus wellness committee study arm.

Sample: Small businesses (20-200 employees, n=23) from six low-wage industries in King County, WA.

Measures: Wellness committee implementation index (0-100%) and EBI implementation (0-100%).

Analysis: We used descriptive and bivariate statistics to describe worksites' organizational characteristics. For the primary analyses, we used generalized estimating equations with robust standard errors to assess the association between wellness committee implementation index and EBI implementation over time.

Results: Average wellness committee implementation index scores were 60% at 15 months and 38% at 24 months. EBI scores among worksites with wellness committees were 27-percentage points higher at 15 months (64% vs. 37% p<.001) and 36-percentage points higher at 24 months (55% vs. 18%, p<.001). Higher wellness committee implementation index scores were positively associated with EBI implementation scores over time (p<.001).

Conclusion: Wellness committees may play an essential role in supporting EBI implementation among small businesses. Furthermore, the degree to which these wellness committees are

engaged and have leadership support, a set plan or goals, and multilevel participation may influence EBI implementation and maintenance over time.

Purpose

Six in ten adults in the United States have at least one chronic condition, and many have two or more.[1-3] Even modest improvements in chronic disease risk behaviors such as physical inactivity, unhealthy eating, and tobacco use could result in substantial reductions or delays in the number of cases of chronic illness each year.[19] Workplaces are a practical and vital setting for implementing effective evidence-based interventions (EBIs) that can reduce chronic disease risk among adults.[20] Full-time employees spend many of their waking hours at work, and previous research has demonstrated that workplace environments and coworkers can shape employees' health behaviors.[21,22] Workplace health promotion programs (WHPPs), defined as employer-sponsored initiatives that aim to improve the health of employees, are one approach to promoting health in this context.[23] Evidence suggests that well-designed, comprehensive, and evidence-based WHPPs can improve health outcomes among employees.[24]

Workplace wellness committees, a purposefully constructed group of employees who meet to plan strategies and activities that can promote health within an organization, are often recommended as a beneficial WHPP strategy.[25-27] Despite identifying wellness committees as a recommended strategy for WHPPs in the CDC Workplace Health Model, existing studies have only evaluated wellness committees as part of a comprehensive WHPP package.[25,28-30] To date, research has not explicitly explored the role wellness committees play in WHPP implementation or the underlying processes that may drive wellness committee effectiveness. Understanding which wellness committee implementation factors contribute to committee success is needed to develop evidence-based strategies for implementation in public health practice.

Current recommendations for health and safety committees, including wellness committees, include meeting regularly; ensuring communication between the wellness

committees and leadership; and involving senior leadership.[25-28,31] Previous studies of health and safety committees have found associations between these factors and *perceived* committee effectiveness.[31] However, studies extending these outcomes to more objective measures of committee effectiveness or health and safety outcomes, such as reduced injury and illness, are limited and have mixed results.[31-33] We were unable to find studies attempting to extend these health and safety committee implementation factors to WHPP wellness committees.

The *HealthLinks* three-arm randomized controlled trial aimed to disseminate EBIs to small worksites in low-wage industries.[34] Smaller worksites are less likely to offer WHPP than larger organizations, even though these businesses are more likely to report that the majority of their employees are low-wage workers, a population at increased risk for chronic diseases.[6,10,11,35] Additionally, smaller organizations often face unique WHPP implementation challenges, including limited staff time or expertise to implement WHPP, limited budgets, and limited ability to reach all employees.[36] In these small business contexts, wellness committees may be particularly beneficial given their low cost of implementation (both in dollars spent and staff time) and their ability to facilitate the development of wellness champions within the organization.[37] Results from the *HealthLinks* trial suggest that while starting and maintaining a wellness committee was challenging, small worksites that were able to sustain wellness committees were more effective at implementing and maintaining EBIs.[37]

While these initial results are promising, we need to improve our understanding of how wellness committees may support EBI implementation in small worksites and the implementation factors that underlie wellness committee success. The purpose of this study is to develop an index of wellness committee implementation and use this index to assess the relationship between wellness committee implementation processes and WHPP EBI implementation outcomes throughout the *HealthLinks* intervention.

Methods

Design

Data for this study come from the *HealthLinks* randomized controlled trial. The goal of the *HealthLinks* trial was to test whether *HealthLinks* improves the adoption of EBIs among small worksites in low-wage industries and whether wellness committees increase EBI adoption. Worksites were randomized to either the standard *HealthLinks* intervention (*HealthLinks*), *HealthLinks* with the addition of wellness committees (*HealthLinks*+), or a delayed control. As the focus of the present study is wellness committee implementation, we limited our scope to a secondary analysis of the *HealthLinks*+ worksites.

Intervention

A detailed description of the *HealthLinks* intervention is published elsewhere.[34] In both *HealthLinks* and *HealthLinks*+, worksites worked with an interventionist to assess whether EBIs addressing healthy eating, physical activity, tobacco cessation, and cancer screening were already in the workplace and identify additional EBIs to implement based on a tailored recommendations report. These worksites then received *Implementation Toolkits* and interventionist support to implement additional EBIs in the workplace. This initial period of active interventionist support (active phase) lasted for the first 15 months of the intervention. In *HealthLinks*+, worksites received additional interventionist support and wellness committee implementation toolkits to assist them with forming a wellness committee to support EBI implementation efforts. Following the 15-month active phase, worksites could request support from the *HealthLinks*/*HealthLinks*+ interventionist, but the interventionist did not initiate contact with their worksite contact (maintenance phase).

Sample

Worksites' study eligibility criteria were as follows: had between 20-200 employees; belonged to one of six low-wage industries (accommodation and food services; arts, entertainment, recreation, education; health care and social assistance or other services

excluding public administration; and retail); had at least 20% of employees reporting to a physical worksite at least once per week; were in business for at least three years; and did not have a wellness committee at time of recruitment.[34] The *HealthLinks* randomized controlled trial was approved by the University of Washington Human Subjects Review Committee (#45447-EJ). Participating worksites documented their consent to participate in the study by completing a memorandum of understanding that included an explanation of all study procedures.

Measures

Wellness committee implementation index – We constructed a wellness committee implementation index based on 8 wellness committee implementation questions collected at 15 and 24 months (0 organizations had a wellness committee at baseline) from a primary contact at the worksite via an in-person or telephone survey at each time point. We had complete wellness committee implementation data for all companies included in the study at both time points. The wellness committee implementation index is comprised of the summed average of four sub-indices (see Table 1 for full score calculation): committee composition (3 items), leadership support (1 item), committee engagement (3 items), and planning and goal setting (1 item). We then divided each sub-index score by its number of items because we expected each domain to have equal importance in predicting overall wellness committee implementation; the overall index score is the unweighted average of the four sub-index scores. Each worksite received an implementation index score between 0-100%. Worksites assigned to the wellness committee arm that did not implement a wellness committee received a score of 0.

EBI Implementation: We calculated employer EBI implementation using a weighted algorithm assessing the degree to which worksites implement EBI communications, programs, and policies promoting cancer screening, healthy eating, physical activity, and tobacco cessation at their worksite. We collected the data for this score during the same phone survey with a primary worksite contact described above, at baseline, 15 months, and 24 months. EBI implementation was scored on a 0-100% scale.[34,38]

Analysis

We described key organizational and employee characteristics using means and standard deviations. We also compared the organizational and employee characteristics between worksites that implemented a wellness committee at 15 months and those that did not (wellness committee implementation score = 0) using t-tests and chi-squared tests.

We assessed the primary relationship between wellness committee implementation and EBI implementation using linear regression models with generalized estimating equations (GEE) using an exchangeable correlation structure. We selected GEE regression models for our analysis to account for correlated data from the same worksites over the three time points. Additionally, we used robust standard errors to ensure proper inference in the event that we misspecified the working correlation structure. For selected models, we also included baseline EBI implementation score to adjust for the amount of EBI activity in the workplace before the *HealthLinks+* intervention.

Results

Worksite characteristics

Two worksites in the *HealthLinks+* arm dropped out during the study period and are not included in this analysis. We present the organizational and employee characteristics of the 23 worksites who completed all three waves of data collection in Table 2. At baseline, worksites had an average of 77 employees (SD: 54), and the average annual salary was $43,867 (SD: $14,603). For comparison, the average annual salary in King County was $72,764 in 2015.[39] Most (59%) worksites were not-for-profit organizations, and nearly half (47%) were from healthcare and social assistance industries.

At 15 months, the end of the active phase, 17 (74%) of the worksites had formed a wellness committee. By the end of the maintenance phase (24 months), 12 of these 17 worksites (52% of the overall sample) were able to maintain an active wellness committee.

None of the worksites without a wellness committee at 15 months were able to start a wellness committee during the *HealthLinks*+ maintenance phase.

Worksites that formed and maintained wellness committees throughout the study period did not differ from those who did not by industry, number of employees, percent of employees working full-time, non-profit status, or baseline EBI score. However, worksites that were unable to form or maintain wellness committees had a higher proportion of employees over the age of 65 (2% of employees over age 65 among those who started and maintained wellness committees vs. 8% among those unable to form for maintain a wellness committee, p=.04). Worksites that formed and maintained wellness committees reported average annual salaries that were $13,602 higher than those that were either unable to form wellness committees or maintain them over the full 24-month study ($36,310 vs. $49,912). However, this result was not significant (p=0.05). Worksites with wellness committees had mean EBI scores that were 27-percentage points higher at 15 months (64% among those with wellness committees vs. 37% without) (p<.001). Although scores in both groups dropped during the maintenance phase, the gap in EBI scores between those with wellness committees and those without grew to a 36-percentage point difference at 24 months (55% vs. 18%, p<.001).

Wellness committee implementation index scores

The average wellness committee implementation index scores were 60% at 15 months and 38% at 24 months for the entire sample. When restricted to the 12 worksites who maintained wellness committees, index scores were 83% at 15 months and 73% at 24 months. Wellness committee implementation index score was significantly associated with EBI score at both 15 months (One-percentage point change in WC implementation index score: β=.49, p<.001, 95%CI: .42, .57) and 24 months (One-percentage point change in WC implementation index score: β=.47, p<.001, 95%CI: .40, .54). At 15 months, controlling for baseline EBI score, every 10-percentage point increase in WC implementation index score was associated with a

4.78-percentage point increase in EBI score (p<.001, 95%CI 3.98, 5.58). At 24 months, controlling for baseline score, every 10-percentage point increase in WC implementation index score was associated with a 4.55-percentage point increase in EBI score (p<.001, 95%CI 3.75, 5.35). Interestingly, while none of the worksites had at least one staff member with health promotion or wellness coordinator responsibilities as part of their job at baseline, worksites who formed wellness committees were significantly more likely to also have a staff member with WHPP responsibilities at 15 months (χ^2: 4.53, p=.03) and 24 months (χ^2:7.44, p=.01). However, the presence of a staff member was not significantly associated with EBI score when included in the GEE model with the wellness committee implementation index.

We also tested the association of each sub-index with EBI score at 15 and 24 months. In these analyses, committee engagement had the strongest association with EBI score at both 15 and 24 months (p<.001) (Table 2). However, all four sub-indices were significantly associated EBI score at both 15 and 24 months, with increased implementation related to committee composition (number of various departments, non-management and senior leadership on the committee), planning and goal setting, and leadership support all contributing to higher EBI scores (p<.001). These results remained consistent and significant in sensitivity analyses restricting the sample to the 12 worksites that maintained wellness committees over the full 24-month study period (p<.001).

Discussion

The purpose of this study was to develop an index of wellness committee implementation and assess its relationship with *HealthLinks* WHPP EBI implementation outcomes. Our findings demonstrated that this summative index was strongly associated with EBI score both at the end of the active *HealthLinks*+ implementation phase and the subsequent maintenance period. Furthermore, each of the sub-index scores was significantly associated with EBI score at both time points. Of these, committee engagement, which assessed the

amount of time dedicated to wellness activities, the frequency of committee meetings, and the proportion of members who attend each meeting, was most strongly associated with EBI score at both time points.

Although we asked all of the companies in this *HealthLinks* study arm to form a wellness committee and provided them with resources and support to accomplish this goal, only 12 of the 23 worksites in this arm were able to maintain a wellness committee for the full 24-month study period. Anecdotally, comments made during survey data collection indicated that worksites often struggled to start wellness committees. Even when worksites were able to start a committee, they were unable to capitalize on initial interest and engagement in the committee fizzled out over time. Given our finding that committee engagement was the wellness committee implementation domain most strongly associated with EBI implementation, we believe time and staff investment in the committee may play a critical role in facilitating long-term wellness committee success.

The overall findings from this secondary analysis support those of the primary *HealthLinks* study: wellness committees may help both with initiating EBI implementation during the active intervention period and maintaining implementation after formal *HealthLinks* support ends.[37] This study adds to that work by identifying four underlying mechanisms of wellness committee implementation that predict worksite EBI implementation success: committee composition, leadership support, committee engagement, and planning and goal setting. Understanding the characteristics of wellness committees that drive success and the summative impact of these factors is critical to identifying actionable strategies that can support small worksites in implementing wellness committees as part of WHPPs.

Both the research and practice communities have recommended wellness committees as a beneficial implementation strategy; this recommendation may be primarily based on research on health and safety committees.[32] Those studies found that many implementation factors included in our wellness committee implementation index (e.g., meeting regularly,

leadership support, and representation from multiple departments) were important for perceived health and safety committee effectiveness.[31,40] However, most of these studies were unable to assess objective indicators of success, such as policy implementation and health & safety outcomes.[31] Our work corroborates and extends findings from previous studies to concrete measures of wellness EBI implementation for small worksites. Furthermore, in certain industries, legislation mandates the formation of health and safety committees. Implementation factors that drive success may differ between committees that are started to meet regulatory standards as opposed to those initiated to promote employee health and well-being.[31] Our findings demonstrate that health and safety committee and wellness committee implementation factors may be aligned despite differences in worksites' motivation.

Overall, our study did not find major statistical differences in worksite characteristics between worksites with a wellness committee and those that could not start or maintain one. These findings may partially reflect our relatively homogeneous sample – nearly half of the sample comprised healthcare and social assistance industries, and 60% of employers were not-for-profit. Our results indicate that neither accommodation nor food services industry worksites were able to form wellness committees. These industries may face particular contextual challenges to form or maintain wellness committees; in these industries, employee turnover rates are high, and additional industry-specific factors such as shift work schedule and younger employee populations may make forming wellness committees particularly challenging.[41,42] Similarly, although all worksites in the sample came from traditionally low-wage industries, worksites that were able to form and maintain wellness committees had employee salaries that were $13,602 higher than worksites that never started wellness committees. These results may indicate that even among low-wage industries, differences in financial resources may impact WHPP implementation success. Future research may need to explore intersections between industry and financial resources on WHPPs, wellness committees, and EBI implementation.

Limitations

The primary limitation of this study is the small sample size. We chose to restrict this analysis to the 23 worksites assigned to the wellness committee arm in order to isolate the sample to worksites asked to form a committee as part of their *HealthLinks* WHPP intervention. Even though we asked all worksites in this arm to form a committee, only 74% of worksites were able to start a committee at all, and just over half (52%) maintained the committees over time. While the results from worksites that were able to implement committees are promising, further studies of the wellness committee implementation index with larger sample sizes are needed. Additionally, the wellness committee implementation index has a relatively small number of items. We constructed this measure to be an index of indicators we believe to be essential for understanding wellness committees and their implementation within a WHPP.[43] While we developed the items in this index based on years of experience working with small employers to implement WHPPs, we may have missed other relevant indicators that may be equally or more important for wellness committee implementation.

Two companies did drop out during the course of the study and were not included in our analyses. These companies came from the arts, entertainment, and recreation and other services industries and neither had formed a wellness committee at 15 months. The two companies that dropped out of the study did not differ significantly from the other study companies in terms of total number of employees, annual employee salary, or EBI implementation score at baseline, but did have significantly lower EBI implementation scores at 15 months (51% vs. 16%, p=0.02).

Strengths

The primary strengths of this study include its ability to examine wellness committee implementation factors as part of a larger WHPP and the longitudinal study design. Our study is the first to assess implementation factors that explain wellness committees' contributions to WHPP success. Our results indicate that the presence and degree of wellness committee

implementation may have an impact on WHPP EBI implementation in small worksites. Future research should take into consideration not only the existence of wellness committees in WHPPs, but also the degree to which a committee is engaged, has a plan, has multiple levels of staff involvement, and has support from leadership. With further study, we also believe this wellness committee implementation index has potential as either an implementation measure in WHPP implementation research or a checklist for public health practitioners to use when implementing wellness committees as part of a WHPP.

Small worksites often have limited staff, time, and financial resources to put towards WHPP implementation. The results of this study indicate that wellness committees may be an effective approach to mitigating some of these constraints. WHPP responsibilities that might typically fall on one individual can be split among multiple individuals, and a coordinated plan developed by employees representing different organizational levels can support broader employee interest and engagement. Successful wellness committee engagement can also facilitate the development of wellness champions who can further drive EBI implementation. Considering that small worksites are more likely to report having a majority low-wage staff, implementing wellness committees as part of a comprehensive WHPP approach may be a particularly effective strategy for reducing chronic disease risk among vulnerable populations.

So What?

What is already known on this topic? Both academic and practice health promotion literature often recommend wellness committees as a workplace health promotion program (WHPP) implementation strategy. However, previous research has not isolated the impact of wellness committees in WHPP or the underlying processes that may drive effectiveness.

What does this article add? This study constructed a wellness committee implementation index and tested its association with evidence-based intervention implementation in a workplace health promotion program over 24 months. Results demonstrate that the degree of wellness committee implementation was associated with EBI implementation among small businesses in low-wage industries.

What are the implications for health promotion practice or research? The degree to which small businesses implement wellness committees that are more engaged and have a clear plan or goals, leadership support, and participation from all levels of the organization may influence their ability to implement EBIs that can promote employee health and well-being.

Table 1: Wellness Committee Implementation Index Items and Response Options

Item	Response Options	Scoring
Committee Composition		
Does a member of senior leadership serve on the wellness committee?	Yes/No	Yes=1, No=0
Are there non-management members on the wellness committee?	Yes/No	Yes=1, No=0
How many various departments or work areas in your organization are represented on the wellness committee?	Less than half, About half, More than half, All or almost all	Less than half=.25, About half=.5, More than half=.75, All or almost all=1
Leadership Support		
Does senior leadership provide resources, such as supplies and staff time, for wellness committee activities when needed?	Rarely, Sometimes, Often, Almost always	Rarely=.25, Sometimes=.5, Often=.75, Almost always=1
Committee Engagement		
How often does the wellness committee meet?	Less than once per quarter, Once per quarter, Every other month, Once per month, More than once per month	Less than once a quarter = .25, Once a quarter=.25, Every other month=.5, Once a month=.75, More than once a month=1
In an average month, how many hours does the wellness committee collectively spend planning wellness-related activities?	Less than one hour, 1-2 hours, 3-4 hours, 7-8 hours, 8 or more hours	Less than one hour=.25, 1-2 hours=.25, 3-4 hours=.5, 5-6 hours=.75, 7-8 hours=1, 8 or more hours=1
How many of the wellness committee members typically attend meetings?	Less than half, About half, More than half, All or almost all	Less than half= 25, About half=.5, More than half=.75, All or almost all=1
Planning and Goal Setting		
Does the wellness committee have a written plan, work plan, or goals?	Yes/No	Yes=1, No=0
*Wellness committee implementation index = ((Committee Composition)/3)+(Leadership Support/1)+(Committee Engagement/3)+Planning and Goal Setting)/4)*100*		

Table 2: Worksite and Employee Characteristics at Baseline (n=23)

Worksite Characteristics	**Mean (SD)**	**Percent**
Total Number of Employees	77 (54)	
Annual Salary	$43,867 ($14,603)	
Proportion of Employees Full-Time		76%
Proportion of Employees in Union		3%
Tax Status		
Not-for-profit		59% (41)
For-profit		41% (28)
Insurance to Employees		
Self-insured		5% (3)
Proportion of employees eligible for health insurance		83%
Proportion of employees enrolled in health insurance		81%
Industry[1]		
Accommodation and Food Services		9% (2)
Arts, Entertainment, and Recreation		9% (2)
Educational Services		9% (2)
Health Care and Social Assistance		48% (11)
Other Services (except Public Administration)		13% (3)
Retail Trade		13% (3)
Employee Characteristics		
Race		
White		67%
Black		10%
Native American/Alaska Native		1%
Asian – Pacific Islander		11%
Multiracial		5%
Other Race		3%
Missing		3%
Ethnicity Hispanic or Latino		15%
Age in Years		
18-44		64%
45-64		31%
65+		5%
Sex		
Male		35%
Female		65%

[1]Percentages add up to over 100% due to rounding.

*Table 3: Generalized Estimating Equations Results: Change in Worksite EBI Implementation Scores by Wellness Committee Implementation Index Sub-Index Score and Overall Wellness Committee Implementation Index Score (n=23)**

Sub-Index Item	**β (15mo)[1]**	**95% CI**	**β (24mo)[1]**	**95% CI**
Committee Composition	.47	.38, .55	.43	.36, .49
Leadership Support	.39	.32, .46	.37	.32, .43
Committee Engagement	.55	.49, .62	.53	.47, .58
Planning and Goal Setting	.39	.32, .46	.36	.30, .42
Total Wellness Committee Implementation Score	*0.49*	*0.42, 0.57*	*0.47*	*0.40, 0.54*
Total Wellness Committee Implementation Score (adjusted model)[2]	*0.48*	*0.40, 0.56*	*0.46*	*0.38, 0.54*

*Beta coefficients presented as per one-percentage point change in wellness committee implementation index score

[1]p = <.001 for all results presented

[2]Adjusted model includes baseline EBI implementation score as a co-variate

Chapter 3: Does race/ethnicity moderate the association between workplace health promotion and employees' perceived support for health?

Abstract

Background: Employees' perceptions of employer support for health may be one important mechanism through which workplace health promotion programs (WHPPs) positively impact employee health outcomes. However, to date research has not explored whether this WHPP-support relationship differs by race/ethnicity, and whether WHPPs provide equal benefit to all racial and ethnic groups.

Aims: We examined whether race/ethnicity moderates the association between *HealthLinks* WHPP intervention arm (*HealthLinks* standard, *HealthLinks* plus wellness committees (*HealthLinks*+), or a delayed control) and employees' perceived employer support for health among 63 small businesses in low-wage industries.

Methods: Companies were randomized to receive the *HealthLinks* intervention, *HealthLinks*+ plus wellness committees, or a delayed control over a 15-month active intervention period. We collected employee surveys at baseline and 15-months that asked questions about employee characteristics and perceptions of employer support for health - overall and specific to physical activity and healthy foods and beverages. We used chi-squared and ANOVA tests for bivariate and multivariate analyses of employer and employee demographics, and linear regression models using generalized estimating equations for the main effect and interaction models.

Results: In the main effect models, *HealthLinks* and *HealthLinks*+ were both significantly and positively associated with employees' perceived employer support at 15 months. Race/ethnicity significantly moderated the relationship between intervention arm and perceived employer support for health at 15 months across all three support items ($p<.001$ for overall support and physical activity-specific support, $p<.05$ for healthy foods and beverages support). When

examining within-race benefits across study arms to identify whether all racial/ethnic employee groups benefitted, we found that both *HealthLinks* and *HealthLinks+* were associated with significantly higher support scores among White employees compared to White employees in the control arm. *HealthLinks+* was also associated with significantly higher support scores among Black employees compared to Black employees in the control arm. We found mixed results among Asian, Hispanic, and Other employees.

Conclusions: WHPP such as *HealthLinks+* can positively impact employees' perceived employer support among small businesses in low-wage industries, and wellness committees may provide an additional benefit. However, additional research with larger samples is needed to determine whether *HealthLinks+* is equally beneficial across diverse populations, particularly Asian, Hispanic, and Other-identifying employees. Additionally, future research examining whether the amount of evidence-based practices in the workplace results may illuminate additional relationships between implementation, wellness committees, and perceived employer support in these settings.

Introduction

Chronic diseases are a leading cause of death in the United States, resulting in $1.1 trillion in direct health care costs and $3.7 trillion in total costs due to lost economic productivity.[3,44,45] Preventable chronic conditions also cost employers $225.8 billion per year in lost productivity from missed work, the equivalent of $1,685 per employee per year.[46] Even when employees are able to work, chronic disease risks and associated risk behaviors, such as obesity and physical inactivity, result in additional employer costs through reduced presenteeism, or impaired performance due to health problems.[47,48] Workplace Health Promotion Programs (WHPP) can be a practical and effective health promotion approach to reducing individual chronic disease risks and in turn, health care costs for employers.[5-7]

While evidence suggests comprehensive and evidence-based WHPP can improve employee health outcomes, much of the current WHPP research is limited to large worksites (≥750 employees).[5-7,10] WHPP in small and mid-sized worksites are understudied, even though these businesses are more likely to report that the majority of their employees are low-wage workers, a population more likely to engage in unhealthy risk behaviors and develop chronic disease than their higher-wage counterparts.[6,10,11] Low-wage workers are also more likely to be racial/ethnic minorities, which may result in an even greater burden of disease.[6,12] To address this gap in WHPP support for small worksites, the *HealthLinks* randomized controlled trial worked with small employers to disseminate EBIs to small employers in low-wage industries.[34] Results of the main outcome study found that compared to the control arm, employees in the intervention arms perceived significantly increased worksite support for health overall and for "living an active life" and consuming healthy foods and beverages at 15 and 24 months.[37] Perceived employer support for health may impact employee health and productivity through psychosocial pathways such as increased work engagement and reduced job stress.[47,49,50] For instance, a 2015 study of Washington State employees found that perceived employer support for wellness was associated with reduced presenteeism, after controlling for demographic characteristics such as age, sex, race, ethnicity, education, income, and health status.[47]

HealthLinks has evidence of effectiveness in improving perceived employer support among employees in low-wage industries. However, implementation studies such as the *HealthLinks* trial also offer us unique opportunity to advance health equity research by identifying the potential mechanisms through which intersecting identities, such as low-wage employment and race/ethnicity, impact health and how this may change over the course of an intervention.[51] Additionally, many health disparities interventions focus on individual-level factors; impacts of systems-level factors such as organizational change are less often examined.[51] This research is also in alignment with the National Institutes of Health's call for the evaluation of intervention components at multiple levels in order to assess the relative,

interactive, and mechanistic effects of public health interventions and advance the science of minority health and health disparities.[52]

Assessing perceived employer support for health among racial and ethnic minorities within low-wage industries may be particularly important when considering that racial and ethnic minorities may feel less supported at work due to higher levels of discrimination and unfair treatment, compared to white employees.[53,54] Additionally, broad implementation of health programs that do not intentionally consider racism as a fundamental driver of inequities may unintentionally exacerbate racial/ethnic health disparities.[52,55,56] To address this gap, the goal of our study was to examine whether race/ethnicity moderates the relationship between the *HealthLinks* intervention at the organizational level and perceived employer support for health among employees within small businesses in low-wage industries. The results of this work may identify whether all racial and ethnic employee groups benefit equally from WHPPs, or alternatively, if additional tailoring or adaptation are needed to meet the needs of employees at greater risk for chronic diseases.

Methods

Design

The employee and employer-level data for this study come from the *HealthLinks* WHPP randomized controlled trial.[34,37] The goal of the *HealthLinks* trial was to test whether *HealthLinks* improves the adoption of evidence-based interventions (EBIs) among small worksites in low-wage industries and whether wellness committees increase EBI adoption. Worksites were randomized to one of three study arms: the standard *HealthLinks* WHPP (*HealthLinks*), *HealthLinks* with the addition of wellness committees (*HealthLinks*+), or a delayed control.

Intervention

A detailed description of the *HealthLinks* WHPP is published elsewhere.[34] In both *HealthLinks* and *HealthLinks*+, worksites worked with an interventionist to adopt and implement

EBIs addressing healthy eating, physical activity, tobacco cessation, and cancer screening. These worksites received interventionist support and implementation toolkits in order to implement EBIs in the workplace. Active interventionist support lasted for 15 months. In *HealthLinks+*, worksites received additional interventionist support and wellness committee implementation toolkits to assist them with forming a wellness committee to support EBI implementation efforts. The *HealthLinks* trial was approved by the University of Washington Human Subjects Review Committee.

Sample

Employer study eligibility criteria were as follows: worksite had between 20-200 employees; belonged to one of six low-wage industries (accommodation and food services; arts, entertainment, recreation; education; health care and social assistance; other services excluding public administration; and retail); had at least 20% of employees reporting to a physical worksite at least once per week; were in business for at least three years; and did not have a wellness committee at time of recruitment.[34] Five worksites in the overall study did not complete employee assessments at all time points; our sample includes the 63 study worksites randomized to one of three study arms with completed employer and employee assessments throughout the study: 20 in the control arm; 22 in the *HealthLinks* arm and 21 in the *HealthLinks+* arm.

Employee surveys were administered to all employees at enrolled worksites willing to participate and who met the eligibility criteria (able to read survey in one of the four offered languages – English, Spanish, traditional Chinese, and Vietnamese – and age 21 or older).

Procedures

For the employer survey, we interviewed a primary contact at the worksite via an in-person or telephone survey at baseline and 15 months. Participating worksites documented their consent to participate in the study by completing a memorandum of understanding that included an explanation of all study procedures.

Following the completion of the employer survey, we distributed employee surveys at each worksite. Employees were offered a $5 incentive for completing the survey at each timepoint. We did not collect any identifying information from employees. As a result, surveys were linked to their employer but otherwise anonymous. Employee survey results are cross-sectional; data was not linked across time-points.

Measures

Perceived employer support for health: Employees responded to three questions related to employer support for wellness on a 5-item Likert scale, with 5 indicating strongly agree and 1 indicating strongly disagree:

1. Overall, my worksite supports me in living a healthier life.
2. My worksite supports me in trying to live an active life.
3. My worksite supports me in trying to eat healthy foods and drink healthy beverages.

Employee race/ethnicity: Employees provided self-reported race/ethnicity at each timepoint by responding to the question “Which one or more of the following would you say is your race? (check all that apply).” Response options included: White, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, Other, Prefer no response. During analysis, we created an additional Multiracial category which included all individuals who indicated they were more than one race. As Hispanic/Latino ethnicity was collected separately, if a respondent indicated they were or Hispanic/Latino origin, we replaced the initial racial/ethnic category with Hispanic/Latino for the purposes of our analysis.

Employer and employee covariates: We included employer and employee covariates we believe may influence perceived employer support for health: employer EBI implementation at baseline and employer industry as well as employee survey language, overall self-reported health, income, education, age, and gender. We calculated employer EBI implementation at baseline using a weighted algorithm assessing the degree to which worksites implement EBI

communications, programs, and policies promoting cancer screening, healthy eating, physical activity, and tobacco cessation at their worksite prior to the start of the intervention. We collected the data for this score from a primary contact at the worksite via an in-person or telephone survey at each time point - baseline and 15 months. EBI implementation at baseline was scored on a 0-100% implemented scale.[34,38] For the topic-specific support item models (physical activity and healthy eating and beverages), we used the corresponding topic-specific baseline EBI implementation score in the model.

Analysis

We present characteristics of worksites and employees using frequencies, percentages for categorical variables and means (standard deviations) for continuous variables and chi-squared and one-way ANOVAs tests for bivariate and multivariate analyses of these characteristics. For the main effect models, we assessed the association between intervention arm and employees' perceived employer support for health using linear regression models with generalized estimating equations (GEE) and an exchangeable correlation structure at both baseline and 15 months for all perceived support items. We selected GEE regression models to account for clustering of employees by worksite. For our interaction models, we used the same linear regression models with GEEs, but included an interaction term for intervention arm*race/ethnicity. We used the Wald test to test for the overall significance of the interaction between *HealthLinks* study arm and race/ethnicity on all perceived support for health items.

Our employee demographic survey included populations typically underrepresented in public health intervention research – namely Native Hawaiians or Other Pacific Islanders, Multiracial, and American Indians or Alaska Natives.[57] We present baseline and 15-month means for the perceived support for health items for these more specific racial identities, because of the unique challenges faced by these subpopulations and need for additional research to better understand their health behaviors.[58] However, due to small sample sizes, we collapsed Native Hawaiian or Other Pacific Islander and Asian into one Asian category, and

American Indian or Alaska Native, Multiracial, and Other into one Other category for our analytic models.

Results

Organizational characteristics

We present baseline employer results by study arm in Table 4. Worksites had on average 74 employees (SD: 67) with an average salary of $39,624 per year (SD: $37,682). For comparison, the average annual salary in King County was $72,764 in 2015.[39] The majority of employers were not-for-profit (62%), with nearly half in the health care and social assistance industry (48%). Most (84%, SD: 19%) employers offered health insurance to their employees; 82% of their employees (SD: 16%) who were eligible for insurance were enrolled. Organizational characteristics did not differ significantly across study arm ($p<.05$ for all baseline characteristics). Worksites had minimal overall EBI implementation at baseline (19% implemented) At 15 months, control worksites' baseline EBI implementation scores increased to 23% (SD: 10%), while EBI implementation among intervention worksites increased to 52% in *HealthLinks* standard (SD: 16%) and 54% in *HealthLinks*+ (SD: 18%).

Employee characteristics

Table 5 provides an overview of employee characteristics by study arm. The sample included 2,529 employees at baseline and 2,459 employees at 15 months. The sample was predominately White (58.88%), followed by Asian including Native Hawaiian/Pacific Islander (17.40%), Hispanic (10.20%), Black (7.43%), and Other including American Indian/Alaskan Native and Multiracial (6.09%). Approximately 47% of employees reported household incomes of less than $50,000 per year, and 64% of participants had a college degree. Most participants were female (68%) and most took the survey in English (95%).

We present means for perceived support for health at baseline and 15 months by study arm in Figures 3-8. Overall, racial/ethnic minority employees perceived higher levels of overall employer support for health compared to White employees. At baseline, American

Indian/Alaskan Native employees reported the highest perceived overall support (3.80, SD: 0.84) and White employees reported the lowest (3.29, SD: 0.89). American Indian/Alaskan Native employees also reported the highest perceived support specific to physical activity (3.60, SD: 0.55), while employees identifying as Other reported the lowest (3.05, SD:0.55). For healthy foods and beverages, American Indian/Alaskan Native reported the highest perceived support (3.40, SD: 0.55) and Black employees reported the lowest (3.05, SD: 1.16).

Overall perceived employer support for health

Tables of the main effects and interaction models for all three support items can be found in the Appendix. At baseline, the interaction between *HealthLinks* study arm and race on overall perceived support for health was not significant (x^2=22.55, p=0.07); at 15 months, this interaction was highly significant (x^2=49.27, p<.001). Table 6 displays the marginal effect coefficients for overall perceived support for health at baseline and 15-months to provide within-race comparisons by study arm. When comparing study arms by race, both *HealthLinks* and *HealthLinks+* were associated with significantly higher support scores among White employees at 15 months relative to White employees in the control arm. White and Black employees in the *HealthLinks+* arm fared particularly well; among White employees, *HealthLinks+* was associated with a 0.35-point higher overall support score (p<.001) compared to White employees in the control arm, while *HealthLinks+* was associated with a 0.59-point higher overall support score (p<0.01) among Black employees compared to Black employees in the control arm. This effect translates to a predicted mean of 3.70 among White employees in the *HealthLinks+* arm compared to 3.35 among White employees in the control arm, and a predicted mean of 3.93 among Black employees in the *HealthLinks+* arm compared to 3.34 among Black employees in the control arm, indicating higher levels of perceived support among White and Black employees in the *HealthLinks+* arm at 15 months compared to control arm employees (Figure 9). Baseline EBI implementation and self-reported health were also significant in the 15-month interaction model.

Perceived employer support for physical activity

The physical activity support item asked whether employees perceived that their employer supported them in trying to live an "active life." Similar to overall support, the interaction between *HealthLinks* study arm and race/ethnicity on perceived physical activity support was not significant at baseline (x^2=15.71, p=0.33) but was highly significant at 15 months (x^2=59.78, p<.001). When comparing employees of the same race/ethnicity across study arms, both *HealthLinks* and *Healthlinks+* were associated with significantly higher physical activity support scores among White (β=0.45, SE: 0.25, p<.001) and Black (β=0.66, SE: 0.22, p<0.01) employees compared to employees of the same race in the control arm (Table 7). *HealthLinks+* was also significantly associated with higher physical activity support score among Hispanic respondents in the *HealthLinks+* arm (β=0.38, SE: 0.38, p<0.05). This effect translates to a predicted mean of 3.56 among White employees in the *HealthLinks+* arm compared to 3.10 among White employees in the control arm, a predicted mean of 3.88 among Black employees in the *HealthLinks+* arm compared to 3.22 among Black employees in the control arm, and a predicted mean of 3.73 among Hispanic employees in the *HealthLinks+* arm compared to 3.34 among Hispanic employees in the control arm, indicating higher levels of perceived support among White, Black, and Hispanic employees in the *HealthLinks+* arm at 15 months compared to control arm employees (Figure 10). Baseline physical activity EBI implementation score and self-reported health were also significant in the 15-month interaction model.

Perceived employer support for healthy foods and beverages

The healthy foods and beverages support item referred to whether employees felt supported in trying to eat healthy foods and drink healthy beverages. Examples of EBI strategies included having healthy options available at meetings and healthy items in on-site vending machines. Similar to the other models, the interaction between *HealthLinks* study arm and race was not significantly associated with healthy foods and beverages support at baseline.

At 15 months, only *HealthLinks+* was significantly associated with support scores in the main effects models (β=0.36, SE: 0.08, p<.001). However, similar to the overall and physical activity support items, the interaction between perceived support for healthy foods and beverages was significant at 15 months (x^2=28.63, p<0.05). When comparing study arms by race/ethnicity, *HealthLinks* was not significantly associated with higher healthy food and beverage support scores among any of the racial/ethnic categories compared to controls (Table 8). However, *HealthLinks+* was significantly associated with higher healthy food and beverage support scores among White employees (β=0.38, SE: 0.09, p<.001) and Black employees (β=0.55, SE: 0.21, p<0.01) in that study arm compared to control arm employees of the same race. This corresponds to a predicted mean of 3.62 among White employees and 3.83 among Black employees in the *HealthLinks+* arm compared to 3.24 and 3.29 in the control arm, respectively (Figure 11). Baseline healthy foods and beverages EBI implementation score and self-reported health were also significant in the 15-month interaction model.

Discussion

The purpose of this study was to determine whether employee race/ethnicity moderates the relationship between the *HealthLinks* WHPP intervention and employees' perceived employer support for health among small businesses in low-wage industries. Overall, our results describe a complex set of relationships between *HealthLinks*, employee race/ethnicity, and perceived support for health. On average, employees felt between "Neutral" and "Agree" when asked to respond to statements about whether they believe their employer supports their health. While the range of scores was overall small (generally less than one point on a 1-to-5-point scale), racial/ethnic minority employees tended to rate their employers as more supportive compared to White employees. Additionally, *HealthLinks* and *HealthLinks+* employees perceived higher support at 15 months compared to their baseline scores and control

employees at 15 months. Similar to baseline scores, racial/ethnic minorities in the two intervention arms generally rated their employers more highly than White employees.

Across all three support items, the overall interaction between study arm and employee race/ethnicity was significant and positive at 15 months. Both *HealthLinks* and *HealthLinks+* were associated with higher support scores among White employees for all three support items compared to White control arm employees, with the exception of healthy foods and beverages support among White employees in *HealthLinks* arm. Of note, employers in both intervention arms were not particularly active in implementing healthy foods and beverages policies in the workplace, but did often implement physical activity programs. *HealthLinks+* was also associated with higher support scores among Black employees across all three support items. For Asian and Other employees, both *HealthLinks* and *HealthLinks+* were generally beneficial, although these differences were not statistically significant and often smaller compared to White and Black employees. Finally, while *HealthLinks+* was positively associated with support scores for Hispanic employees (significantly for physical activity), *HealthLinks* offered little benefit or even resulted in worse support scores compared to Hispanic controls.

The finding that *HealthLinks+*, which also supported employers in forming wellness committees, had additional benefits for employees' perceived support is in alignment with our main outcome study results and offers a promising way forward for supporting low-wage employees and employees of color.[37] Wellness committees may represent an overall more inclusive approach to implementing WHPPs. Recommendations for wellness committees often include ensuring representation from multiple levels of an organization to ensure WHPP EBIs take into account the needs and preferences of employees outside of leadership.[26] In alignment with this idea, in our study 100% of worksites that implemented wellness committees had representation from multiple levels of the organization at 15 months. Given that employees of color are disproportionally underrepresented in organizational leadership positions, wellness committees may offer an opportunity for more diverse perspectives to be taken into account

when planning and implementing EBIs in the workplace.[59] Alternatively, companies with wellness committees may have implemented more EBIs in workplace. We recommended replicating these analyses using EBI implementation as a predictor to confirm which mechanism may underlie higher levels of perceived employer support among employees.

Despite the added benefit of wellness committees, our study results also suggest that some additional tailoring or adaptation of *HealthLinks+* may be warranted. Health disparities researchers have long cautioned that the broad implementation of "non–culturally congruent" interventions across diverse settings can have the unintended impact of exacerbating health disparities instead of promoting health equity.[52,56] Our results do suggest that White employees, who are overall at lower risk for many chronic disease compared to racial and ethnic minorities, consistently benefitted from the intervention in both study arms. *HealthLinks* also appeared to provide either no benefit or result in lower support scores for Hispanic employees compared to Hispanic control employees. However, the findings that Black employees benefitted from *HealthLinks+* and that Hispanic employees in the *HealthLinks+* arm perceived significantly higher levels of support for physical activity compared to Hispanic employees in the control arm are promising. Identifying strategies that can help employers be more inclusive to employees of color, particularly those with Asian, Hispanic, and Other identities, when implementing *HealthLinks+* will help ensure this WHPP more intentionally addresses these intersecting determinants of health.

Limitations

There are a few limitations to the present study. First, this study may not have been sufficiently powered to detect differences for some of the employee of color racial/ethnic categories. Many of the expected differences in mean scores are small, and with much smaller sample size among all of the employee of color categories, our ability to identify significant differences was limited. For instance, the coefficient values for some employees of color were larger than for White employees but were non-significant.

Additionally, while our employer data was longitudinal, our employee data is linked to the employee's worksite but not across time (baseline to 15 months). For this reason, all 15-month employee results are cross-sectional; we are unable to assess whether the employees in the baseline sample are the same employees at 15 months and analyze changes over time relative to changes in the workplace. Low-wage industries often have high turnover rates, which could increase the chances that employees at baseline and 15 months are not the same. Third, the small sample size among some subgroups required us to collapse them into larger racial/ethnic categories, restricting our ability to analyze outcomes using these more nuanced data. We recognize there may be key differences between these racial/ethnic subgroups that could impact study outcomes. For instance, we collapsed Multi-racial and American Indian/Alaskan Native employees into the Other category, even though these employees had relatively different mean support scores. We believe further research with larger samples of these subpopulations is needed. Finally, the employers in our study were predominately non-profit organizations and almost half (48%) came from the health care and social assistance industry. It is highly plausible that these companies are generally more supportive of employee health compared to other low-wage industries; more research comparing industries where employee health may be more aligned with worksites' mission overall to other industries, and its interaction with low-wage employment and race/ethnicity, is also warranted.

Strengths

To our knowledge, this is the first study assessing differences in perceived support by race/ethnicity and examining the interaction between WHPP and race/ethnicity on relevant outcomes. Additionally, this study examines these relationships within understudied small businesses in low-wage industries. Populations at increased risk for chronic diseases, including racial and ethnic minorities, are less likely to work for employers that offer WHPP and reflect larger social inequities that drive access to WHPPs.[60,61] Given that *HealthLinks* and *HealthLinks+* targets small businesses in low-wage industries - employers less likely to offer

WHPPs – examining potential disparate impacts among employees of color is critical to ensuring our efforts are not exacerbating existing health disparities.[35] Our overall large sample size offered us the opportunity to tease out moderating effects among multiple racial and ethnic groups historically understudied in health promotion intervention and WHPP research. Additionally, the availability of multi-level data at two time points allows us to identify potential organizational-level intervention associations with employee-level outcomes.

Disrupting the historic patterns of racial oppression embedded in our society requires intentionally focusing on the needs of people of color and implementing health promotion interventions that take this and other social determinants of health into account.[55] Taking an intersectional approach to implementation science research also requires us to focus on populations that may be subject to additional vulnerability due to their social status as both employees in low-wage industries and racial/ethnic minorities.[55] While further work and adaptations are needed, WHPPs with wellness committees such as *HealthLinks+* may offer a promising way forward to promote health equity among employees of color in low-wage industries.

Aim 2 Tables

Table 4: Baseline employer characteristics by study arm

	Control (n=20)	Healthlinks (n=22)	Healthlinks+ (n=21)	Overall Sample (n=63)	
Variable	**mean (sd) or n**	**mean (sd) or n**	**mean (sd) or n**	**mean (sd) or n**	**p-value**
Total number of employees	77 (48)	73 (45)	71 (48)	74 (67)	0.91
Annual Salary	$37,890 ($11,282)	$36,638 ($8,668)	$44,388 ($14,879)	$39,624 ($37,682)	0.13
Proportion of Employees Full-Time	75% (22%)	76% (23%)	75% (26%)	75% (23%)	0.98
Proportion of Employees in Union	0% (0%)	8% (23%)	3% (13%)	4% (0%)	0.30
Tax Status					0.93
Not-for-profit	13 (65%)	13 (59%)	13 (62%)	39 (62%)	
For-profit	7 (35%)	9 (41%)	8 (38%)	24 (38%)	
Insurance to Employees					
Proportion of employees eligible for health insurance	86% (17%)	85% (17%)	82% (24%)	84% (19%)	0.87
Proportion of employees enrolled in health insurance	82% (18%)	82% (16%)	84% (16%)	82% (16%)	0.92
Industry					0.29
Accommodation and Food Services	2 (10%)	1 (5%)	2 (10%)	5 (8%)	
Arts, Entertainment, and Recreation	0 (0%)	0 (0%)	2 (10%)	2 (3%)	
Educational Services	3 (15%)	2 (9%)	2 (10%)	7 (11%)	
Health Care and Social Assistance	8 (40%)	12 (55%)	10 (48%)	30 (48%)	
Other Services (except Public Administration)	7 (35%)	3 (14%)	3 (14%)	13 (21%)	
Retail Trade	0 (0%)	4 (18%)	2 (10%)	6 (10%)	
Baseline EBI Score (0-100%)	20% (20%)	18% (8%)	19% (9%)	19% (9%)	0.92

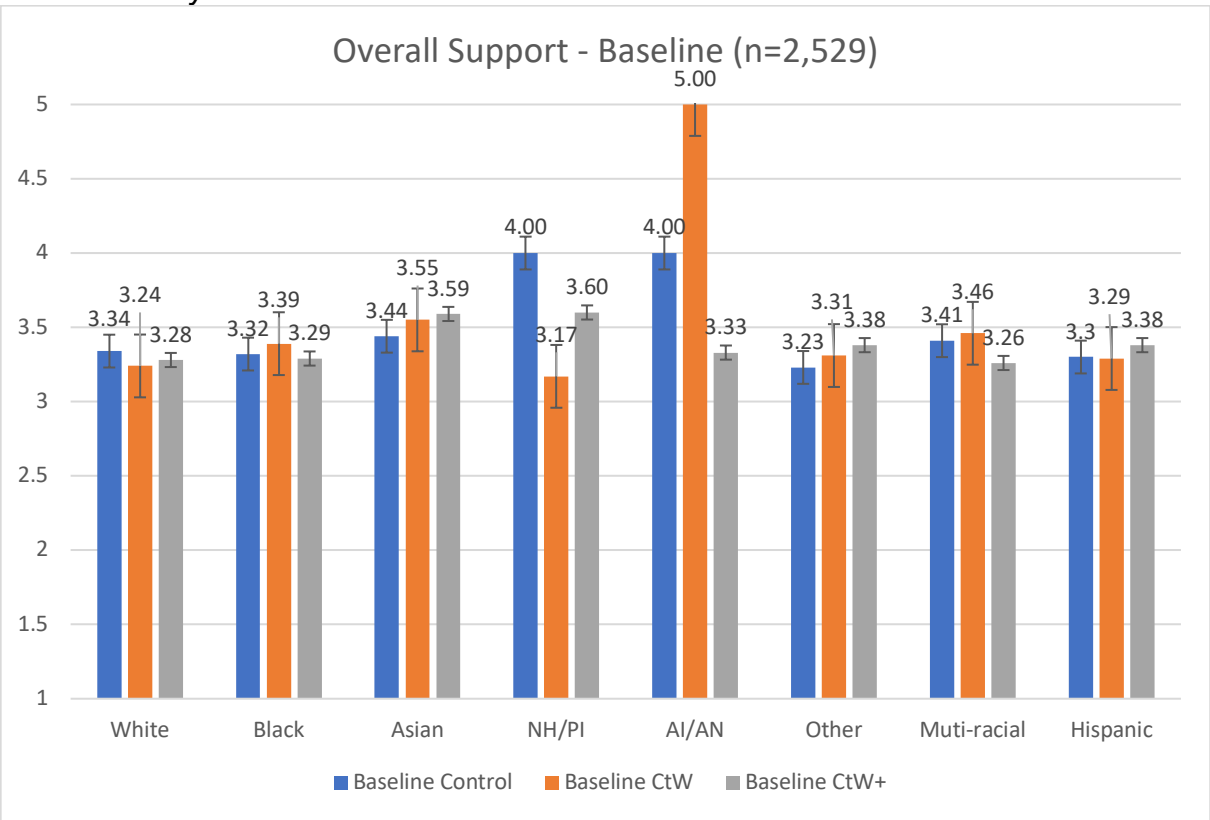
*Percents may sum to greater than 100% due to rounding

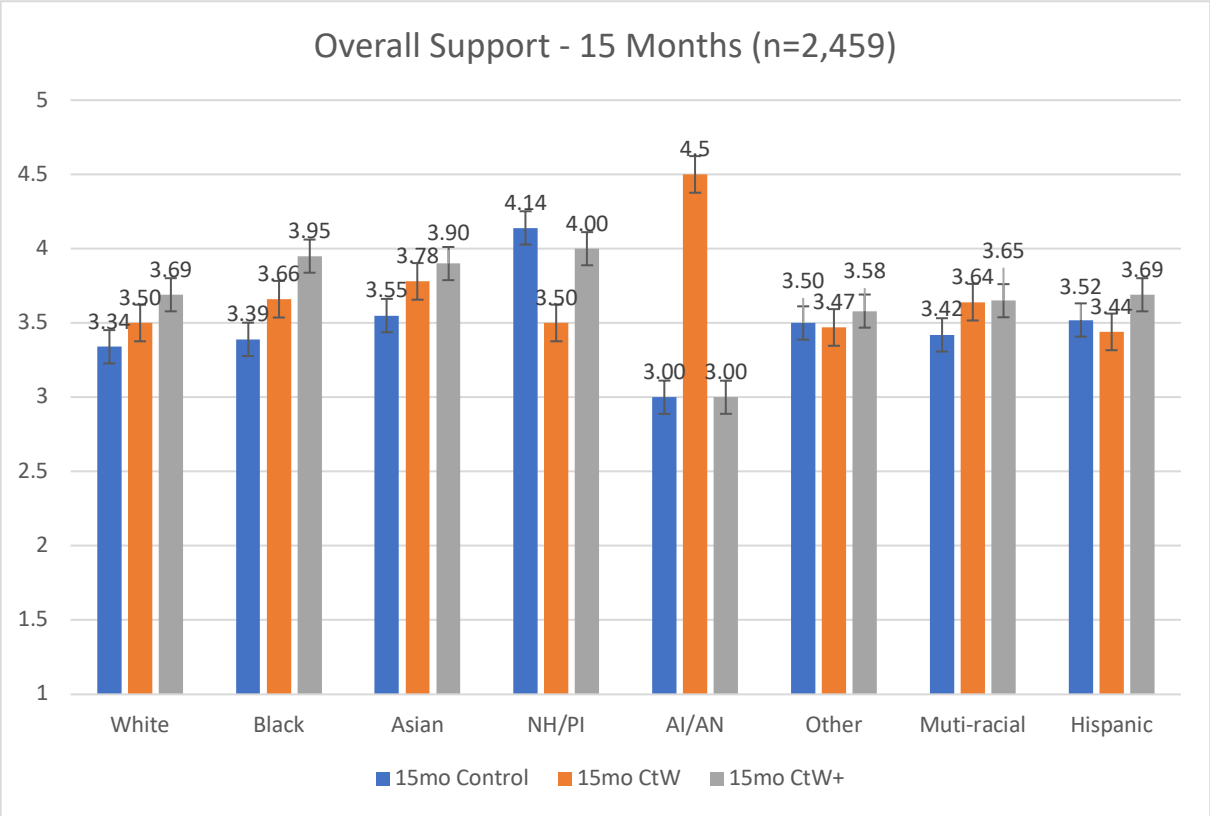
*Table 5: Baseline employee characteristics by study arm**

	Control (n=736)		Healthlinks (n=906)		Healthlinks+ (n=887)		Overall Sample (n=2,529)		p-value
Variable	n	%	n	%	n	%	n	%	
Race									<.001
White	511	69%	477	53%	501	56%	1,489	59%	
Black	53	7%	96	11%	39	4%	188	7%	
Asian (Including Native Hawaiian/Pacific Islander)	84	11%	164	18%	192	22%	440	17%	
Other (Including American Indian/Alaskan Native and Multi-Racial)	47	6%	56	6%	51	6%	154	6%	
Hispanic	41	6%	113	12%	104	12%	258	10%	
Income									<.001
Less than $15,000	25	3%	66	7%	33	4%	124	5%	
$15,000-24,999	83	11%	125	14%	97	11%	305	12%	
$25,000-49,999	207	27%	289	32%	283	32%	779	31%	
$50,000-$74,999	135	18%	148	16%	169	19%	452	18%	
$75,000 or more	303	40%	274	30%	313	35%	890	35%	
Education									<.001
Elementary school	10	1%	18	2%	8	1%	36	1%	
Some high school	9	1%	41	4%	11	1%	61	2%	
High school graduate	44	6%	114	12%	88	10%	246	9%	
Some college or technical school	156	20%	246	27%	205	22%	607	23%	
College graduate	558	72%	509	55%	609	66%	1,676	64%	
Age									0.08
18-34	297	38%	344	36%	378	40%	1,019	38%	
35-54	315	40%	394	42%	395	42%	1,104	41%	
55 or older	180	23%	207	22%	168	18%	555	21%	
Sex									0.16
Male	230	30%	314	34%	301	32%	845	32%	
Female	547	70%	612	66%	629	68%	1,788	68%	
Survey Language									<.001
English	773	98%	861	91%	919	98%	2,553	95%	
Spanish, traditional Chinese, or Vietnamese	19	2%	84	9%	22	2%	125	5%	
Self-Reported Health									0.80
Excellent	109	14%	118	13%	114	12%	341	13%	
Very good	294	37%	323	35%	349	37%	966	36%	
Good	304	38%	376	40%	357	38%	1,037	39%	
Fair	73	9%	103	11%	96	10%	272	10%	
Poor	10	1%	15	2%	16	2%	41	2%	

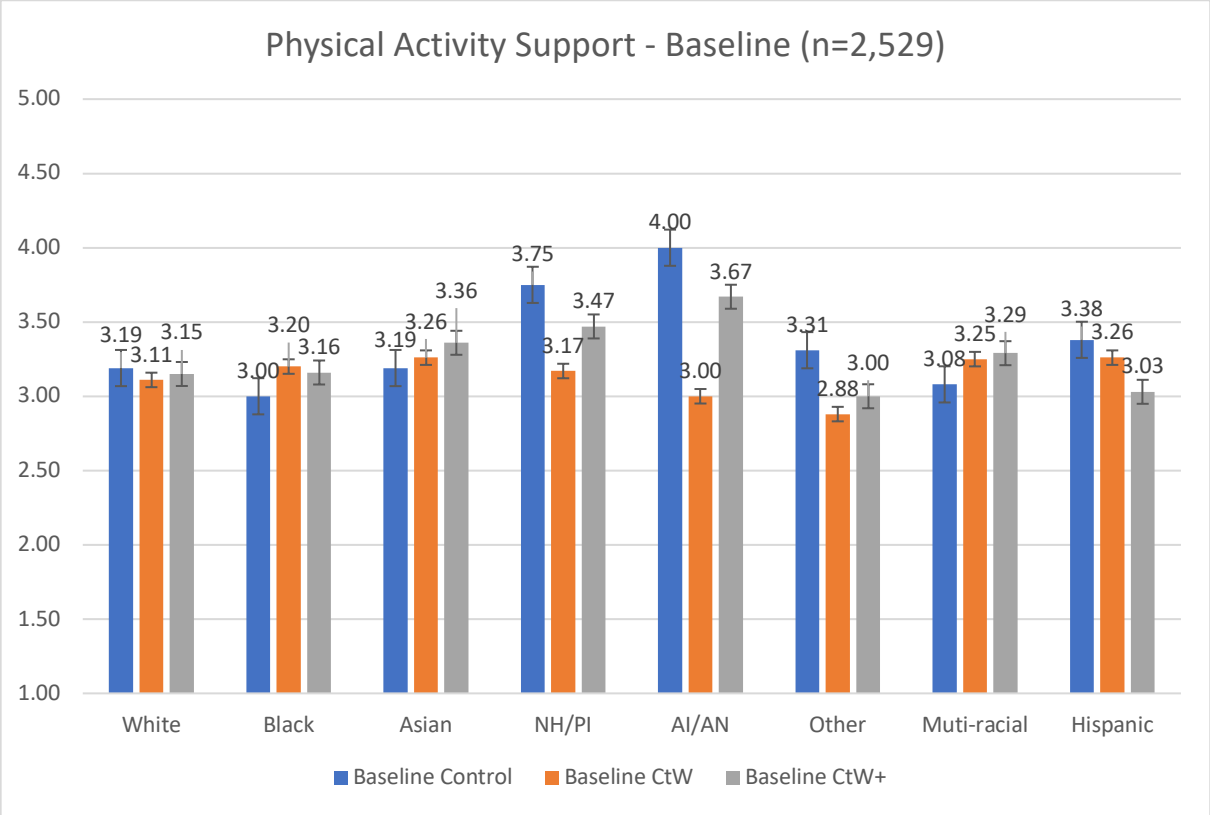
* Does not include 149 employees with missing race/ethnicity data excluded from this study.

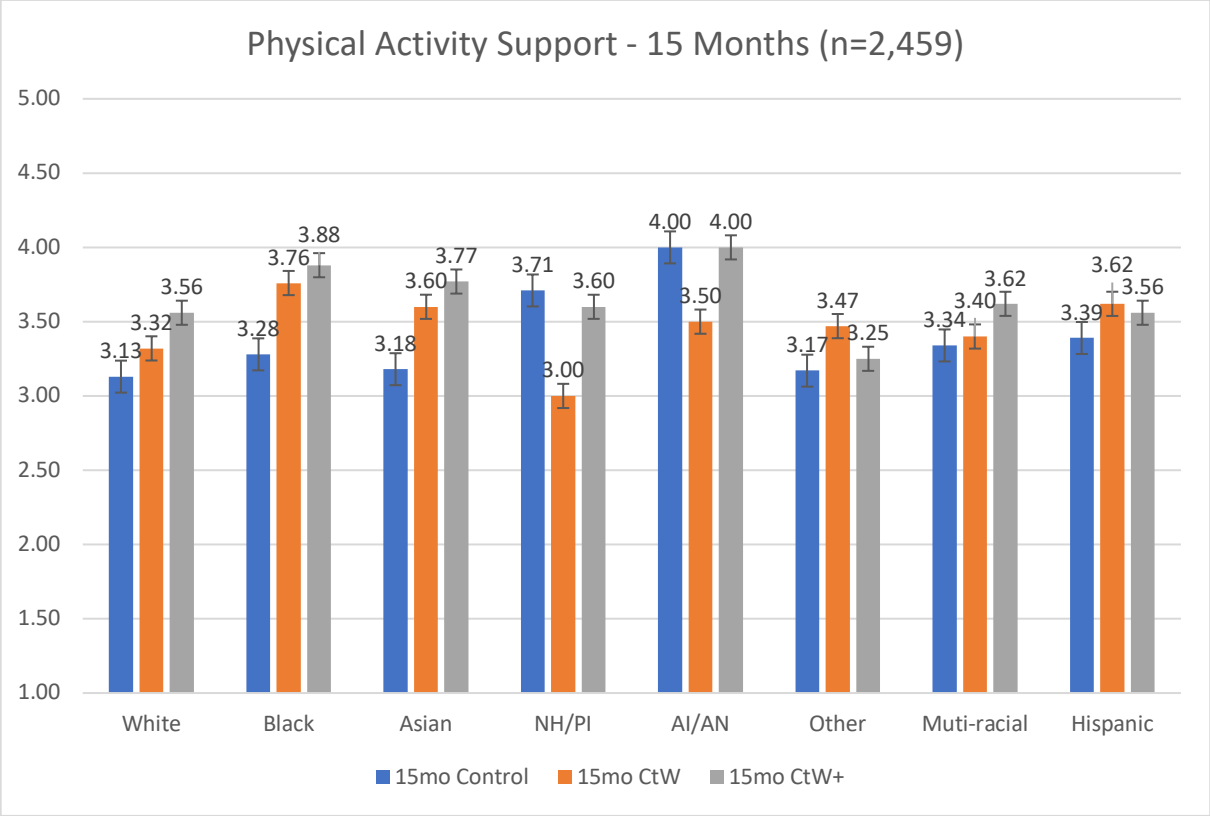
Figures 2-3: Baseline and 15-Month Mean Overall Perceived Employer Support by Race/Ethnicity



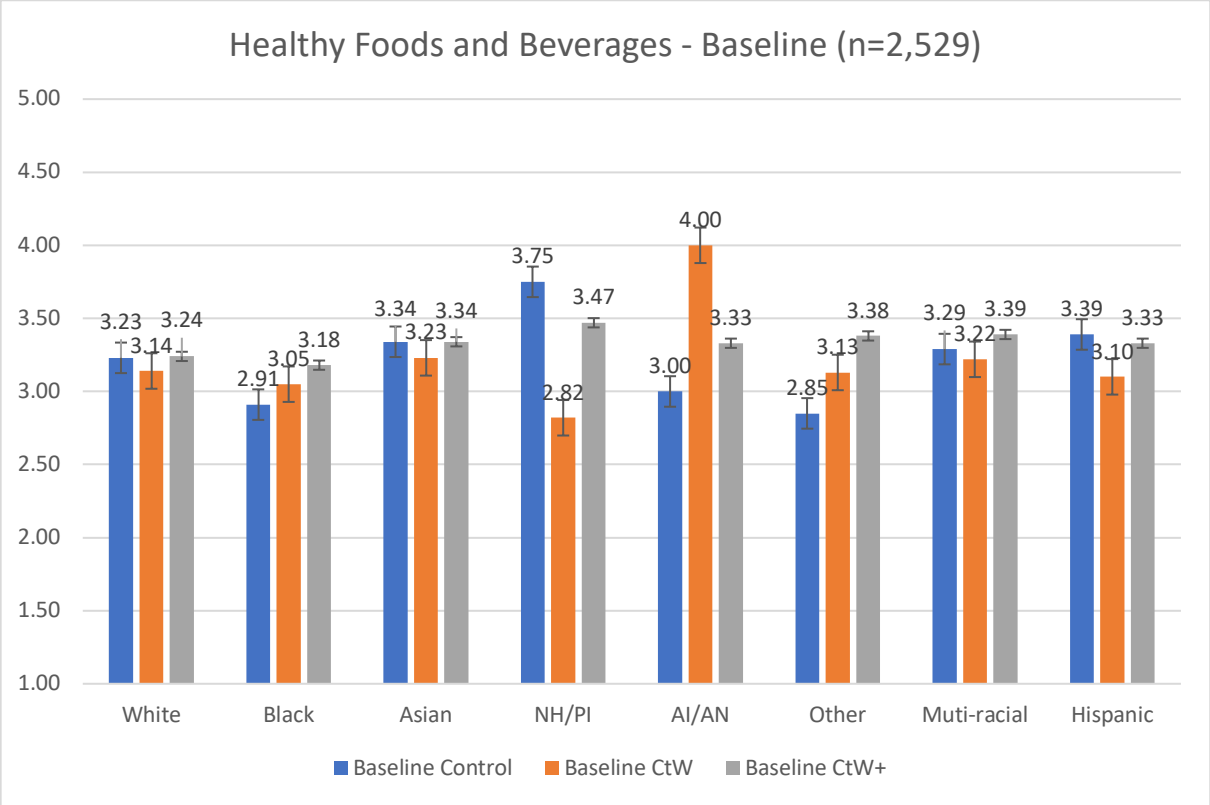


Figures 4-5: Baseline and 15-Month Mean Physical Activity Employer Support by Race/Ethnicity





Figures 6-7: Baseline and 15-Month Mean Healthy Foods and Beverages Employer Support by Race/Ethnicity



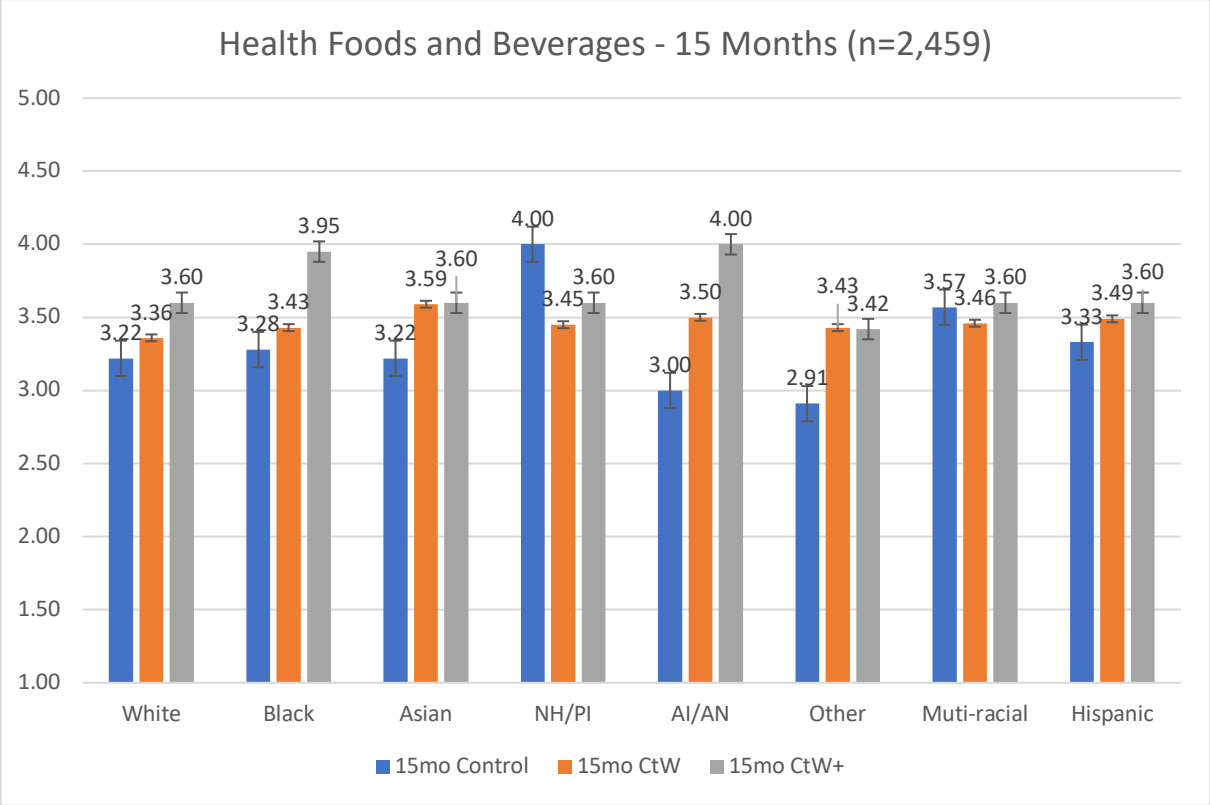


Table 6: Overall Support Marginal Effects Coefficients at Baseline and 15 Months

Baseline

	Control	*CtW*	*CtW+*
White	0 (reference)	-0.05 (0.09)	0.03 (0.09)
Black	0 (reference)	0.00 (0.19)	0.05 (0.22)
Asian	0 (reference)	-0.01 (0.16)	0.06 (0.16)
Other	0 (reference)	0.03 (0.20)	-0.08 (0.20)
Hispanic	0 (reference)	-0.06 (0.19)	0.20 (0.19)

15 Months

	Control	*CtW*	*CtW+*
White	0 (reference)	0.18 (0.08)*	0.35 (0.08)***
Black	0 (reference)	0.26 (0.19)	.59 (0.21)**
Asian	0 (reference)	0.13 (0.14)	0.17 (0.15)
Other	0 (reference)	0.25 (0.18)	0.26 (0.18)
Hispanic	0 (reference)	-0.19 (0.16)	0.22 (0.16)

Table 7: Physical Activity Support Marginal Effects Coefficients at Baseline and 15 Months

Baseline

	Control	*CtW*	*CtW+*
White	0 (reference)	-0.05 (0.09)	0.03 (0.09)
Black	0 (reference)	0.11 (0.19)	0.11 (0.22)
Asian	0 (reference)	0.00 (0.16)	0.40 (0.16)
Other	0 (reference)	-0.32 (0.20)	-0.34 (0.20)
Hispanic	0 (reference)	0.13 (0.19)	0.26 (0.19)

15 Months

	Control	*CtW*	*CtW+*
White	0 (reference)	0.25 (0.09)**	0.45 (0.09)***
Black	0 (reference)	0.49 (0.20)*	0.66 (0.22)**
Asian	0 (reference)	0.28 (0.15)	0.40 (0.16)
Other	0 (reference)	0.24 (0.19)	0.08 (0.07)
Hispanic	0 (reference)	0.01 (0.17	0.38 (0.38)*

Table 8: Healthy Foods and Beverages Marginal Effects Coefficients at Baseline and 15 Months

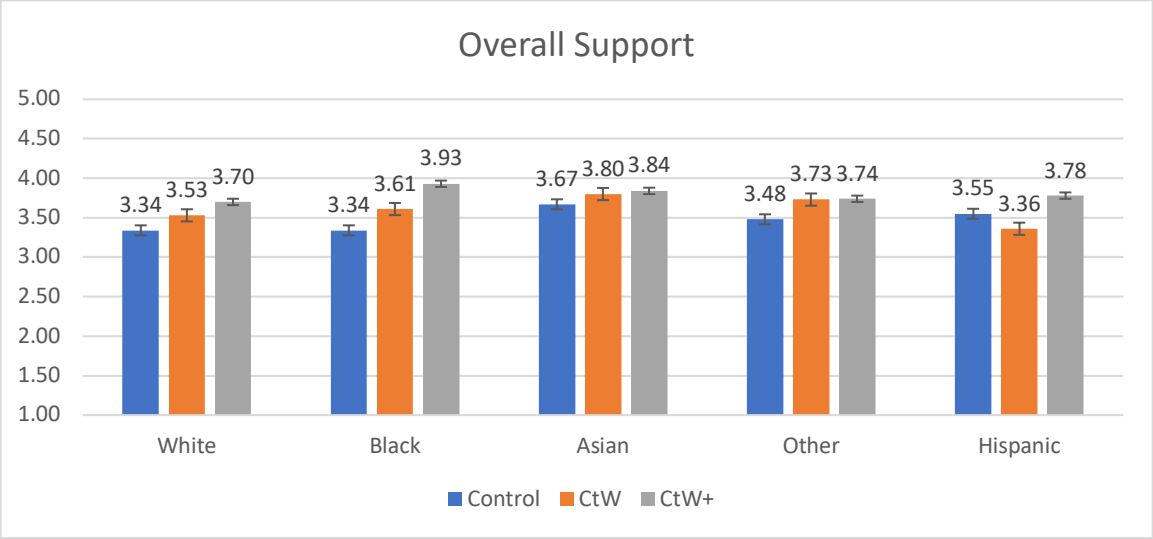
Baseline

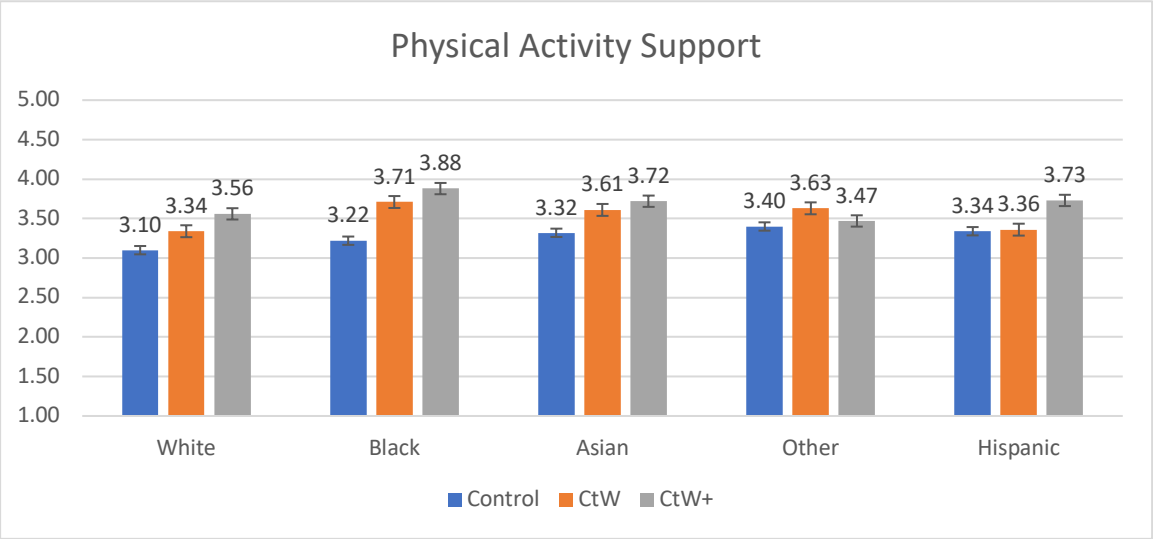
	Control	*CtW*	*CtW+*
White	0 (reference)	-0.10 (0.10)	0.03 (0.10)
Black	0 (reference)	-0.02 (0.20)	0.19 (0.23)
Asian	0 (reference)	-0.09 (0.17)	0.00 (0.17)
Other	0 (reference)	-0.27 (0.21)	0.01 (0.21)
Hispanic	0 (reference)	-0.19 (0.20)	0.26 (0.20)

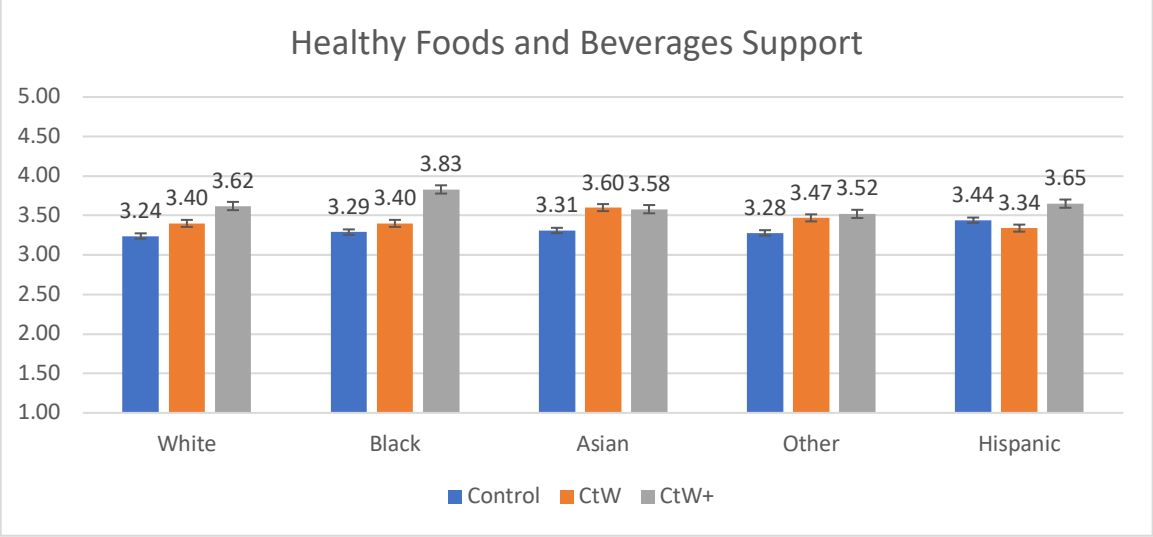
15 Months

	Control	*CtW*	*CtW+*
White	0 (reference)	0.15 (0.09)	0.38 (0.09)***
Black	0 (reference)	0.11 (0.20)	0.55 (0.21)**
Asian	0 (reference)	0.28 (0.15)	0.27 (0.16)
Other	0 (reference)	0.19 (0.19)	0.24 (0.19)
Hispanic	0 (reference)	-0.10 (0.17)	0.22 (0.17)

Figures 8-10: Predicted 15-Month Means for Overall, Physical Activity, and Health Foods and Beverages Support Items







Chapter 4: Local Health Departments' Capacity for Workplace Health Promotion Programs to Prevent Chronic Disease: Comparison of Rural, Micropolitan, and Urban Contexts

Abstract

Objective: To examine local health department (LHD) contexts, capacity for, and interest in partnering with employers on workplace health promotion programs (WHPPs) for chronic disease prevention.

Design: Qualitative interviews with LHD directors, along with data on these LHDs' characteristics from the *2016 National Profile of Local Health Departments* administered by the National Association of County and City Health Officials.

Setting: LHDs from 21 counties in 10 states.

Participants: Twenty-one LHD directors.

Main Outcome Measures(s): Interview questions focused on existing partnerships, decision-making, funding, data needs, and organizational capacity for WHPP partnerships with employers.

Results: We identified four themes: 1) Community partnerships are critical to LHDs' chronic disease prevention efforts; 2) LHDs see the value of partnering with employers but lack capacity to do so effectively; 3) While LHDs base priorities on identified community needs, funding ultimately drives programmatic decision-making; and 4) Rural, micropolitan, and urban LHDs differ in their readiness and capacity to work with employers.

Conclusions: While LHDs prioritize community needs, ultimately, funding and staff capacity drive decisions about whether to partner on new chronic disease prevention initiatives. Urban LHDs often have the staff and funding to support LHD-employer partnerships, but urban LHD directors perceived limited employer demand in their communities. In contrast, rural LHDs have a great need and demand for partnerships with employers to implement EBIs but lack the

funding and staff to do so. Micropolitan LHDs may be best suited to partner with employers on EBI implementation without additional funding or staff, due to higher levels of funding compared to rural LHDs and higher demand for additional partnerships compared to urban LHDs.

Introduction

Workplace health promotion programs (WHPPs) offer local health departments (LHDs) an effective way to deliver evidence-based interventions (EBIs) that can prevent chronic diseases among working adults and promote health equity.[62,63] EBIs continue to be underutilized in public health practice despite a wealth of supportive resources, such as *The Guide to Community Preventive Services* (*The Community Guide*).[64,65] Underutilization of EBIs in public health practice is particularly concerning given that rates of chronic disease in the US continue to increase.[66,67] Increased EBI implementation via WHPPs could reduce rates of chronic disease and related health risk behaviors.[19]

Frequently cited barriers to LHDs' EBI implementation include lack of time, inadequate funding, difficulty with interpreting research evidence, and lack of leadership support.[63] Small LHDs in rural communities in particular face a "double disparity" – higher rates of risk factors for chronic disease among rural populations, and more limited LHD capacity (understaffed and underfunded) to address chronic disease prevention.[68] For LHDs of all sizes, capacity-building – increasing the resources, supports, and workforce available to deliver EBIs – is one approach that can improve LHDs' ability to implement EBIs.[63] Training LHDs on partnering with employers to implement WHPPs in one capacity-building approach that can increase LHDs' reach in community-based settings. Over 60% of adults in the United States work. LHD-employer WHPP partnerships can help LHDs be strategic in reaching a large segment of a population at-risk for chronic diseases with health-promoting EBIs.[41] Furthermore, public health leaders have called for cross-sector partnerships as a way for LHDs to have a broader public health impact.[69] For

rural communities in particular, building additional partnerships may be a particularly useful strategy to improve capacity given more limited resources.[68]

Supporting LHDs in building successful partnerships with employers on WHPPs requires understanding LHDs' current interest in and capacity for LHD-employer partnerships.[63] Our study team has experience training LHDs in rural and urban communities in Washington State to deliver *Connect to Wellness (CtW)*, an evidence-based WHPP designed to disseminate EBIs and support their implementation in worksites.[70] These pilot efforts have been successful, and plans are currently underway to expand this initiative nationwide. However, little is known about how to appropriately tailor these efforts to meet the needs of LHDs outside of Washington State.[71] To address this gap, we interviewed LHD directors from several states about their capacity and interest in building partnerships with employers to implement WHPPs, and more specifically, *CtW*. To provide a more thorough comparison of these LHDs' contexts, we then paired these qualitative results with their responses to the *2016 National Profile of Local Health Departments* survey (*National Profile*) administered by the National Association of County and City Health Officials (NACCHO). In particular, we were interested in learning how rural, micropolitan, and urban counties may be similar or different in their capacity for and interest in partnering with employers.

Methods

Sample and Recruitment Procedures

The present study was part of a larger project exploring state and local health department perspectives on recruitment, training, and support for WHPPs, and specifically *CtW*, as part of our nationwide scale-up efforts. For the present study, we interviewed LHD directors between February and August 2019. We predominantly recruited LHD directors via referral from state chronic disease directors we interviewed during the first phase of this project. Either the state chronic disease director or our study team staff initially contacted the LHD director via

email to assess interest in participating in an interview. In order to ensure a sufficient sample and variety in state representation, we also worked with the Northwest Center for Public Health Practice (a Health Resources and Services Administration [HRSA]-funded Public Health Training Center located at the University of Washington) to identify additional LHD directors to recruit.

Measures

Our final interview guide consisted of 11 open-ended questions (provided in Table 1) focused on 1) background information, including current chronic disease prevention partners and partnerships with employers; 2) chronic disease funding and decision-making; and 3) capacity for WHPPs and *CtW*.

Interview Procedures

We conducted interviews with LHD directors via Zoom audio conference call. Each interview lasted 30-45 minutes. All interviews were audio-recorded and transcribed verbatim by a professional transcriptionist for analysis. We then uploaded these transcripts into Atlas.ti version 8 for analysis.

In order to further characterize the participants' LHDs, we also obtained descriptive data from the NACCHO-administered *National Profile* survey on reported LHD characteristics and chronic disease prevention activities.[72] We defined LHD jurisdiction size (urban, micropolitan, or rural) based on Rural-Urban Commuting Area Codes (RUCA) using the zip code of the primary physical or mailing address of the LHD. RUCA codes classify US Census tracts based on a combination of population density, urbanization, and daily commuting factors.[73] We classified RUCA codes 1-3 as urban, 4-6 as micropolitan, and 7-10 as rural.[73,74] Using RUCA classifications, these urban jurisdictions have population sizes of 50,000 or more, micropolitan jurisdictions have 10,000-49,999 residents, and rural jurisdictions have less than 10,000 residents. The Human Subjects Review Committee at the University of Washington approved

the interview guide and study protocol, and all study participants provided verbal consent before the start of the interview.

Analysis

We used an inductive constant comparison method for the coding and analysis of transcripts.[75,76] This qualitative approach to identifying and applying new concepts that arise during the coding process is frequently used in formative intervention-implementation research.[77] First, we established a set of a priori codes based on study objectives and questions (e.g., "Chronic disease partners," "Barriers to CtW," and "Resources for CtW").[76] All three coders (MB, CK, MR) then read and coded two of the same transcripts. We reviewed these transcripts as a team to ensure consistency among coders and clarify any discrepancies in coding. We then divided the remaining transcripts among the coding team and coded our assigned transcripts independently. Throughout the coding process, our study team met to discuss the transcripts, refine the codebook, and ensure consistency throughout the analysis.[78] Once coding was completed, we constructed code summary reports that described the central ideas identified in each of the codes. We then used these code summary reports and coded text to identify our primary themes. Consensus among study team members determined the final codebook, primary themes, and representative quotes included in this manuscript.

We performed descriptive analyses (means, standard deviations, and proportions) for relevant survey items from the *National Profile*.

Results

LHD Characteristics

We interviewed 21 LHD directors from 10 states across the country. We present the geographic and governance-structure characteristics of these LHDs in Table 2. The 10 states included in this sample came from three of four US Census regions: Northeast (1), West (6), and Midwest (3). While we did interview state chronic disease directors from southern states in

the overall parent study, none of these directors were willing to connect us to LHD directors in their state for the present study. We were able to speak with LHD directors from states with both centralized (state-governed) and decentralized (locally-governed) governance structures. Governance structure often determines LHD funding and decision-making abilities, two ideas central to our research questions. Six LHDs operated under centralized governance structures; the remaining 15 LHDs had decentralized governance structures. Of the 21 LHDs we interviewed, eight were based in urban areas, eight in micropolitan areas, and five in rural areas. Five of the LHDs we interviewed did not have *National Profile* survey data available. We present relevant *National Profile* results from the 16 LHDs for which we had available survey data by RUCA code category in Table 2. This subsample includes seven urban, six micropolitan, and three rural LHDs.

As expected, urban LHDs that responded to the survey on average had larger staff sizes, full-time equivalents (FTE), and annual expenditures than micropolitan LHDs, and micropolitan LHDs had larger staff sizes, FTE, and annual expenditures than rural LHDs. Most urban LHDs (88%) in our sample implemented chronic disease prevention activities themselves while more micropolitan and rural LHDs reported that others in their community provided chronic disease prevention activities independent of LHD funding (100% of rural and 83% of micropolitan vs. 43% of urban). Survey respondents indicated limited partnerships with employers – one urban LHD indicated they had “regularly scheduled meetings” with employers, and one urban LHD and three micropolitan LHDs indicated they “exchange information” with employers. Regarding EBI implementation, none of the LHDs who responded to the survey indicated that their staff consistently use the *Community Guide* in their work. Additionally, 38% of the LHDs who responded to the survey in our sample did not know if their staff ever used the *Community Guide*.

Qualitative Results

In our coding and analysis of the 21 interviews with LHD directors, we identified four major themes: 1) community partnerships are critical to LHDs' chronic disease prevention efforts; 2) LHDs see the value of partnering with employers but lack capacity to do so effectively; 3) while LHDs base priorities on identified community needs, funding ultimately drives programmatic decision-making; and 4) Rural, micropolitan, and urban LHDs differ in their readiness and capacity to work with employers.

Community partnerships are critical to LHDs' chronic disease prevention efforts

LHD directors perceived community stakeholders to be essential partners in their chronic disease work. Many of these partnerships were related to community health (needs) assessments (CHAs), community health improvement plans (CHIPs), and accountable communities of health (ACHs). Commonly mentioned partners included schools, hospitals, and other public agencies. Initially, CHA and CHIP partnerships involved working together to collect community health data. However, the CHA and CHIP results led to continued collaborations that ultimately informed LHD chronic disease priorities. ACHs served a similar purpose, but hospitals were the primary partners, and conversations focused more intentionally on social determinants of health.

We noticed some differences among rural, urban, and micropolitan LHDs regarding whom they partnered with, and their role in chronic disease efforts. Micropolitan LHD directors in particular mentioned the essential role of hospitals and ACHs. Both rural and urban LHD directors mentioned stakeholder collaboratives and task forces as critical partners. When LHD directors worked with these groups, partners often helped implement LHD-funded programs in addition to informing priorities. Urban LHD directors were also the only participants who mentioned interacting with local policymakers on policy implementation and advocacy.

"*We have to engage and have willing partners, or else you don't get anywhere."* – LHD 030 (Urban, Decentralized)

LHDs see the value of partnering with employers but lack the capacity to do so effectively

Many LHD directors perceived a need for partnering with employers on WHPP implementation in their community and that their staff had the expertise to recruit, partner with, and train employers. Partnering with employers on WHPP implementation was also seen as a strategic opportunity, as new offerings could strengthen existing partnerships. However, while each LHD funding situation was unique, LHD directors from all areas and governance structures mentioned similar funding challenges and concerns. Most importantly, many LHD directors felt that embarking on new partnerships with employers would be challenging without additional funding support or staff time to commit to these efforts. For instance, over half (3/5) of rural LHDs we interviewed had funding for WHPPs in the past but did not have any at present. These rural LHDs already felt stretched thin and unable to take on any more work without additional funding. Most of the micropolitan LHDs we spoke with did have at least one WHPP initiative already in place or were actively working on starting one. However, these were often not comprehensive programs, but more educational presentations or topic-specific resources. Similar to rural LHDs, some had previous funding to implement WHPPs, but it was not renewed. Half (4/8) of the urban LHD directors mentioned previously partnering with employers to implement EBIs, but these programs were discontinued due to lack of interest from employers. Despite this, urban LHD directors mentioned that, with additional funding for WHPP, they would be willing to re-engage employers on EBI implementation.

"We know how to do this work. We've done policy work and we know how to do it, but we just don't have the capacity. We have capability, but not the capacity." - LHD 029 (Rural, Decentralized)

LHDs identified siloed funding as one of the biggest funding challenges they face. Some LHD directors felt this type of funding restricted their flexibility and ability to meet community needs. Notably, none of the rural LHD directors we interviewed received funding earmarked for chronic disease but did apply general state funds towards chronic disease efforts. Rural LHDs also mentioned that low tax revenue limited their capacity for chronic disease prevention, either due to declining tax bases or political resistance to increasing taxes at the local or state level. Generally, LHD directors felt that budgets were getting tighter, with less funding and staff available to accomplish the same amount of work.

"Part of my reaction to this is that we wind up at health departments — because health departments are committed to this kind of work — we will often say, 'Yes, sure, we can do that, too.' But then there is a limit to how much we can do without bringing in new resources." LHD 015 (Micropolitan, Centralized)

Some of the LHD directors with prior WHPP funding mentioned concerns with starting new WHPPs due to challenges with sustainability, and in some cases, the loss of trust with employers once the previous programs ended. LHD directors were also concerned about interest among employers as well as the amount of time their staff would need to dedicate to recruitment.

<u>While LHDs base priorities on identified community needs, funding ultimately drives programmatic decision-making</u>

LHD directors of all sizes mentioned using CHAs, CHIPs, state health improvement plans, and strategic planning documents, all developed in partnership with stakeholders, as their primary sources for determining whether a program is a good fit for their community. Since

chronic disease prevention is often a priority, evidence-based WHPPs resonated with community needs for most. LHD directors also frequently mentioned the importance of employer demand and community interest in these partnerships. If local employers were to express an interest in WHPPs, LHD directors indicated that they would be more interested in supporting these efforts. However, all said additional funding and staff time would be necessary for them to partner with employers to implement WHPPs.

"*Certainly if there's a public health need, we'll look for ways to fund it, but we can't just do something without money."* – LHD 027 (Urban, Decentralized)

Many of the LHDs we spoke to had funding that specifically required EBIs. Both micropolitan and urban LHD directors varied in their willingness to consider committing existing resources towards *CtW,* which offers employers a menu of EBIs. Overall, micropolitan LHDs seemed to be more interested in exploring ways to apply existing funds. When explicitly asked about *CtW*, all of these LHD directors were open to partnering with employers to implement EBIs but wanted to ensure the program fulfilled an unmet need or complemented work already in place.

In general, [funders] want us to always use evidence-based programs. So when we have the flexibility of picking and defining our own scope of work, that's where we would start…what are the outcomes we're trying to impact and what are the evidence-based strategies to address that?...What's synergistic with other things we're doing, and what would be synergistic with what partners are doing but not duplicative? - LHD 011 (Urban, Decentralized)

Rural, micropolitan, and urban LHDs differ in their readiness and capacity to work with employers

Despite better overall agency-level funding environments, urban LHD directors in our sample seemed to be less interested in taking on new LHD-employer partnerships compared to LHDs directors in rural and micropolitan communities. Urban LHDs' reluctance was often due to a lack of demand among employers for WHPPs when these LHDs offered programs in the past. Additionally, urban LHD directors often already had numerous partnerships with employers inside and outside the healthcare system. In contrast, rural communities expressed a need for these kinds of initiatives. However, despite this interest, funding, and staff availability severely restricted rural LHD leaders' ability to consider additional external partnerships.

Our interviews with LHD directors suggest that micropolitan LHDs may have the right balance of capacity for and interest partnering with employers on WHPP, particularly without additional funding or staff availability, compared to urban and rural LHDs. Most of the micropolitan LHDs we spoke with already had at least one WHPP initiative in place or development. The micropolitan LHD directors we spoke with often had large enough operations with funding and staff to commit towards these efforts compared to rural LHDs. However, the micropolitan LHD directors we spoke with felt that partnering with employers on WHPPs and EBI implementation would be a more comprehensive approach to their current chronic disease prevention work compared to the urban LHD directors we interviewed.

Discussion

This study included interviews with 21 LHD directors from three US regions in order to understand their current chronic disease prevention decision-making, capacity, and potential to partner with employers on WHPPs. Across rural, micropolitan, and urban areas, LHD directors noted that while identified community needs guides most decision-making, ultimately, funding drives decisions related to new chronic disease prevention initiatives. Many directors mentioned

using CHAs or CHIPs developed in partnership with community stakeholders to inform priorities. This finding aligns with Public Health Accreditation Board standards and measures regarding data-driven decision-making.[79] However, funding constraints limited LHDs' efforts to be entirely data-driven. As a result, their willingness to partner with employers often reflected balancing community need with available funding. Even when LHDs had an interest and need for these partnerships, most felt they would be unable to take on a new program due to funding constraints.

Rural LHD interest partnering with employers on WHPPs is promising, given that these partnerships may be a particularly useful strategy to improve capacity in the context of notable health disparities and limited resources.[68] Our study team has had previous success in working with rural LHDs to implement *CtW*. However, one notable difference between our pilot work and the rural LHD directors we spoke with in this study is the availability of funding. In our pilot study, LHDs had funding support from the Centers for Disease Control and Prevention (CDC) to implement community-based healthy eating, physical activity, and tobacco cessation EBIs, and they were encouraged to work with employers.[70] In the present study, despite an interest in LHD-employer WHPP partnerships, none of the rural LHD directors we spoke to had funding earmarked for chronic disease prevention. Additionally, our results differ from Linnan et al.'s (2019) assessment of WHPP activity among state and territorial health departments in that most of the LHDs we interviewed did not currently partner with employers to implement WHPPs.[62] We believe this may be the result of two factors. First, similar to our previous work with rural LHDs, CDC funding mechanisms available during the time of the Linnan et al. study had ended by the time of our interviews.[62] Second, state and territorial-level departments may generally have more staff and capacity. Despite these differences, similar to Linnan et al., our results suggest that LHDs need increased flexibility in existing funding sources, additional funding for partnerships, and improved stability of funding over time in order to meaningfully partner with employers on evidence-based WHPP implementation.[62]

The primary limitation of our study is the small numbers of LHDs within each community area. We conducted these interviews as part of the more extensive parent study that was not specific to differences by rural, micropolitan, and urban areas. While we believe the 21 LHD directors we spoke to provided us with a representative depiction of LHDs from rural, micropolitan, and urban areas, conversations with additional LHD directors may have identified region-specific contextual factors that did not arise in our interviews.

Furthermore, our restricted sample of 16 LHDs from the *National Profile* survey also limits our ability to conduct more meaningful comparisons of LHDs in this sample. Despite these limitations, our description of contextual factors that may impact LHDs' ability to partner with employers on EBI implementation via WHPPs and those specific to rural, micropolitan, and urban-area LHDs is a strength of our study. Research identifying contextual considerations for LHD capacity-building is presently limited. This study presents critical new information on differences among urban, micropolitan, and rural LHDs that can inform future capacity-building efforts.

Public Health 3.0 goals call for health departments to engage with multiple sectors and community partners to generate collective impact.[69] LHDs are uniquely positioned to collaborate with organizations outside the traditional healthcare system, and employers offer a widely available setting in which to partner on the delivery of EBIs.[62,70,74,80] However, stakeholder partnerships to support implementing EBIs in public health practice requires sufficient capacity.[63] In the present environment, funding allocated for chronic disease prevention and community partnership development is relatively small compared to other topic areas and functions.[81,82] While employers may be promising partners for EBI implementation, LHDs may have severely limited capacity due to funding and staff availability to support these efforts. Additionally, community size may be an additional crucial contextual factor to take into consideration for this type of work, with micropolitan communities offering the most promising avenue for LHD-employer partnerships.

Implications for Policy & Practice

Partnering with employers on WHPPs may allow LHDs to strategically reach a large number of at-risk adults with EBIs to prevent chronic disease.

- Research on contextual factors that may influence willingness to partner with employers is limited; understanding LHDs' current interest in and capacity for LHD-employer partnerships is vital to understanding how to implement WHPPs nationally.
- Our interviews with 21 LHD directors from three US regions found that community partnerships play a critical role in determining LHD priorities.
- Many of the LHDs we spoke to had worked with employers but currently lacked funding for new partnerships. LHDs generally saw the value of partnering with employers but currently lacked funding and staff capacity for these efforts.
- While LHDs base priorities on identified community needs, funding ultimately drives programmatic decision-making. Most LHDs do not have funding to partner with employers on WHPPs, and expanding LHD-employer partnerships nationwide may be challenging under current conditions.
- Rural communities in particular need more funding flexibility, additional funding for partnerships, and improved funding stability to partner with employers.
- Micropolitan LHDs may be best suited to partner with employers relative to urban and rural LHDs due to higher funding levels, staff availability, and limited scope of current partnerships.

Table 9: LHD Interview Guide Questions

Background information
1) What are your job responsibilities as a local health department director? We are particularly interested in your responsibilities related to chronic disease prevention and management.
2) What is your agency's stated mission and goals?
3) Who are your most important public and private partners for chronic disease prevention in your jurisdiction?
4) Does your agency currently partner with or support employers to promote health or prevent chronic disease?
Chronic disease funding and decision-making
1) How do your agency's mission and goals align with chronic disease prevention for adults?
2) How does your agency fund chronic disease prevention programming?
3) How does your agency decide whether or not to adopt a new program for chronic disease prevention?
Organizational capacity
1) Thinking about your past experiences with these types of programs, what resources do you feel would be important or necessary to have to implement CtW? (*Probes: financial resources, staff time, supportive leadership, organizational infrastructure*)
2) What type of funding or cost data related to CtW program delivery would be helpful for you to know? (*Probes: staff time and training, allocation of funding for program activities*)
3) At your agency, who would deliver CtW to employers?
4) What do you think would most powerfully motivate local health departments in your state to do this type of work with employers? (*Probes: information about accreditation/re-accreditation, alignment with other grants/initiatives*)

Table 10: Local Health Department (LHD) National Association of County and City Health Officials 2016 National Profile Study Characteristics by Rural, Micropolitan, and Urban RUCA[1] code (n=16, 9 states represented[2])

Survey Item	**Urban (n=7)**	**Micropolitan (n=6)**	**Rural (n=3)**
Number of Staff	106 (SD: 72)	36 (SD: 34)	12 (SD: 3)
FTE	81 (SD: 37)	32 (SD: 33)	10 (SD: 2)
Annual Expenditures	$8,047,085 (SD: $6,656,257)	$4,548,706 (SD: 4,754,392)	$707,328 (SD: $327,789)
Chronic disease prevention activities are (select all that apply):			
Performed by LHD directly	100% (7)	83% (5)	67% (2)
Contracted out by LHD	0	0	0
Provided by others in community independent of LHD funding	43% (3)	83% (5)	100% (3)
Actively involved in obesity/chronic disease policy or advocacy in the past two years.	57% (4)	83% (5)	67% (2)
Partnerships with employers in previous year			
Shared Personnel/ Resources	0	0	0
Written agreement	0	0	0
Regularly scheduled meetings	14% (1)	0	0
Exchange information	14% (1)	50% (3)	0
LHD use of the Community Guide:			
LHD staff have not used the Community Guide	14% (1)	17% (1)	33% (1)
LHD staff in some programmatic areas have used the Community Guide	43% (3)	50% (3)	33% (1)
LHD staff consistently use the Community Guide in all relevant programmatic areas	0%	0%	0%
Do not know	43% (3)	33% (2)	33% (1)
LHDs current fiscal year budget is			
Less than previous year	0%	0%	0%
About the same	29% (2)	50% (3)	0%
Greater than previous year	57% (4)	17% (1)	66% (2)
No response	14% (1)	33% (2)	33% (1)
LHD budget expectations for upcoming year			
Less than current year's budget	29% (2)	17% (1)	0%
Approximately the same	29% (2)	33% (2)	0%
Greater than the current year's budget	29% (2)	17% (1)	66% (2)
No response	14% (1)	33% (2)	33% (1)

Source: National Association of County and City Health Officials (NACCHO) 2016 National Profile Study

[1]Rural-Urban Community Area

[2]In one state, none of the three LHDs we interviewed completed the National Association of County and City Health Officials (NACCHO) National Profile Study.

Chapter 5: Conclusions

Chronic conditions are a leading cause of death in the United States and disproportionately affect low-wage workers, racial and ethnic minorities, and rural residents. Three modifiable health risk behaviors - unhealthy diet, physical inactivity, and tobacco use - drive much of the development of chronic disease in the United States. Effective preventative health interventions such as workplace health promotion programs (WHPPs) can successfully enable individuals to modify these behaviors and reduce their risk of chronic disease, reducing overall morbidity, mortality and health care costs.[83,84]

However, effectiveness and success in reaching all target populations is critically influenced by the context within which the intervention occurs.[13,85] In other words, context and implementation are inextricably linked.[13,85] Despite this, primary studies of interventions are often limited in their description of contexts.[13] For instance, a 2015 review of intervention studies in influential public health journals found that studies' descriptions of contexts were vague overall and limited to either physical settings or confounding factors that needed to be controlled for in analysis.[16] In a world of academic research where models identifying causal pathways and eliminating confounders are highly valued, the study of implementation context is often framed as identifying and controlling for factors that interfere with program success.[86] While minimizing the influence of context in research methodology and analysis is critical to understanding *what* works to promote population health, studying the normal conditions under which these programs occur moves us towards an understanding of *how* these programs work in real-world settings, narrowing the gap between research and practice.[86,87]

When we limit our incorporation of contexts to physical settings or otherwise static entities, we miss out on a more complete understanding of malleable contextual factors that may impact intervention success. Even when contextual factors are not mutable (such as funding constraints), understanding how these factors may impact EBI implementation can help us identify new opportunities for innovations and adaptations that address these challenges.

The complexity and context-specific nature of many health promotion programs necessitates an improved understanding of the dynamic relationships between implementation processes and contextual factors that can influence intervention success. The translation of the knowledge gained from studies of implementation contexts can lead to improved implementation and outcomes, particularly for vulnerable populations such as low-wage workers, racial and ethnic minorities, and rural populations. To that end, the three studies in this dissertation utilized longitudinal, multi-level, and qualitative data to provide a uniquely robust examination of the role organizational contexts and implementation processes play in individual, organizational, and local health department (LHD)-level WHPP outcomes. The results of these studies elucidate the complex ways in which WHPP implementation and surrounding contexts may influence one another and identify strategies that may support consistent WHPP implementation and outcomes across varying small business low-wage industry contexts.

Summary of Findings

Aim 1: Wellness committees may help both with initiating evidence-based intervention (EBI) implementation during the active intervention period and maintaining implementation after formal *HealthLinks* support ends.[37] However, understanding what characteristics of wellness committees drive success and the summative impact of these factors is critical to identifying actionable strategies that can support small worksites in implementing wellness committees as part of WHPPs. Aim 1 identified four underlying mechanisms of wellness committee implementation that predict worksite EBI implementation success: committee composition, leadership support, committee engagement, and planning and goal setting. Small worksites often have limited staff, time, and financial resources to put towards WHPP implementation. The results of this study indicated that wellness committees may be an effective approach to mitigating some of these constraints. WHPP responsibilities that might typically fall on one individual can be split among multiple individuals, and a coordinated plan developed by

employees representing different organizational levels can support broader employee interest and engagement. Considering that small worksites are more likely to report having a majority low-wage staff, implementing wellness committees as part of a comprehensive WHPP approach may be a particularly effective strategy for reducing chronic disease risk among vulnerable populations. Furthermore, the wellness committee implementation index we developed holds promise as a new WHPP implementation instrument.

Aim 2: The purpose of this study was to determine whether employee race/ethnicity moderates the relationship between *HealthLinks* WHPP intervention arm (*HealthLinks* standard, *HealthLinks+,* or delayed control) and employees' perceived employer support for health in small businesses in low-wage industries. Overall, our results described a complex picture of relationships between *HealthLinks*, employee race/ethnicity, and perceived support for health. Across all three support items, the overall interaction between study arm and employee race/ethnicity was significant and positive at 15 months. Our results did suggest that White employees, who are at lower risk for many chronic diseases compared to racial and ethnic minorities, most consistently benefitted from the intervention in both study arms. *HealthLinks* also appeared to provide either no benefit or result in lower support scores for Hispanic employees compared to Hispanic control employees. However, our findings that Black employees benefitted from *HealthLinks+* and Hispanic employees in the *HealthLinks+* arm perceived significantly higher levels of support for physical activity compared to Hispanic employees in the control arm are promising. *HealthLinks+,* which supported employers in forming wellness committees in addition to the standard *HealthLinks* intervention, had additional benefits for all employees relative to *HealthLinks*. Wellness committees may represent an overall more inclusive approach to implementing a WHPP. While additional tailoring and adaptations to meet the needs of Asian, Hispanic, and Other employees in particular are needed, *HealthLinks+* may offer a promising way forward for supporting low-wage employees

who are also employees of color and promoting health equity among these vulnerable populations.

Aim 3: This study interviewed 21 LHD directors from three US regions in order to understand their current chronic disease prevention decision-making, capacity, and potential to partner with employers on WHPPs to implement EBIs in worksites. Across communities of all sizes, our conversations with LHD directors revealed that while identified community needs provide the initial foundation of LHD decision-making, ultimately, funding drives decision making related to new chronic disease prevention initiatives. Funding constraints also limited LHDs' efforts to be entirely data-driven. As a result, their willingness to partner with employers on WHPPs often reflected balancing identified community need with LHD funding and staff availability. Even when LHDs had an interest and need for these partnerships, most felt they would be unable to take on a new program such as *HealthLinks*/*CtW* due to funding constraints. Our results did suggest that micropolitan LHDs may be best positioned to partner with employers to implement EBIs without additional funding or staff availability, as micropolitan communities are often large enough to have funding and staff to commit towards these efforts, but are also still small enough that partnering with employers on WHPPs and EBI implementation would be a more comprehensive approach to their current work. While employers may be a promising setting for EBI implementation, overall LHDs may have severely limited capacity for these types of partnerships due to funding and staff availability to support these efforts.

Implications for Research

In both Aims 1 and 2, wellness committees, particularly when possessing more of the characteristics included in the Aim 1 wellness committee implementation index, appear to hold promise for WHPPs among small businesses in low-wage industries. However, many employers found wellness committees difficult to both start and maintain over time. We recommend

additional research on wellness committee implementation with larger samples and an emphasis on industries outside of the healthcare and social assistance industry in order to better identify how wellness committees and their implementation contribute to WHPP outcomes among employers and employees. Additionally, more research on how wellness committees could be used to promote health equity among employees of color and tailoring existing *HealthLinks+* implementation to better support the needs of Asian, Hispanic and Other races/ethnicities is also needed. This will also require research that specifically works to recruit from races/ethnicities typically underrepresented in public health intervention research, including those with Native Hawaiian/Pacific Islander, American Indian/Alaskan Native, and Multiracial identities. For Aim 3, further research on how to best partner with LHDs when resources are limited could help identify the best path forward for scaling up *CtW/HealthLinks* given present chronic disease policy and funding contexts. Finally, while these dissertation papers capture a robust view of the links between context and implementation in WHPP and strategies that may apply across varying WHPP contexts, relationships between context and implementation are a dynamic and evolving process. To this end, we also recommend additional research to further identify which core components of WHPP interventions are adaptable to varying small business and low-wage industry contexts without compromising the fidelity that establishes them as evidence-based.

Implications for Practice

Understanding the specific internal and external contexts of a worksite implementing a WHPP or worksites involved in WHPP implementation partnerships is critical to WHPP success. Interventions such as *HealthLinks/CtW* are adaptable to different contexts, but understanding if certain contextual barriers or facilitators may exist (e.g., shift schedules make forming a wellness committee difficult, health and wellness already aligns with overall organizational mission, employer is particularly aware and active in addressing needs of employees of color)

may play a role in how successful the intervention will be for all relevant target populations. Overall, we recommend the use of wellness committees as beneficial implementation strategy for WHPPs among small businesses in low-wage industries, particularly when the committee has representation from multiple levels of the organization, leadership is involved, the committee is engaged, and the committee has a set plan or goals. Results from Aim 2 indicate that wellness committees may reflect more inclusive WHPP implementation, but worksites must also be intentional about addressing the needs of employees who may be at increased risk for chronic disease, such as those with worse self-reported health and racial and ethnic minorities. For those who may be involved in scaling up WHPP, assessing geographic contexts and funding environments prior to the start is critical to understanding how these interventions may or may not easily translate into practice on a broader scale.

Implications for Policy

Aim 3 in particular focused on the role of policy and funding environments on LHD decision-making and potential to partner with employers on WHPPs. Funding constraints pose significant barriers to LHD-employer partnerships and their ability to be fully data-driven in addressing chronic disease. Based on the results of our study, we echo the recommendations by Linnan et al. to 1) increase funding resources for existing workplace health promotion grants; 2) increase flexibility for existing funding streams such as those provided for occupational safety and health and chronic disease prevention and management; and 3) provide greater stability in funding for state and local public health entities.[62]

We believe the overarching findings from these studies examining relationships between WHPP contexts, implementation, and outcomes also have policy-relevant implications for the larger field of implementation science. Implementation science is defined as the "scientific study of methods and strategies that facilitate the uptake of evidence-based practice and research into regular use by practitioners and policymakers."[88] Funded research questions often focus on

systemically getting these practices to those who need it the most with greater speed, efficiency, sustainability, and scale. Improving our ability to implement evidence-based interventions efficiently, quickly, and at a broad scale that can be sustained is critical to achieving population health goals. However, the results of these studies highlight the importance of understanding the contexts in which this large-scale implementation will occur. Context must be considered at each phase of design, implementation, and dissemination to ensure these programs do not exacerbate disparities, particularly for marginalized populations with additive risk, such as low-wage workers in rural communities and low-wage employees who are also racial and ethnic minorities.[56] Future implementation science funding priorities should focus on research that intentionally incorporates the perspectives of groups who are often left out of the research process, particularly in conversations concerning scale and sustainability, and that researchers are intentional about examining whether interventions truly promote health equity among those most at-risk.

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Appendix

Appendix Table 1: Aim 2 Main effect and interaction models for overall perceived employer support among employees

	Baseline		**15 Months**	
	Arm and Race/Eth Model	Interaction of Arm and Race/Eth Model	Arm and Race/Eth Model	Interaction of Arm and Race/Eth Model
Industry	-0.05 (0.03)	-0.05 (0.03)	-0.05 (0.02)*	-0.05 (0.03)
Baseline EBI Implementation	1.10** (0.37)	1.08** (0.37)	0.73 (0.32)*	0.70 (0.34)*
Study Arm (Control as reference)				
HealthLinks	-0.04 (0.08)	-0.05 (0.09)	0.15 (0.07)*	0.18 (0.08)*
HealthLinks+	0.05 (0.08)	0.03 (0.09)	0.33 (0.07)***	0.35 (0.08)***
Race/Ethnicity (White as reference)				
Black	0.07 (0.08)	0.05 (0.15)	0.10 (0.08)	-0.01 (0.15)
Asian	0.26*** (0.07)	0.23 (0.12)	0.25 (0.06)***	0.32 (0.11)**
Hispanic	-0.06 (0.07)	-0.13 (0.15)	0.01 (0.07)	0.20 (0.13)
Other	0.03 (.08)	0.04 (0.14)	0.12 (0.07)	0.13 (0.13)
Survey Language	0.16 (0.11)	0.19 (0.11)	-0.02 (0.11)	-0.02 (0.11)
Self-Reported Health	-0.12*** (0.02)	-0.12*** (0.02)	-0.15 (0.02)***	-0.15 (0.20)***
Income	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	0.00 (0.02)
Education	-0.10*** (0.03)	-0.10*** (0.03)	-0.02 (0.03)	-0.02 (0.03)
Age	0.00 (0.03)	0.00 (0.03)	0.05 (0.03)	0.05 (0.03)
Sex	-0.09* (0.04)	-0.09* (0.04)	-0.02 (0.04)	-0.02 (0.04)
Moderating effects				
Black - HealthLinks		0.05 (0.19)		0.08 (0.19)
Asian - HealthLinks		0.04 (0.16)		-0.05 (0.14)
Hispanic - HealthLinks		-0.01 (0.19)		-0.38 (0.16)*
Other - HealthLinks		0.08 (0.20)		0.06 (0.18)
Black - HealthLinks+		0.02 (0.22)		0.24 (0.21)
Asian - HealthLinks+		0.03 (0.16)		-0.18 (0.15)
Hispanic - HealthLinks+		0.16 (0.19)		-0.13 (0.16)
Other - HealthLinks+		-0.11 (0.20)		-0.09 (0.18)
Wald test for significance of the interaction $\chi 2$		22.55		49.27***

*p<.05
**p<.01
***p<.001

Appendix Table 2: Aim 2 Main effect and interaction models for perceived employer support for physical activity among employees

	Baseline		15 Months	
	Arm and Race/Eth Model	Interaction of Arm and Race/Eth Model	Arm and Race/Eth Model	Interaction of Arm and Race/Eth Model
Industry	-0.04 (0.03)	-0.04 (0.03)	-0.04 (0.03)	-0.04 (0.03)
Baseline Physical Activity EBI Implementation	0.94 (0.40)*	0.91 (0.40)*	0.90 (0.39)*	0.91 (0.39)*
Study Arm (Control as reference)				
HealthLinks	-0.04 (0.08)	-0.05 (0.09)	0.25 (0.08)**	0.25 (0.09)**
HealthLinks+	0.03 (0.08)	0.03 (0.09)	0.43 (0.08)***	0.45 (0.09)***
Race/Ethnicity (White as reference)				
Black	-0.01 (0.08)	-0.10 (0.15)	0.28 (0.08)**	0.11 (0.16)
Asian	0.18 (0.07)**	0.15 (0.12)	0.22 (0.06)**	0.22 (0.12)
Hispanic	0.00 (0.08)	-0.20 (0.15)	0.12 (0.07)	0.24 (0.14)
Other	-0.04 (0.08)	0.23 (0.15)	0.15 (0.08)*	0.29 (0.14)*
Survey Language	0.15 (0.11)	0.15 (0.12)	-0.01 (0.12)	0.00 (0.00)
Self-Reported Health	-0.12 (0.02)***	-0.12 (0.02)***	-0.12 (0.02)***	-0.12 (0.02)***
Income	-0.04 (0.02)*	-0.04 (0.02)*	0.00 (0.02)	0.00 (0.02)
Education	-0.05 (0.03)	-0.05 (0.03)	-0.02 (0.03)	-0.02 (0.03)
Age	-0.05 (0.03)	-0.05 (0.03)	0.02 (0.03)	0.02 (0.03)
Sex	-0.15 (0.04)**	-0.15 (0.04)***	0.00 (0.04)	0.00 (0.04)
Moderating effects				
Black by HealthLinks		0.16 (0.19)		0.23 (0.20)
Asian by HealthLinks		0.05 (0.16)		0.03 (0.15)
Hispanic by HealthLinks		0.17 (0.19)		-0.23 (0.17)
Other by HealthLinks		-0.28 (0.20)		-0.02 (0.19)
Black by HealthLinks+		0.09 (0.22)		0.21 (0.22)
Asian by HealthLinks+		0.01 (0.16)		-0.06 (0.16)
Hispanic by HealthLinks+		0.23 (0.19)		-0.07 (0.17)
Other by HealthLinks+		-0.37 (0.20)		-0.38 (0.19)*
Wald test for significance of the interaction $\chi 2$		15.71		59.78***

*p<.05

**p<.01

***p<.001

Appendix Table 3: Aim 2 Main effect and interaction models for perceived employer support for health foods and beverages among employees

	Baseline		15 Months	
	Arm and Race/Eth Model	Interaction of Arm and Race/Eth Model	Arm and Race/Eth Model	Interaction of Arm and Race/Eth Model
Industry	-0.08 (0.03)*	-0.08 (0.03)*	-0.07 (0.03)*	-0.07 (0.03)*
Baseline Healthy Eating and Bev Score	0.82 (0.30)**	0.86 (0.30)**	0.57 (0.27)*	0.59 (0.27)*
Study Arm (Control as reference)				
HealthLinks	-0.12 (0.10)	-0.10 (0.10)	0.15 (0.08)	0.15 (0.09)
HealthLinks+	0.06 (0.10)	0.03 (0.10)	0.36 (0.08)***	0.38 (0.09)***
Race/Ethnicity (White as reference)				
Black	-0.15 (0.08)	-0.24 (0.15)	0.08 (0.08)	0.05 (0.16)
Asian	0.12 (0.07)	0.13 (0.12)	0.09 (0.06)	0.07 (0.11)
Hispanic	-0.03 (0.08)	-0.09 (0.15)	0.03 (0.07)	0.19 (0.14)
Other	-0.01 (0.08)	0.05 (0.15)	0.00 (0.08)	0.03 (0.14)
Survey Language	0.27 (0.12)*	0.29 (0.11)*	0.11 (0.12)	0.10 (0.12)
Self-Reported Health	-0.10 (0.02)***	-0.10 (0.02)***	-0.09 (0.02)***	-0.09 (0.02)***
Income	-0.04 (0.02)	-0.04 (0.02)*	-0.01 (0.02)	-0.01 (0.02)
Education	-0.02 (0.03)	-0.02 (0.03)	-0.03 (0.03)	-0.03 (0.03)
Age	0.00 (0.03)	0.00 (0.03)	0.00 (0.03)	0.00 (0.03)
Sex	-0.04 (0.04)	-0.05 (0.04)	0.03 (0.04)	0.03 (0.04)
Moderating effects				
Black by HealthLinks		0.08 (0.19)		-0.04 (0.20)
Asian by HealthLinks		0.01 (0.16)		0.13 (0.15)
Hispanic by HealthLinks		-0.08 (0.19)		-0.25 (0.17)
Other by HealthLinks		-0.17 (0.20)		0.04 (0.19)
Black by HealthLinks+		0.16 (0.23)		0.16 (0.22)
Asian by HealthLinks+		-0.2 (0.17)		-0.12 (0.16)
Hispanic by HealthLinks+		0.23 (0.19)		-0.17 (0.17)
Other by HealthLinks+		-0.02 (0.20)		-0.14 (0.18)
Wald test for significance of the interaction $\chi 2$		18.50		28.63*

*p<.05

**p<.01

***p<.001