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Degree of integration between occupational safety and health programs and wellness programs: first year results from an insurer-sponsored wellness grant for smaller employers

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Abstract

Objective: Describe levels of integration between occupational safety and health (OSH) and workplace wellness programs/practices/policies ("programs") among participants in an insurer-sponsored wellness grant program.

Methods: We analyzed survey responses about year one of an insurer-sponsored grant to start a wellness program from 220 small- and medium-sized employers. Responses yielded 25 indicators of OSH-wellness integration, and 10 additional indicators to summarize multiple responses.

Results: At least half of employers (N=220) reported some level of integration within five of seven categories of OSH-wellness integration. Employers sometimes considered ergonomics, safety, or substance exposure hazards while designing their wellness program (15%) or reduced such hazards to support their wellness program (24%). Few meaningful differences were observed by employer size.

Conclusion: While high levels of integration were unusual, some degree of integration was common for most indicator categories.

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1. Introduction

Background: Integration of Wellness Programs with Occupational Safety and Health

Workers' safety, health, and well-being is affected not only by workplace safety and health hazards but also workers' own health behaviors. Reflecting this, two different, often complementary approaches exist in the workplace: occupational safety and health (OSH) programs and wellness programs. In this paper, 'program' refers to formal programs as well as all OSH- or wellness-related practices or policies in the workplace. Both OSH and wellness programs aim to maintain or improve workers' safety, health, and well-being. Traditional OSH programs are designed to prevent work-related injuries and illnesses by reducing workers' exposure to occupational hazards (mainly ergonomic risk factors, hazardous substances, physical safety hazards, psychosocial factors, and work organization factors). Workplace wellness programs are designed to help workers to improve their own health and well-being.

Integration of OSH and wellness programs is an increasing subject of research. Available, but still limited evidence suggests that integrating these two approaches may have a synergistic effect on worker safety and health (1-5). This evidence indicates that employers who integrate their wellness and OSH programs may have a greater impact on improving health-related participant employee outcomes such as tobacco cessation, blood pressure, work-related injuries, absenteeism, and health care costs (2, 6-12). Accordingly, integration of OSH and wellness programs has been identified as a hallmark of the Total Worker Health® (TWH) approach (1, 13, 14). A recent publication on research methodologies for TWH states that "the [TWH] paradigm expands upon the previous definition that emphasized integration of health protection and health promotion (1) to encourage integration across a wider set of workplace efforts that support safety, health, and well-being. Integration can occur through collaboration and coordination around organizational leadership and commitment; supportive organizational policies and practices; accountability and training; management and employee engagement strategies; supportive benefits and incentives; and integrated real-time evaluation and surveillance that leads to corrective action where needed."(13) As this summary suggests, integrated OSH-wellness programs bring together various departments, functions, and programs of an organization, such as human resources, benefits management, employee relations, employee assistance programs, medical services, work scheduling and basic work supervision (15). Integration of these departments, functions, and programs may occur in various ways, such as through coordinating data management systems, budgeting, reporting structures, or decision making (1, 16).

Prior studies of integration have been hampered until recently by lack of well-developed methods for tracking and measuring integration of OSH and wellness programs at the employer level (13). Several tools exist that include OSH-related content within an integrated tool for measuring, tracking, and evaluating health and well-being at an employer level (17-20). However, few tools are available that are designed to measure the level and type of *OSH-wellness integration* at the employer level. A team of Harvard researchers has been rigorously developing and testing integration measurement tools for several years (16, 21-24). The most recent iteration of that tool is the Workplace Integrated Safety

and Health (WISH) assessment tool (25). The WISH tool calculates an overall integration score using 40 questions within six domains: leadership and commitment; participation; policies, programs, and policies focused on positive working conditions; comprehensive and collaborative health and safety strategies; adherence to regulations and ethical norms; and data-driven change. The questions in the WISH domains include both measures of OSH-wellness integration and other important elements that support an overall TWH approach. To our knowledge, research using this tool has not been published yet. However, an earlier version of the Harvard survey, the Indicators of Integration tool (16, 21, 22), was used in a recently published cross-sectional survey of 114 employers with <750 employees (26). In that study, McLellan et al reported that the mean integration score was low, 13.6 out of 44, based on 22 indicators of integration. However, the authors only reported the overall scores, without sharing descriptive results by indicator.

The most prominent previous studies of integration have focused on using high quality study designs with control groups to examine the effectiveness of researcher-designed integrated programs in small sample sizes of large employers (2, 6-8, 10). However, analyses in which employers are the unit of analysis have been relatively few (26, 27). Other previous research has relied largely on studies designed to use individual participant employees as the unit of analysis to evaluate changes in unhealthy behaviors and biomedical outcomes (3, 4, 14). Little research has been done on the prevalence and nature of integration of wellness and OSH programs within the general population of employers, especially among smaller employers.

The Ohio Workplace Wellness Grant Program

The Ohio Bureau of Workers' Compensation (OHBWC) insures about 60% of Ohio workers, mostly employed by small to medium sized businesses with fewer than 500 employees. OHBWC launched the $4 million Workplace Wellness Grant Program (WWGP) in 2012. The WWGP has provided grants for establishment of workplace wellness programs to hundreds of small- and medium-sized employers (1-500 employees) who previously had no program, or only a minimal program. While the WWGP was developed as a purely health promotion-based intervention, a central goal was ultimately to reduce occupational injuries and illnesses. This WWGP is one of two known efforts by a workers' compensation insurer to support wellness programs (28). The other program was launched by Pinnacol Assurance in Colorado in 2010 (28, 29).

Starting in 2012, wellness grants were awarded on a rolling basis throughout the life of the program, for up to four years per grantee. In other words, after the first year of the program, participating employers applied for their next year of funding while new employers applied for their first year of WWGP funding. OHBWC intentionally designed the program to be most appealing to employers with <100 employees. Employers were eligible for a maximum total of $15,000 in grant funding spread over four years to support participation of up to 50 employees per year for four years ($300 maximum per participant employee over four years). Employers could use program funds to pay for participant health risk appraisals, certain biometric screenings, and subsequent activities designed to address the results of the screening and assessment. Participating employers were encouraged to design

and implement their wellness programs to fit their needs as long as certain basic features were included.

All OHBWC-insured employers who submitted a complete grant application and met the following eligibility criteria were approved for the program (30): 1) their workers' compensation policy was current on monies owed to OHBWC, 2) they maintained active workers' compensation coverage, 3) they contracted with a third party wellness program vendor, and 4) they did not already have a workplace wellness program or had a minimal workplace wellness program. The criterion most relevant to this study was that only employers with no wellness program or a minimal wellness program were eligible. Vendors only shared aggregate health risk appraisal (HRA) and biometric data with employers and employers shared aggregate data with OHBWC. For the purpose of program eligibility, an employer who had a minimal wellness program was still eligible if their existing program 1) did not measure health risk factors using both HRAs and biometric assessments, and 2) did not use HRAs and biometric assessments results regarding health risk factors to design health promotion programming.

Ongoing participation in the four year program was voluntary. Employers could leave the program at any time, upon request. They could also be removed by OHBWC if they failed to meet program requirements. OHBWC required employers to include four main features in their workplace wellness programs: 1) work with a wellness program vendor; 2) collect biometric and health risk appraisal data from participating employees at the beginning of the grant year; 3) share aggregate, deidentified data for their organization with OHBWC; and 4) respond to a self-administered, yearly "case study" (YCS) survey submitted at the end of each funding year, no later than 15 months after grant funds were distributed (31). Employers who declined to participate in the YCS survey were removed from the grant program for the prior year and required to return any money they had received.

Basis and Goals of the Present Study

The YCS survey included questions to measure integration between workplace wellness and OSH programs. Any integration observed would be naturally occurring, in the sense that it developed without an intervention designed to intentionally integrate the programs. To our knowledge, when the YCS survey was first published in 2013, it was the first, publicly available survey designed to measure integration as reported by employers. The degree of integration was of special interest to the OHBWC, because a major goal of the wellness grants was not only to improve employee health, but to reduce work injuries and workers' compensation claims. However, the YCS survey was designed under tight time constraints with the primary purpose of enabling OHBWC to better administer, monitor, and assess the WWGP program. It was not primarily designed as an academic research tool for the study of integration. OHBWC shared the YCS survey and other WWGP data used in this study with NIOSH to address common goals.

The main purposes of this study are to 1) present methods for assessing OSH-wellness integration via the YCS survey, 2) describe the degree and type of integration observed among employers in their first year of implementing a wellness program, and (3) compare integration by employer size for public and private employers.

2. Methods

We conducted a cross-sectional study of Ohio employers who completed their first year in the OHBWC WWGP from the beginning of the program, February 2012, through June 17, 2015. Administrative OHBWC data sources were used to determine number of employees before and after receiving the grant, employer type (public or private), and industry sectors. Industry sector definitions were those of the National Institute for Occupational Safety and Health (NIOSH) National Occupational Research Agenda (NORA): Agriculture, Forestry and Fishing; Construction; Healthcare and Social Assistance (Healthcare); Manufacturing; Mining; Oil and Gas; Public Safety; Services; Transportation, Warehousing, and Utilities (Transportation); and Wholesale and Retail Trade (Trade) (32).

All other information used in this study was obtained from self-reported responses to the YCS survey: number of employees at time of the survey, number of employees participating in the wellness program in the past year, and all measures of integration. The YCS survey was completed on behalf of the participating employer by one or more key informants who were knowledgeable about their employer's wellness and OSH programs. The YCS survey (31) used both structured-response and open-ended questions. Descriptive, structured questions asked about: 1) the employer, 2) participating employees, 3) the workplace wellness program, 4) workplace factors that are barriers to exercise and healthy eating, and 5) indicators of OSH-wellness integration. The focus of this study is YCS survey questions designed to measure the level of seven categories of OSH-wellness integration in the previous year. These seven indicator categories cover management strategies (policies, practices, programs, and the people involved) and modifying working conditions (physical, psychosocial, and work organization) to maintain or improve worker health and well-being. We discuss the indicators of integration in more detail below and in Table 1.

We analyzed data for all employers who received first-year wellness grants awarded by June 18, 2015 and from whom survey responses were received by June 17, 2016. Only employers for whom surveys were due by June 17, 2016 (due date is 15 months after grant award date) were included in the survey response rate calculation.

We defined a set of five employer size categories (1-10, 11-49, 50-99, 100-249, 250+, Total), as well as a set of two size categories: large employers (>=median) and small employers (<median). We constructed two variables to describe employee participation in the wellness program: 1) number of participating employees, and 2) participating employees as a percent of total employees. Percent participation was calculated as the number of participants divided by number of employees. We also calculated the percent of participating employees funded by the grant. The WWGP pays for up to fifty employees, so all employers with fifty or fewer participants were funded 100%. For employers with >50 participants, the percent funded by grant was equal to fifty divided by the number of participants.

Indicators of Integration

We used YCS survey responses to create 35 integration indicator variables, 25 based on individual YCS survey question response options (A1–A10, B1–7, C1, D1, E1–7, F), and 10 that were constructed to summarize multiple responses for the five integration

categories with ordinal variables (A11–13, B8–10, C2, D2, G1–2). These were grouped into 7 integration categories (A-G) and presented in Table 1. For each indicator category, Table 1 provides: 1) the exact text of the relevant survey questions, 2) the exact text of the relevant work-related response options, 3) answers used as integration indicators (underlined), and 4) a brief rationale for each integration indicator variable. The work-related response options are those that are potentially relevant to assessing integration, because they involve connection of the wellness program to activities, functions, or personnel outside the program. In this paper, sometimes we use the word 'safety' rather than OSH because it is a direct quote from the YCS survey or we are referring to a subset of OSH programs or hazards that prevent or describe physical hazards or exposures that cause occupational traumatic injuries (e.g. work-related injuries caused by a slip, fall, violence, contact with objects or equipment). The complete YCS survey is available on the OHBWC website (30). The seven categories of integration indicators are: A. OSH factors influencing program design, B. Improving working conditions to support wellness program, C. Frequency of joint program monitoring, D. Frequency of integrated communication, E. Departments and employee types engaged in program design or implementation, F. Groups/committees for planning and evaluation, and G. Overlapping primary areas of responsibility for Wellness and OSH Program Managers.

The indicators for category G (Overlapping primary areas of responsibility) require more explanation than is provided in Table 1. Methods used to ascertain overlapping responsibilities for program managers (Indicator G) were complicated by the complex format used for that set of survey questions. A complex matrix of multiple selection questions was used to ask respondents about primary and other areas of responsibility for the wellness and OSH program managers. Also, there was a checkbox to indicate whether the same person was responsible for both programs: "If the same person is responsible for your organizations' safety and wellness programs check this box and fill out only the Workplace Wellness Program columns below." In the end, for a number of reasons, we could not accurately identify all the employers where the same person was responsible for both programs. It is possible that a portion of responses coded as 'primary area overlap' were also managed by the same person. Any Human Resources, "Safety" (OSH), and Wellness 'main' area responses were used to ascertain overlap between main areas.

Analysis

We tabulated the number and percent of employers selecting each response indicating integration for the entire study population of employers and for each of four subgroups: public employers, private employers overall, and private employers by size (two categories defined by the median). We tested the statistical significance of differences in response distributions for small and large private employers. We made a post-hoc decision to exclude public employers from analyses by size due to sparse numbers of small public employers in this study.

The comparisons described above were conducted using a chi-square goodness-of-fit test to compare categories at alpha < .05. However, when any cell was less than five, we used Fisher's exact test.

To help determine whether there was any systematic difference between employers who completed the YCS survey and those who did not, we compared these two groups in terms of employer size, type, and NORA sector.

All analyses were conducted using SAS version 9.4 (SAS Institute, Inc., Cary, NC).

3. Results

Study Population

By June 16, 2016, 257 employers had completed all grant requirements for their first year in the WWGP and were required to complete the YCS survey. The survey response rate was 85.6% (N=220). The mean and median number of employees was lower but not significantly different (*P*=.26) for survey participants (mean=113.3, standard deviation=109.8) compared to non-responders (mean=137.7, standard deviation=121.5). Survey response rates were similar (*P*=.57) for private (86.2%) and public employers (83.0%) and were not associated with employee size (*P*=.26) (data not shown in tables). Fisher's exact tests of differences by NORA sector were non-calculable due to numerous missing or sparsely populated cells.

Study population employer characteristics are described in Table 2. All WWGP grantees employed < 500 employees, >50% had < 100 employees, and >85% had between 11-249 employees. Compared to private employers (N=181), public employers (N=39) had a higher mean number of employees (public mean=182.5, private mean=105.3) and were more likely to be in the large employer size category (74.4% vs. 44.8%) (data not shown in table). Most public employers were schools (43.6%) or cities (25.6%) (data not shown in table). Most private employers were from the NORA Services (28.7%), Manufacturing (23.8%), Healthcare (15.5%), and Wholesale Retail Trade (18.2%) sectors (Table 1).

The percentage of all employers from private industry and the percent of all participating employees from private industry were similar, 82.3% and 78.0%, respectively (Tables 2 and 3). Employee participation is described in Table 3. Among 26,183 potential employee participants, employers reported 10,312 employees participated in wellness programs. 90.2% of participating employees were funded by the grant. Participation rates were highest among employers with <50 employees (≥66.5%) and decreased incrementally for each larger size category. The mean participation rates were higher for private (53.6%) compared to public employers (35.7%) overall.

Integration Indicators

Descriptive statistics about the degree of integration between OSH and workplace wellness programs are presented by integration category in Table 4, overall and stratified by four subgroups — public employers, private employers, small private employers (<median), and large private employers (>median). With the exception of the complex matrix question for category G, Overlapping responsibilities for program managers, no more than two respondents skipped any question and all possible answers were used. No one skipped the entire matrix for the category G question, but 46 employers did not identify a main area of responsibility for the wellness program manager. For indicator category D, OSH factors influencing program design, one additional integration indicator was added, because >1

employer who selected “Other workplace-specific factors” mentioned the same factor — multiple or remote work locations (N=3, A9).

For OSH factors influencing program design (category A), considering employee work schedules (65.8%), workplace culture (37.9%), and considering >1 OSH related factor (59.4%) were the most common. Ergonomic, safety, or substance exposure hazards were considered in the design of the wellness program by 15.1% of employers. There were 51 unique combinations of factors that employers considered in designing their wellness programs, based on the response options they selected from among those listed as A1-A9 in Table 1.

For OSH improvements to support wellness program, 42.9% of employers indicated that their organization supported their wellness program using at least one of eight OSH-related activities (B8), and the most common individual improvement was reduction of safety hazards (16.9%). 25% of employers reported reducing ergonomic, safety, or substance exposure hazards to support their wellness program. Individually, these three types of hazards were reduced by 5.0–16.9% of employers. There was just partial overlap between the group of employers who reported considering ergonomic, safety, or substance exposure hazards in program design (33 employers, indicator A13) and the group who reported actually reducing these hazards (54 employers, indicator B10) — 18 employers were in both groups (data not shown). There were 30 unique combinations of employer actions to address work hazards or the work environment in order to support their wellness programs, based on the response options they selected from among those listed as B1-B7 in Table 1.

Joint monitoring (C) and integrated communication (D) occurred at least sometimes for at least half of employers, 51.8% and 65.3%, respectively.

Overall, 96% of survey respondents reported engaging employees from other departments or levels of the organization to make major decisions that affected the design or implementation of the workplace wellness program (data not presented in table). 70.2% of employers included senior management (E3) and 51.8% received input from Human Resources (E1). Half of employers had some overlapping responsibilities between OSH and wellness program managers, usually because the same person was responsible for both programs (37.8%). It was less common for employers to have integrated safety-wellness committees (17.7%), where essentially the same group of people participated in planning or evaluating their organizations’ OSH and wellness activities. Results for that indicator category also show that 75.9% of employers had a safety committee and 73.6% had a wellness committee. Large private employers were 10–12% more likely to have either committee, but they were not more likely to have integrated committees.

Integration Levels among Private Employers by Employer Size

Of 35 comparisons of integration indicators by size (small or large) for private employers (N=181), we found six statistically significant differences within three integration categories (A, B, and E). Large private employers (N=81) were significantly more integrated than small private employers (N=100) for four indicators of OSH factors influencing program design: A5. shift work, A7. workers’ compensation, A11. >1 OSH factor, and A12. >2 OSH factors.

Small private employers had statistically significant, higher levels of integration than large private employers for E3, senior management involvement, and B5, scheduling changes.

4. Discussion

This is the first paper to present any WWGP results. These results will be used to track changes over time and will eventually be linked to workers' compensation outcomes.

Study Population and Survey Participation

Public employers accounted for a larger share of employers in this study than they do among all employer policies issued by OHBWC. Previous estimates by Wurzelbacher et al (2016) indicated that less than 2% of OHBWC policies were public employers, accounting for 18.4% of employees, whereas in this study 17.7% of grantees were public employers, accounting for 27.2% of affected employees and 22.0% of participant employees. Perhaps the WWGP was an attractive program to public employers with tight budget constraints who would otherwise not be able justify funding workplace wellness programs for their employees. Although most private employer WWGP grantees came from the Services sector, the program was particularly popular among Manufacturing and Healthcare sector employers. Compared to the distribution of all unique private employer OHBWC policies by NORA sector (33), the proportion of Manufacturing sector employers who participated in the WWGP was 17 percentage points higher and Healthcare was 6.6 percentage points higher. Two of the largest sectors were underrepresented by at least 5 percentage points in WWGP — Construction (−5 points), and Services (−18.4 points). One of the eligibility criteria for participating in the program was that the employer could not already have an established workplace wellness program in place. Differential participation by NORA sector may reflect differences in prior adoption of workplace wellness programs by NORA sector during the study period. Regardless, the variety of employer types and the workforces they represent is a strength of the study. In 2016, Feltner and colleagues (3) conducted a systematic review of intervention studies designed to evaluate the effectiveness of an integrated approach to advancing worker health, safety, and well-being. Feltner and colleagues (2016) found fifteen quality studies that met their inclusion criteria and most were conducted among manufacturing and construction workers.

Integration Measurement Methods

This study examined OSH-wellness integration using 35 indicators of integration extracted from *portions* of the WWGP YCS survey. For this paper, six integration categories related to measuring management strategies (policies, practices, programs, and the people involved) and one category related to modifying working conditions (physical, psychosocial, and work organization) to support the wellness program. The indicators related to management strategies addressed the degree to which the management and implementation of the wellness program appeared to be integrated with management of OSH, as well as the depth and extent of participation in management and implementation by employees from a variety of parts of the employer organization, such as Human Resources, Safety, Wellness, senior management, and other hourly or salaried employees.

A planned future study will examine an eighth category — how employers addressed potential workplace barriers to healthy eating or physical activity. Because responses to these questions are complex due to the significant open-ended component, we plan to analyze them later. We also plan a future assessment of integration and its changes over time among grantees.

The Harvard Center for Work Health and Well-being has developed two questionnaires (16, 25) that assess the degree to which employers have implemented a TWH approach, including the degree to which OSH and wellness programs have been integrated. Most of the survey questions used in this study are difficult to map to specific indicators included in the two Harvard questionnaires, because of the many-to-one or one-to-many relationships between specific items. However, in a general sense, all of the integration categories represented in this paper are also represented in the Harvard questionnaires. This study provided more detailed indicators to assess specifically which changes were made to work or the workplace to complement the wellness program design and activities. The Harvard questionnaires provided more detailed responses (Likert scales) to all questions and more questions about leadership commitment, comprehensive health and safety initiatives, and program monitoring and evaluation. In a recently published survey of employers with <750 employees (N=114) McLellan and colleagues (2017) (26) used the Indicators of Integration to measure integration; however, results are only reported using one overall integration score, not separately for each indicator. This study reports results separately for each indicator, without an overall score. Unfortunately, that means we cannot compare the results of this study to the McLellan et al (2017) study.

Integration Indicators

A. OSH Factors Influencing Program Design—The question format used to ask about factors influencing wellness program design (Table 1, A) was a multiple answer poll, where respondents could indicate multiple ‘yes’ responses from a fixed list of twelve specific examples (9 of 12 were work-related), or select “other workplace-specific factors (please be specific)” and provide a written explanation. Each of the nine work-related response options was selected by more than one employer, and we only added one additional factor based on written descriptions for ‘other’ factors. This indicates that all of the factors included in the response options were relevant to this employer population. Because there was only one additional OSH factor added to the list based on open-ended responses, this suggests that most potential responses were included.

It seems encouraging that 59.4% of employers considered more than one of the OSH-related workplace factors when designing their workplace wellness program. The most popular answers were ‘employee work schedules,’ and ‘the social work environment and company culture.’ A relatively modest number of employers (N=33, 15.1%) considered at least one of the traditional OSH hazards (ergonomic, safety, or substance exposure) in designing their wellness program. This might not be surprising, given that the funding from the WWGP could only be used for health promotion activities. Also, TWH is still a new concept, and we suspect that many respondents had not thought about integration very much until taking the survey. More work is needed to encourage integrated interventions that eliminate or reduce

workplace hazards as part of a comprehensive program. This is already a main focus of the NIOSH TWH Program (13). Future analyses will examine longitudinal data from the same survey to see how responses change over time — especially for multiple responses from the same person.

B. OSH Improvements to Support Wellness Program—Indicators B1–B7 characterize the types of work or OSH-related improvements employers funded themselves to support their workplace wellness program. This question gets to the heart of what we, as OSH researchers or practitioners, are really interested in understanding and improving — investment in a range of workplace policies, practices, or programs to improve worker well-being. However, in general, actions to improve working conditions to support wellness were less frequent than consideration of OSH factors in program design. For example, work schedules were the most often reported OSH factor affecting design of wellness programs, and change in work schedules was one of the most often reported changes made to support wellness programs. However, taking scheduling into account in program design (N=144; also considering shift work N=40) was much more common than making scheduling changes (N=32). This makes sense, because finding time for exercise and wellness activities is fundamental to a wellness program, but it is probably difficult to make work schedule changes in many circumstances. The pattern was reversed for safety hazards, which were considered by only 6.8% employers in program design compared to 16.9% employers who reduced safety hazards (B4). Similarly, ergonomic hazards were considered in design by 7.8% employers compared to 13.2% employers who reduced ergonomics stresses. It is also notable that 33 employers (15.1%) made improvements to their disability management and return-to-work programs to support their wellness program. While not a large proportion, these could be meaningful changes made without any direct funding support, indicating that some real spillover impacts of wellness programs exist.

The YCS survey presented employers with a long, detailed list of OSH factors that might have been considered in design, and a similar list of potential working condition improvements to support the wellness program. Given the infrequency with which employers chose most of these responses, it is possible that taking the survey could stimulate consideration of further integration and serve as a catalyst for change. Since the survey is repeated each year in the grant program, we will later be able to see if there is evidence of increasing integration.

C. and D. Frequency of Joint Program Monitoring (C) and Integrated Communication (D)—The monitoring and communication indicators are related to whether managers really view OSH and wellness programs as addressing the same overarching concern about worker health, and whether this might be conveyed either implicitly or explicitly in their communications with employees. The results suggest that some degree of integrated vision is present in many employers, but that a thoroughly integrated vision is still uncommon. Over half of respondents (51.8%) reported that they regularly or sometimes jointly monitored safety and employee wellness by gathering together information about both programs, but just 11.9% regularly did so. Likewise, 65.3% of employers communicated about safety and wellness topics together, at least occasionally,

but only 17.4% frequently did so. Note that responses to the monitoring question might have been affected by an underlying assumption of the question that the employers do monitor both programs, and by the fact that grantees were required to gather together information about the workplace wellness program before or while responding to the survey. Note also that the survey question on communication only measures the frequency of communication about both topics at the same time, not necessarily well integrated content.

The most desirable integrated communication is described by Sorensen et al (34) who recommend, “comprehensive program content and coordinated messages that acknowledge and describe additive and sometimes synergistic effects of exposures to worksite hazards and individual health behaviors.” A strong, integrated communication strategy is recommended as one way to encourage worker engagement in TWH (1).

Similarly, joint monitoring is a component of data-driven change, one of the six constructs Sorensen et al have included in the WISH Assessment tool published in 2018 (25). An example of joint monitoring would include integrating data systems across programs and among vendors (NIOSH 2016). However, it is important to integrate systems while ensuring the confidentiality and privacy of workers (NIOSH 2016). One way to do this would be to summarize and standardize data by groups of workers (e.g., department). Another way is to calculate rates based on number of employees or hours worked. The YCS survey did not specifically ask about whether information gathered via joint monitoring practices or policies were used to improve OSH or wellness programs, practices, or policies.

E. Departments and Employees Engaged in Program Design or Implementation—Participatory TWH approaches that engage employees at all levels of the organization are essential, as there is some evidence that a participatory approach to integrated programs is more effective (3, 14). Other than the person in charge of the workplace wellness program, survey respondents most commonly identified senior managers (70.2%) as helping to make decisions about their program. It is unsurprising, yet positive, that senior management would be involved in making decisions that impacted the program. Leadership commitment is regarded as critical for program success (1, 3, 16, 25) Of course, the YCS survey only indicates widespread leadership participation, so we don’t know how often this was associated with leadership commitment to the program. Human resources personnel also often participated in program design and implementation (51.8%). This suggests that dissemination efforts targeted toward professional organizations in the Human Resources field could be useful. Safety personnel were involved in 19.7% of employers, which indicates again, a relatively modest frequency of coordination between OSH and wellness programs.

F. Groups/Committees for Planning and Evaluation—In this study, 62.3% of employers had planning and evaluation committees for both OSH and wellness. Within this group of 137 employers, 28.5% had a single committee for both OSH and wellness, or two committees with very similar membership. It would have been desirable to ask about coordination between separate OSH and wellness committees, but this was not included in the survey. We note that having a single committee covering both OSH and wellness was about as frequent among smaller and larger employers, but that larger employers

much more frequently had both types of committee. Our results can be compared to recent findings of the Workplace Health in America Survey, a survey conducted using a nationally representative sample of U.S. workplaces (35). The authors reported similar proportions of "combined wellness and safety" committees (18%) among employers with an existing health promotion program (35). However, the same survey found considerably lower percentages of employers with safety committees (52%) and wellness committees (47%). In this study, 73.6% of employers had a wellness committee and 75.9% had a safety committee. Having a committee is positive evidence of using a participatory approach that engages employees in planning and evaluating programs designed to advance worker safety, health, and well-being, and is recommended in the best practices guidelines provided by OHBWC to WWGP participants (30). Thus, having a committee can be regarded as an indicator of the participatory aspect of integration. While a participatory approach to TWH is recommended (1, 25), and there is evidence of its effectiveness among several studies (3), we do not yet know whether it is more effective to have a single committee to plan and evaluate all programs related to worker safety, health, and well-being. This is a topic for future research.

G. Overlapping Responsibilities for Program Managers—Many respondents did not follow the instructions or skipped the question about primary areas of responsibility of program managers. Participants were instructed to select only one primary area of work responsibility; however, in the first calendar year of the WWGP, respondents could skip the question or provide multiple responses rather than just one. Some program managers with multiple responsibilities may have found it difficult to select just one. Despite this problem, key findings from the program management question are still useful for understanding integration of wellness and OSH roles in smaller employers. For those who did answer, we learned whether there is evidence that the person(s) in charge of wellness and OSH work together — whether it be by chance, due to the nature of small employers, or intentional. At least 30% of small- and medium-sized employers delegated responsibility for wellness and OSH programs to the same person. In a recent study of TWH among smaller employers, Rohlman and colleagues (2018) (36) noted that very small employers were more likely to have staff in charge of OSH or wellness programs that have multiple areas of responsibility rather than a single area such as OSH. This finding came from a report based on interviews and workplace audits conducted during 33 site visits to Iowa employers with 10–250 employees. Furthermore, the authors concluded that integration often happens naturally due to a lack of resources, rather than intentionally for purposes of maximizing the effectiveness of programs to support workers' well-being (36). Understanding the role(s) of the person(s) responsible for OSH and wellness programs in small employers can help to broaden the reach of the TWH approach and provide tools to the people responsible for advancing worker safety, health, and well-being.

Limitations

This study has several limitations. The main limitation is that our findings may not be generalizable to all employers. The survey was administered only to grantees in the Ohio WWGP, which targeted small- and medium-sized employers. Given the requirements for applications and reporting to obtain a grant, and the limitations on the number of employees

for whom funds could be obtained for individual biometric tests and HRAs (50 employees), incentives to apply were lower for most larger employers, with the possible exception of public employers. All employers had less than 500 employees. As we saw, there are a few indicators of integration that were different for smaller and larger employers. In addition, employers were only eligible if they had no previous wellness program, or only a minimal wellness program. Integration might be more or less common among employers who have a substantial, well established wellness program. Grantees might also have come from industries that have lower existing rates of wellness program adoption. Of course, the Ohio location of the WWGP also may have affected results.

The program also may have been more popular among employers with 'minimal' existing wellness programs in place that lacked HRA or biometric testing components. For this study, data were unavailable to identify the level of any pre-existing program. Since employers with more robust wellness programs would tend to have more opportunities for integration in the first year, levels of integration observed in this study may be more representative of employers who are actively working to improve their wellness programs than employers who just started their programs. In future analyses we will have employer responses from the OHBWC "safety management self assessment survey" (37) to three questions about employee wellness programs. Our analyses can include those data to measure the quality of each employers' existing wellness programs among employers when we analyze associations between the WWGP and workers' compensation outcomes.

Another limitation is the lack of cognitive and validity testing regarding the survey design. In 2012, the YCS survey questions had to be developed quickly (< 3 months) with a practical purpose in mind. At the time, there were no publicly available questions to use in this context. By contrast, the team of Harvard scientists spent several years to develop and test their surveys. In the end, the set of questions designed to assess overlapping areas of program management was problematic. Cognitive testing could be used to modify questions for that indicator category.

Although the 85.6% response rate was very good, response bias may still be a concern. WWGP rules require non-responders to be removed from the program retroactively and required to return any grant funds previously received. It is not clear what aspect of the survey or other factors would account for this lack of response. Based on anecdotal feedback from participants to OHBWC co-authors, some program requirements were very time consuming (e.g., employers' data entry time burden increases as the number of participants increases), especially given the modest financial incentive ($100 per participant for a maximum of 50 participants in the first year) and limitations on how the funds could be spent (e.g. fitness trackers were excluded). None of these factors would affect the truthfulness of responses used to measure integration in this study. As previously stated, there were no meaningful or statistically significant differences between those who did not respond to this survey in terms of employer type, size, or NORA sector. Furthermore, there is support for the credibility of the integration measures in this study because 1) levels of integration were usually ≤ 50% for each measure, indicating that respondents aren't inflating their answers, 2) the concept of integration is a relatively new idea to OSH practitioners,

and 3) at this time, definitions of integration and methods for measuring integration are still evolving.

Recommendations

The YCS survey was created for a specific purpose, not for general use. However, some questions and integration indicators presented in this paper could be useful for measuring integration among other populations. However, before using YCS survey questions and integration indicators presented here in other contexts, we recommend considering some modifications: 1) modifying one question, 2) tailoring the questions to the target population, and 3) adding a few additional questions, if possible. First, as previously mentioned, the "Overlapping responsibilities for program management" questions (category G) should be changed. We suspect that choosing a 'main area of responsibility' was challenging to people who are responsible for many different areas. Conducting a focus group or individual interviews with target respondents from smaller employers would be useful.

Second, before using the YCS survey questions in other contexts, we recommend pre-testing questions with people from the target population because the YCS survey was designed specifically for small- and medium-sized employers in Ohio who had a workplace wellness program in place during the prior year. The questions should be modified both to fit the context of their use and to improve clarity among the population of eligible respondents. We recommend excluding employers without a current workplace wellness program from the target population.

If possible, several additional questions could be added to improve the assessment of integration of "Frequency of joint monitoring," "Departments and employees engaged in program design or implementation", "Groups/Committees," and "Overlapping responsibilities for program managers" (categories C, E, F, and G). For example, before asking about "Frequency of joint monitoring," category C, ask whether they monitor wellness or employee health data. Also, consider adding a question to ascertain whether the employer uses data that are gathered about OSH or workplace wellness to improve working conditions. To improve the interpretation of results related to "Departments and employees engaged in program design or implementation" and "Overlapping responsibilities for program managers" (categories E and G), ask which response options for categories E and G are relevant to their organization (HR, Safety, Senior management, Wellness, other hourly workers, other salaried workers). Although results for integration related to "Departments and employees engaged in program design or implementation" and "Groups/Committees can also be used to infer leadership commitment, it would also be helpful to add explicit question(s) to assess the level of leadership commitment to a culture of health and safety. Among respondents who have one or more groups to plan or evaluate both safety and wellness, for integration of "Groups/Committees," it would be useful to add a question to rate the level of coordination between OSH and wellness activities.

Strengths

This study also has several strengths. The study population includes 220 small- and medium-sized employers with over 10,000 employee participants, representing six NORA

sectors. Both private sector and public sector are represented, with 181 and 39 employers, respectively. The $4 million grant program is still underway. In this study, employers who had more than fifty participants paid for at least 1,000 additional HRAs and biometric assessments themselves.

Only a few other studies have used employers as the unit of analysis or specifically measured OSH-wellness integration. A survey conducted by Tremblay et al (27) had a 30% response rate, reporting results from 890 mostly small- and medium-sized workplaces (94% had <500 employees) in Massachusetts. Tremblay et al included one question to assess the degree of "coordination" between OSH and wellness program activities. Also, the McClellan et al (26) study had a 29% response rate to a survey of small- and medium-sized employers (<750 employees). The authors reported mean integration score results for 114 employers located in Upper Midwestern states. In contrast with the aforementioned surveys, the YCS survey encompasses a wide range of indicators of OSH-wellness integration and was required for receipt of a grant, resulting in a high response rate. Our study is an important addition to the understudied topic of OSH-wellness integration.

Future work

Ultimately, we plan to use the results of this study to quantify associations between OSH-wellness integration measures and workers' compensation claims or other outcomes, while controlling for confounders. However, an important intermediary next step is to create quantitative versions of the seven integration indicator categories (A-G) and one overall integration score, analgous to the Harvard studies. We have substantially different numbers of indicators per integration category and several summary response indicators, so it would not be appropriate to simply assign the same number of points for each indicator. We need to carefully consider how to weight the overall score by integration category, because the relative importance of each indicator and each category in association with outcomes is unknown. We will also conduct survey reliability and validity assessments.

Future work on this project will also include analyzing responses to a set of complex annual case study survey questions about overcoming workplace barriers to implementing workplace programs that promote healthy eating or physical activity. Efforts to reduce any such barriers should also be considered a form of integration. Finally, due to differences in workplace exposures by industry sector, we would expect to find differences in integration by sector. Future studies will need to compare integration and its association with outcomes across sectors, as well as across employer size categories.

Conclusions

We found some evidence of integration of OSH and workplace wellness programs, practices, and policies for most indicators in this baseline survey. There were only a few meaningful associations between employer size and measures of integration. Much work is still required to evaluate levels, types, and impacts of integration, especially integration that focuses on elimination of workplaces hazards as part of a comprehensive program. The findings from this study may provide some insights into where future research and intervention efforts are most needed.

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Disclaimer

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Table 1.

Work-related survey questions and question responses indicating occupational safety and health (OSH)-wellness program integration from the Ohio Bureau of Workers' Compensation Workplace Wellness Grant Program yearly case study —.

Integration category	Survey question[a]	Work-related response options[a,b] (responses indicating integration are underlined)		Rationale	
A. OSH factors influencing program design	"When you designed your workplace wellness program, which of the following factors influenced the program's design? Please focus on whether you made specific choices about what to include in the program or how to implement it based on the factors listed below. Please check all that apply."	**1**	"Employee work schedules (work breaks, time constraints, overtime, flexible schedules)"	•	9 response options indicated some degree of integration, in the sense that work hazards or more general aspects of working conditions were considered in the design of the wellness program. The other four response options were not work-related (e.g. specific employee health interests, employee age range).
		2	"Ergonomic hazards (e.g., manual material handling)"		
		3	"Exposure to hazardous substances (e.g. chemical, biological)"		
		4	"Physical safety hazards at your workplace (e.g. fall hazards, motor vehicle accidents)"		
		5	"Shift work at your workplace (e.g. night, rotating)"		
		6	"Social work environment and company culture"		
		7	"Workers' compensation claims history"		
		8	"Work stress among your employees"		
		9	"Other workplace-specific factors (please be specific" –Multiple work locations		
		10	"Made no additional changes to promote employee wellness"		
			Summary indicators:		
		11	More than one yes response to A1–A9		
		12	More than two yes responses to A1–A9		
		13	One or more yes response to A2–A4 — the three traditional OSH-program areas		
B. Improving working conditions to support wellness program	"Beyond the activities funded by your Workplace Wellness Program Grant, what else did your organization do to support your wellness program? Please check all that apply."	**1**	"Improved disability management policies and practices to promote timely return-to-work after injury or illness"	•	A list of 32 response options was provided for the question about any activities not funded by the grant that were made to support the wellness program. We identified seven of them as indicators of OSH-wellness program integration, because they were related to work hazards or the work environment.
		2	"Made changes to reduce chemical or biologic exposures (e.g. improved ventilation, etc.)"		
		3	"Made changes to reduce physical workload or ergonomic stresses at work (e.g. reduce overexertion material handling equipment)"		
		4	"Made changes to reduce safety hazards at work (e.g. provide controls to reduce falls)" [b]		
		5	"Made scheduling changes to promote physical fitness and work-life balance (e.g. flexible work hours)"		

Integration category	Survey question[a]	Work-related response options[a,b] (responses indicating integration are underlined)		Rationale	
		6	"Made work organization changes to empower employees by giving them more control over their work"		
		7	"Stress management program"		
			Summary indicators:		
		8	One or more yes response to B1–B7		
		9	More than one yes responses to B1–B7		
		10	One or more yes response to B2–B4 — the three traditional OSH-program areas		
C. Frequency of joint program monitoring	"Does your company jointly monitor safety and employee wellness by gathering together information on both? For example, combining information on workers' compensation claims or safety inspections with information on the health of your employees."	**1**	Select one: • "No, we review our data on work safety, but we don't look at wellness information at the same time. • We have looked at safety and employee wellness data at the same time, but not on a regular basis (yes — sometimes). • We regularly monitor safety and employee wellness information together (yes — regularly)."	•	Employers who say they regularly put together their information on OSH and employee wellness may be more likely to manage these two programs in a coordinated fashion. • Employers who do this only sometimes may be less likely to do so, and those who never do, less likely still.
			Summary indicator:		
		2	At least sometimes		
D. Frequency of integrated communication	"Within the past year, how often have safety and workplace wellness program topics been included in the same communication materials or training sessions?"	**1**	Select one: • "Never • Occasionally • Often"	•	When employers indicate that they often include OSH and workplace wellness topics within the same communication materials or training, this would seem to represent a more holistic view of that spans occupational and non-occupational issues.
			Summary indicator:		
		2	At least occasionally		
E. Departments and employee types engaged in program design or implementation	"In the last year, think about all other [people not *responsible* for implementing the workplace wellness program] employees (if any) who contributed to major decisions that affected the design or implementation of your workplace wellness program. What are their main areas of responsibility? Please check all that apply."	**1**	"Human Resources	•	The responses provide a way of assessing the depth and diversity of personnel participating in implementing the programs. • The responses also indicate whether senior management was likely to have fully supported and provided leadership to these programs, and whether non-managerial employees are likely to have been able to participate. • Both senior management and non-managerial participation have been
		2	Safety		
		3	Senior management (e.g. President, Owner, CFO, etc.)		
		4	Wellness		
		5	Other hourly		
		6	Other salaried workers		
		7	No one else contributed"		

Integration category	Survey question[a]	Work-related response options[a,b] (responses indicating integration are underlined)	Rationale
			regarded as a form of integration in the sense that this is likely to lead to tailoring of the wellness program to employee needs and the working conditions specific to an employer's workplace.
F. Groups/ committees for planning and evaluation	"Do you have any groups at your workplace that plan or evaluate safety and wellness activities?"	Select one: • "No, we have no groups or committees for safety or wellness. • Yes. We have a group for safety only. • Yes. We have a group for wellness only. • Yes. We have groups for both safety and wellness, and these are separate groups/committees. • Yes. There is one group or committee that deals with both safety and wellness (or 2 different groups but the members are almost the same).	• The assumption is that if a single group or committee focuses on both OSH and wellness, then OSH and wellness activities are more likely to be coordinated.
G. Overlapping primary areas of responsibility for Wellness and OSH Program Managers	"For the person in your company responsible for implementing your workplace wellness program and safety program (which may be you), please indicate primary and other areas of responsibility for each person:" *	• "Human Resources • Safety • Senior management (e.g. President, Owner, CFO, etc.) • Wellness • Other hourly • Other salaried workers • No one else contributed" Constructed indicator: **1** Degree of overlap for the person(s) responsible for the workplace wellness program and the OSH program: • Same person = box checked to indicate that the same person was responsible for both programs • Primary area overlap = both programs were managed by person(s) with the same primary area(s) of responsibility • Some other overlap = primary areas were different and any of the "other areas of responsibility" were the same Summary indicator:	• If the respondent did not indicate that the same person was responsible for both programs, then we looked for overlap in "main areas of responsibility" or "other areas of responsibility" between the person(s) in charge of each program. • Only human resources, OSH, or wellness were considered as potential areas of overlap between areas of responsibility, because other functional areas were not described clearly enough in the survey responses to determine whether areas of responsibility overlapped. • Refer to the Indicators of Integration in the Methods section for a more detailed explanation

Integration category	Survey question[a]	Work-related response options[a,b] (responses indicating integration are underlined)		Rationale
		2	Any overlap (responses fell into any of the three response options in F1)	

*Refer to the Indicators of Integration in the Methods section for a more detailed explanation.

Notes:

*(a)*For questions with multiple response options, each numbered response is treated as a yes/no question and analyzed separately in this study. The lettered and numbered indicators in this table correspond with the letters and numbers for results in Table 4. Link to full survey: https://www.bwc.ohio.gov/downloads/blankpdf/SH-30.pdf

*(b)*In this paper, sometimes we use the word 'safety' rather than OSH because it is a direct quote from the Yearly Case Study survey or we are referring to a subset of OSH programs or hazards that prevent or describe physical hazards or exposures that cause occupational traumatic injuries (e.g. work-related injuries caused by a slip, fall, violence, contact with objects or equipment). ∞Measures followed by a ∞ are not considered indicators of integration.

Table 2.

Distribution of employers by employer size, policy type, and NORA sector for private employers.

Employer characteristics	N	% total	% subgroup
All employers	220	100.0	
Employer size characteristics			
Number of employees	26,183.0	100.0	
Mean	119.0	-	
Median	89.0	-	
Distribution of employers by size category			
1-10	4	1.8	
11-49	65	29.5	
50-99	50	22.7	
100-249	76	34.5	
250+	25	11.4	
Employer subgroups			
Public employers*	39	17.7	
Small	10		25.6
Large	29		74.4
Private employers	181	82.3	
Small	100		55.2
Large	81		44.8
NORA Sector∞			
Construction	13		7.2
Healthcare & Social Assistance	28		15.5
Manufacturing	43		23.8
Services	52		28.7
Transportation, Warehousing & Utilities	12		6.6
Wholesale & Retail Trade	33		18.2

*Small: <median or <89 employees; Large: >= median or >=89 employees

∞NORA=National Occupational Research Agenda, while there are ten possible NORA sectors, there were zero private employers in the study from Agriculture, Forestry and Fishing; Mining; Oil and Gas; or Public Safety.

Table 3.

Description of employee participation among survey respondents (N=220 employers) by three employer characteric categories (size, type, NORA sector) for: number of participating employees, percent participation, and percent participants funded by grant.

Employer Category	Participating employees		Mean % Employee participation	Mean % Funded by grant
	N	% subgroup		
All employers	10,312		50.4	90.2
Public employers *	2,265		35.7	87.7
Small	246	10.9	51.7	100
Large	2,019	89.1	30.2	83.5
Private employers	8,047		53.6	90.7
Small	2,743	34.1	65.8	99.1
Large	5,304	65.9	38.5	80.4
NORA Sector ∞				
Construction	405	5.0	44.7	98.7
Healthcare & Social Assistance	1,402	17.4	37.9	86.7
Manufacturing	2,552	31.7	61.7	85.1
Services	1,724	21.4	57.2	94.2
Transportation, Warehousing & Utilities	564	7.0	55.9	86.1
Wholesale & Retail Trade	1,400	17.4	53.2	94.6

* Small: <median or <89 employees; Large: >= median or >=89 employees

∞ NORA=National Occupational Research Agenda, while there are ten possible NORA sectors, there were zero private employers in the study from Agriculture, Forestry and Fishing; Mining; Oil and Gas; or Public Safety.

Table 4.

Indicators of integration for all respondents (N=220) and presented separately for public (N=39) and private(N=181) employers. Private employer results are also presented and compared by employer size (median-split).

							Private Employers						
			All respondents			Total Public Employers		Total Private		Small		Large		Small vs. Large Private Employers
Integration Category		Description of indicator variables[Δ,∞,δ]	N	%	skipped	N	%	N	%	N	%	N	%	p-value[*]
A. OSH factors influenced program design														
	1	Schedules	144	65.8	1	22	56.4	122	67.8	64	64.6	58	71.6	0.32
	2	Ergonomic stresses	17	7.8	1	2	5.1	15	8.3	10	10.1	5	6.2	0.34
	3	Chemical/biological exposures	9	4.1	1	0	0.0	9	5.0	6	6.1	3	3.7	0.52 [*]
	4	Safety hazards	15	6.8	1	1	2.6	14	7.8	7	7.1	7	8.6	0.70
	5	Shift work	40	18.3	1	9	23.1	31	17.2	10	10.1	21	25.9	< .01
	6	Workplace culture	83	37.9	1	18	46.2	65	36.1	31	31.3	34	42.0	0.14
	7	Workers' compensation	31	14.2	1	5	12.8	26	14.4	9	9.1	17	21.0	0.02
	8	Work stress	59	26.9	1	11	28.2	48	26.7	23	23.2	25	30.9	0.25
	9	Multiple locations	3	1.4	-	1	2.6	2	1.1	1	1.0	1	1.2	1.00 [*]
	10	None[∞]	39	17.8	0	7	17.9	32	17.7	20	21.0	12	14.8	0.28
		Summary indicators												
	11	More than one yes response to A1-A9	130	59.4	1	17	43.6	113	62.4	53	53.0	60	74.1	< .01
	12	More than two yes responses to A1-A9	58	26.5	1	10	25.6	48	26.5	19	19.0	29	35.8	0.01
	13	One or more hazardous exposures[α]	33	15.1	1	3	7.7	30	16.7	17	17.2	13	16.0	0.84
B. Improving working conditions to support wellness program														
	1	Disability management	33	15.1	1	7	17.9	26	14.4	12	12.1	14	17.3	0.33
	2	Reduce chemical or biologic exposures	11	5.0	1	2	5.1	9	5.0	6	6.1	3	3.7	0.52 [*]
	3	Reduce ergonomic stresses	29	13.2	1	4	10.3	25	13.9	16	16.2	9	11.1	0.33
	4	Reduce safety hazards	37	16.9	1	4	10.3	33	18.3	20	20.2	13	16.0	0.47
	5	Scheduling changes	32	14.6	1	3	7.7	29	16.1	22	22.2	7	8.6	0.01
	6	Work organization	11	5.0	1	3	7.7	8	4.4	4	4.0	4	4.9	1.00 [*]

Integration Category	Description of indicator variables[Δ,∞,δ]		All respondents N	%	skipped	Total Public Employers N	%	Private Employers: Total Private N	%	Small N	%	Large N	%	Small vs. Large Private Employers p-value[*]
	7	Stress management	7	3.2	1	3	7.7	4	2.2	2	2.0	2	2.5	1.00[*]
	Summary indicators													
	8	One or more yes responses to B1-B7	94	42.9	1	14	35.9	80	44.4	43	43.4	37	45.7	0.76
	9	More than one yes response to B1-B7	39	17.8	1	5	12.8	34	18.9	22	22.2	12	14.8	0.21
	10	One or more hazardous exposures[a]	54	24.7	1	8	20.5	46	25.6	26	26.3	20	24.7	0.81
C. Frequency of joint monitoring														0.57
	1	Frequency			2									
	-	Regularly	26	11.9		5	12.8	21	11.7	10	10.1	11	13.8	
	-	Sometimes	87	39.9		13	33.3	74	41.3	44	44.4	30	37.5	
	-	Separate[∞]	105	48.2		21	53.8	84	46.9	45	45.5	39	48.8	
	Summary indicators													
	2	At least sometimes	113	51.8	2	18	46.2	95	53.1	54	54.5	41	51.3	0.90
D. Frequency of integrated communication														
	1	Integrated Communication (3 categories)			1									0.08
	-	Often	38	17.4		4	10.3	34	18.9	14	14.0	20	25.0	
	-	Occasionally	105	47.9		16	41.0	89	49.4	56	56.0	33	41.3	
	-	Never[∞]	76	34.7		19	48.7	57	31.7	30	30.0	27	33.8	
	Summary indicators													
	2	At least occasionally	143	65.3		20	51.3	123	68.3	70	70.0	53	66.3	0.59
E. Departments and employees engaged in program design or implementation														
	1	Human Resources	113	51.8	2	18	46.2	95	53.1	48	48.0	47	59.5	0.13
	2	Safety	43	19.7	2	6	15.4	37	20.7	17	17.0	20	25.3	0.17
	3	Senior management	153	70.2	2	24	61.5	129	72.1	80	80.0	49	62.0	< .01
	4	Wellness[∞]	68	31.2	2	9	23.1	59	33.0	36	36.0	23	29.1	0.33
	5	Other hourly	58	26.6	2	16	41.0	42	23.5	19	19.0	23	29.1	0.11
	6	Other salaried	70	32.1	2	18	46.2	52	29.1	27	27.0	25	31.6	0.50

Integration Category	Description of indicator variables[Δ,∞,δ]	All respondents N	%	skipped	Total Public Employers N	%	Private Employers: Total Private N	%	Small N	%	Large N	%	Small vs. Large Private Employers p-value[*]
	7 No one else[∞]	8	3.7	2	2	5.1	6	3.4	5	5.0	1	1.3	0.23 [*]
F. Groups/Committees				0									0.80 [†]
	- Integrated groups	39	17.7		4	10.3	35	19.3	20	20.0	15	18.5	
	- Two separate groups[∞]	98	44.5		20	51.3	78	43.1	33	33.0	45	55.6	
	- Safety only[∞]	30	13.6		4	10.3	26	14.4	15	15.0	11	13.6	
	- Wellness only[∞]	25	11.4		5	12.8	20	11.0	15	15.0	5	6.2	
	- None[∞]	28	12.7		6	15.4	22	12.2	17	17.0	5	6.2	
G. Overlapping responsibilities for program managers													0.53
	1 Degree of overlap, select one:												
	- Same person	67	30.5	≠	15	38.5	52	28.7	31	31.0	21	25.9	
	- Main area overlap	16	7.3	46	0	0.0	16	8.8	7	3.0	9	11.1	
	- Some other overlap	27	12.3	≠	9	23.1	18	9.9	8	8.0	10	12.4	
	2 Any overlap (subtotal)	110	50.0		24	61.5	86	47.5	46	46.0	40	49.4	≠,NC

OSH= occupational safety and health; NC= non-calculable

Δ= For categories with more than one indicator, each variable is numbered, response options for single response multiple choice questions are preceded by a dash

∞= Measures followed by a ∞ are *not* considered indicators of integration

δ= in this paper, sometimes we use the word 'safety' rather than OSH because it is a direct quote from the Yearly Case Study survey or we are referring to a subset of OSH programs or hazards that prevent or describe physical hazards or exposures that cause occupational traumatic injuries (e.g. work-related injuries caused by a slip, fall, violence, contact with objects or equipment)

*= most p-values are from X^2 tests, unless followed by a *, which indicates that Fisher's Exact Test was used

†= tested 'Integrated groups' compared to all other groups combined

≠= Each category represented for Indicator G is mutually exclusive but they are not mutually exhaustive. While 46 employers did not identify a main area of responsibility for the person in charge of wellness, we were able to determine areas of other some other overlap for eleven employers

[a]= traditional OSH ergonomic hazards, hazardous substances, or physical safety hazards.