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The Prevalence Of Practicing Safety Professionals' Knowledge, Involvement, And Competency Associated With Workplace Wellness Programs: Gauging The Safety Profession'S Engagement With The Total Worker Health Initiative

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DEDICATION

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THE PREVALENCE OF PRACTICING SAFETY PROFESSIONALS' KNOWLEDGE, INVOLVEMENT, AND COMPETENCY ASSOCIATED WITH WORKPLACE WELLNESS PROGRAMS: GAUGING THE SAFETY PROFESSIONALS' ENGAGEMENT WITH THE TOTAL WORKER HEALTH® PROGRAM

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The morbidity and mortality burden of occupational injuries and illnesses in the United States became such a public health concern that in 1970 the Occupational Safety and Health Act was signed into law. This law requires employers to provide workplaces "free from recognized hazards" and spurred the development of specific regulations along with the creation of academic and professional training programs to educate individuals about the safety sciences and careers in safety fields. Today there are an estimated 26,000 professionally trained and board certified safety professionals supporting workplace programs across the country, alongside numerous non-certified, but degreed, practicing safety professionals. While the collective efforts of these professionals has served to significantly reduce the rate of workplace injuries and illnesses, an emerging body of scientific knowledge indicates that the health status of any worker is affected by both occupational and non-occupational exposures. The failure to consider both impacts an

employee's "total worker health". Led by the U.S. National Institute for Occupational Safety and Health (NIOSH) Total Worker Health® (TWH) initiative, some employers have created workplace wellness initiatives and programs. While these efforts are quite laudable, it is unclear to what extent, if any, safety professionals are involved in developing or operating TWH-related programs. Involvement with a wellness program carries with it certain sensitivities and risks. To gain a better sense of the level of safety professional involvement with workplace TWH-related programs, this research project was implemented to:

- Ascertain the prevalence of the safety professionals' knowledge of wellness programs in general and specifically the TWH initiative;
- Establish what level of involvement, if any, safety professionals have with their institutions' workplace wellness programs;
- Identify training or credentialing safety professionals have, if any, in wellness topics; and
- Examine the associations between outcomes (knowledge, involvement and competency level) and selected covariates/determinants (age, gender, smoking status, ethnicity, self-reported health, years of work experience, years of experience in safety, years of experience in wellness, field of work and number of employees at place of employment).

We administered a web-based survey emailed to 5150 ASSE members during the fall of 2017. We received completed surveys from 654 responders (12.7%). Results showed that the majority of safety professionals (73%) are not familiar with the TWH program, but 78%

reporting their company having a workplace wellness program. Safety professionals do implement and train in some of the topics covered in TWH. The main correlates of TWH knowledge were being female (aOR 1.49, 95%CI:1.02-2.16), African-American (aOR 3.33, 95%CI: 1.53-7.23) and having years of experience in wellness. Increasing years of experience in wellness was also a positive determinant for involvement with their institution's workplace wellness program and having prior training in TWH topics, with adjusted odds ratios ranging from 3.5 to 35.5. Poor self-rated health was inversely associated with knowledge of TWH (aOR 0.44, 95%CI: 0.22-0.89). Company size was inversely associated with the likelihood that a safety professional is familiar with TWH. Only 284 (43.4%) of safety professionals reported receiving training in wellness topics. With these low rates of knowledge and training in TWH, increased awareness is needed. Safety professionals' involvement with TWH is moderately high for traditional safety topics, but low in other areas. Training opportunities in TWH are minimal and credentialing is non-existent. These findings, in turn, suggest that there is an opportunity to develop educational materials and training programs specifically designed for safety professionals as well as potentially developing a credentialing program for TWH.

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Literature Review

Before the United States Department of Labor was created, individual states were finding the need to enact laws for the purpose of protecting the safety and health of workers. Increases in industrial production demands were leading to increasing numbers of injuries, illnesses and death (Fisk, 2003). Activists for labor and social reform focused on establishing health and safety regulations. The first law of this kind was enacted by the State of Massachusetts, with a requirement for factory inspection that covered machine guarding, elevators, and fire exits. By the 1890s several other states followed with the promulgation of regulations ranging in topic from factory inspections to health hazards. By the 1930s every state in the Union had promulgated a form of safety regulation (U.S. Department of Labor, 2009, MacLaury, 1981). Additionally, a uniform system for collecting information and collecting records was also developed, allowing injury information to be collected from all over the United States (Grossman, 1973). Over the 20th century the number of laborers jumped from 24 million people to 139 million people, with employment shifting from farms and forestry to professional, technical and service positions. The number of employees working in the industrial sector also grew, increasing from 31 percent of the workforce to 78 percent (Fisk, 2003).

As the workforce experienced this change, the morbidity and mortality burden of occupational injuries and illnesses in the United States became such a public health concern that in 1970 the Occupational Safety and Health Act (OSHA) was signed into law. This law

requires employers to provide workplaces "free from recognized hazards" and prompted the development of specific regulations along with the creation of academic and professional training programs to educate individuals about the safety sciences. General safety and specific safety fields begin to propagate as professional options for people entering the workforce. The numbers of injuries and fatalities started to decrease as a result of defining and developing a dedicated workforce to safety with the idea of preventing injuries, rather than assigning safety tasks to those after employees have been injured (Fisk, 2003).

Today there are an estimated 26,000 professionally trained and board certified safety, industrial hygiene, health physics and biosafety professionals supporting workplace safety programs across the country, alongside numerous other non-certified, degreed and non-degreed practicing safety professionals[1] (ABHP, BCSP, ABSA, and ABIH, 2017). While the collective efforts of these professionals has served to assist in significantly reducing the rate of workplace injuries and illnesses, an emerging body of scientific knowledge indicates that the health status of any worker is clearly affected by both occupational and non-occupational exposures, and the failure to consider both impacts an employee's "total worker health". Accordingly, some employers have created workplace wellness initiatives and programs, addressing aspects such as smoking cessation, healthy nutrition, and physical activity (Feltner, 2015). While these efforts are quite laudable, it is unclear to what extent, if any, safety professional are involved in developing or operating these programs.

[1] Number calculated by summing the total number of certified, active members listed on websites for the American Board of Health Physics, the American Biological Safety Association, the American Board of Industrial Hygiene, and the Board of Certified Safety Professionals as of January 31, 2017.

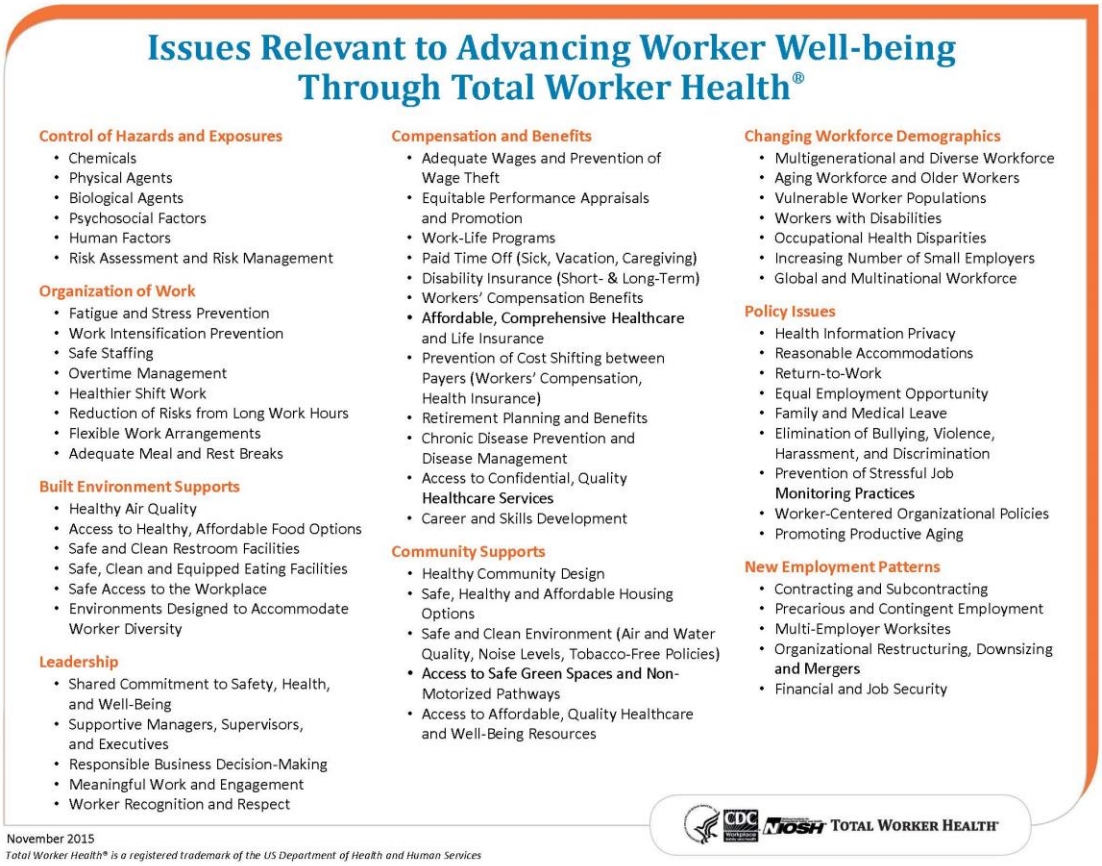
This consideration of the safety professional in the development and/or implementation of wellness programs is important because training and education in the area of wellness is generally absent from the current established safety certification or degree programs. Safety employees may not be aware of the sensitive boundaries that reside at the interface of occupational and non-occupational exposures. For example, can or should a safety professional inquire about non-work activities associated with high levels of noise exposure? Or the weight fluctuation of an employee who visibly appears to have an obvious change in body weight, such that may affect the fit of their respirator (29 CFR1910.134(f)(3))? Or the amount of exercise a worker gets or should get? Involvement with a wellness program carries with it certain sensitivities and risks that must be appropriately managed. Sensitivities that can affect the degree of trust between employees and safety personnel may be mistaken or interpreted as information that may be construed as protected by Health Insurance Portability and Accountability Act, or raise suspicion about why a safety employee, or any other employee, is taking an interest in the personal lives of the people in the workplace.

The Total Worker Health Initiative

Over the last 14 years, the National Institute for Occupational Safety and Health (NIOSH) sponsored symposiums and fora that culminated in the establishment of the Total Worker Health® (TWH) Program, which was officially launched in 2011. The program had evolved from the 2003 Steps to a Healthier U.S. Workforce Initiative using guidance from events such as the WorkLife 2007 Symposium. Incorporation of wellness into the mission of

NIOSH grew as the idea that risk factors affecting health were not exclusive to home or work, that individuals should not be singled out or discriminated against for behaviors, and that expanding our knowledge of employee health can positively contribute to worker health and safety. NIOSH defined TWH as policies, programs, and practices that integrate protection from work-related safety and health hazards with the promotion of injury and illness prevention efforts to advance worker well-being (Feltner, 2015). The goal of TWH is a comprehensive workplace prevention program based on a holistic approach, rather than classifying the effects of behaviors as either work or home-based (Redinger, 2016). In the workplace, this type of program is frequently referred to as a "wellness program". Risk factors identified by TWH include abnormal weight fluctuations, sleep disorders, cardiovascular disease, depression, and other health conditions (NIOSH, 2016). Based on this premise, TWH is investigating how "environmental and workplace factors can both mitigate and enhance overall worker health beyond traditional occupational safety and health concerns" (CDC, 2017). Examples of topics identified by TWH include controls of hazards and exposures, work organization, and work demographics (Sorenson, 2013). Current efforts have included scientific research and a review of current practices and policy where wellness interventions are being integrated into the workplace (Feltner, 2015).

Figure 1. Issues Relevant to Advancing Worker Well-being through Total Worker Health. From the Total Worker Health website, March, 2017 (https://www.cdc.gov/niosh/twh/totalhealth.html)



To incorporate wellness programs into the workplace, NIOSH has considered using already established programs that promote worker health and safety. In fact, the NIOSH Total Worker Health Program: Seminal Research Papers 2012 detailed a main goal of stimulating discussion on health promotion through the workplace with the environmental health and safety programs.

The four evidence-based principles that were developed for the integration process and written by Sorensen and Barbeau (NIOSH, 2012), are:

1. Workers' risk of disease is increased by both exposures to occupational hazards and risk-related behaviors.
2. The workers at highest risk for exposure to hazardous working conditions often are also those most likely to engage in risk-related health behaviors.
3. Integrating worksite health programs with traditional occupational health and safety may increase program participation and effectiveness for high-risk workers.
4. Integrated occupational health and safety/worksite HP efforts may benefit the broader work organization and environment.

   (Anger et al., 2014)

Studies in Total Worker Health

Research initiatives for Total Worker Health and/or wellness programs are actively being debated and developed through a NIOSH collaborative effort that includes panelists and established Centers of Excellence across the country (Feltner, 2015). TWH intends to pave a path forward for the integration of departments across institutions and companies to form a solid and consistent program that unifies the concepts of health promotion and health protection for the prevention of illness and injury and the advancement of health and well-being (Shill, 2013). Redinger et al. further define this effort as a cumulative risk assessment, which takes into account risk factors from the workplace, home life and the surrounding

environments when considering the health and well-being of today's worker. NIOSH is encouraging research efforts on these behaviors as a whole and potential intervention programs that will positively influence the correlations between home behaviors and work behaviors towards a healthier work population (Redinger, 2016).

The Debate of Using Safety to Implement TWH

There is some debate that traditional safety programs cannot incorporate wellness issues coherently into their programs. For example, several participants at the 2015 NIOSH Pathways to Prevention Workshop suggested that wellness programs may not get sufficient attention because established programs might focus on the more "traditional" health and safety concerns. Responses from the TWH Pathways to Prevention panel asserted that launching the TWH initiative across companies and institutions would require other methods than incorporating the efforts directly into the occupational health and safety programs. For instance, the panel suggested that TWH needs to reach beyond the border of any one particular program to include a cross section of departments across a company. Subsequently, boundaries between departments could become less strict when discussing health and safety and an overall sense of wellness could be maintained. Besides safety, other departments such as human resources, benefits, labor relations, and all levels of management could invest in these wellness initiatives. Each of these areas could be responsible for, and participate in, training, accountability and budgeting for implementing TWH programs (TWH Webinar, 2015).

The specific factors that influence successful implementation of TWH programs by companies have not yet been identified. Thus, the current direction of TWH sponsored research is to identify the measures and implementation methods that are effective in developing the TWH culture within an institution (TWH webinar, 2015).

TWH Interventions and Published Research

In 2014, Anger et al. published a systematic review of TWH intervention programs that were implemented in companies across the United States. They found only seventeen journal articles that covered interventions meeting the criteria of using both safety and wellness programs and reported program outcomes for both safety and wellness. Another requirement is that the selected studies all reported whether or not their results were statistically significant. While the actual interventions provided by the companies could have ranged in number from one to several, the goal of each intervention was to influence individual behavior change. The 17 studies were summarized in a table by Anger et al. that can be seen below (Table 1).

Table 1. Summary of prospective TWH research studies compiled by Anger et al. (Table from Anger et al., 2014)

Table 1
Categories of Intervention Programs

Intervention program category	Study/primary reference	Focus of intervention program	Intervention methodology
a. Very large-scale, company-wide makeover programs (HP + OSH-W)	Bertera (1990)	Broad HP and OSH program.	Risk assessments, training, self-directed behavior change, incentives
	Dalton and Harris (1991)	Broad HP and OSH program.	Prevention services, targeted messages, counseling, feedback, incentives
b. Programs that had substantial and evenly addressed HP and OSH components (HP + OSH)	Eriksen et al. (2002)	Physical exercise (PE), stress management training (SMT), and an integrated program (IHP) of exercise, stress management coping, and nutrition were compared.	Training, exercise programs
	Wellworks-2: Sorensen et al. (2002)	Comprehensive OSH program targeted at reducing workplace exposure hazards and an HP program to reduce tobacco consumption and increase healthy eating.	Participatory intervention, professional consultation, training
	SHIFT: Olson, Anger, Elliot, Wipfli, and Gray (2009)	Weight loss and safe driving competition, with training/coaching in healthy eating, exercise, and injury prevention.	Training, competition (team strategies), motivational interviewing, self-monitoring, feedback, incentives
c. Programs in which either the HP or OSH component of the intervention was addressed in a stronger or broader fashion than the other component (HP + osh and hp + OSH), and programs with narrowly focused HP and OSH components (hp + osh)	Healthy Directions: Sorensen et al. (2005)	Broad wellness program combined with an OSH program focused on reducing exposure to carcinogens that synergize with cancers associated with smoking (HP + osh).	Training, interactive activities, industrial hygiene recommendations
	Peters and Carlson (1999)	Broad wellness and well-being program with largely unspecified safety training information (HP + ohs)	Training, self-assessments, goal setting, behavior contracting, self-management, feedback, incentives
	PHLAME: Elliot et al. (2007)	Broad wellness and well-being program with largely unspecified safety training information (HP + ohs)	Scripted training, team strategies, feedback, motivational interviewing
	Rasmussen et al. (2006)	OSH program focused on psychosocial factors to reduce eczema and occupational accidents, and to improve mental health (hp + OSH).	Group participatory process to target and solve problems (team strategies)
	Tsutsumi, Nagami, Yoshikawa, Kogi, and Kawakami (2009)	Broad OSH program focused on reducing job stress and on improving mental health (hp + OSH).	Group participatory process to target and solve problems (team strategies)
	Tveito and Eriksen (2009)	Broad OSH program focused on physical exercise, stress and stress management, and job redesign with smoking and lifestyle components (hp + OSH).	Professional exercise trainers to implement exercise program, group participatory processes to plan/implement job redesign, training on lifestyle issues
	Wellworks: Sorensen et al. (1995)	Programs targeted at reducing tobacco consumption and workplace exposure hazards, and increasing healthy eating (hp + osh).	Participatory intervention, professional consultation, training
d. Programs addressing a single problem or using a single method that addresses both HP and OSH needs (hp + osh-S)	MASSbuilt: Okechukwu, Krieger, Sorensen, Li, and Barbeau (2009)	Program aimed at reducing smoking and reducing exposures to chemicals that synergize with smoking (thus increasing cancer risk) to reduce cancer risk.	Health risk appraisal, training, feedback, motivational interviewing
	Alkhajah et al. (2012)	Program designed to reduce sitting and increase exercise to improve both health and safety.	Training and experience using a sit-stand station
	Take-a-Stand: Pronk, Katz, Lowry, and Payfer (2012)	Program designed to reduce sitting and increase exercise with implications for safety (e.g., reducing musculoskeletal injuries).	Experience using sit-stand station, incentives
	Konradt, Schmook, Wilm, and Hertel (2000)	Program to reduce job stress with safety and efficiency benefits.	Group processes (team strategies) to identify and solve problems
	Ott et al. (2009)	Company-wide program that used the medical exam as a health and safety management tool.	Medical exams as a tool to target problems, training

Note. HP = health promotion; OSH = occupational safety and health.

Measured outcomes included weight change, exercise frequency, smoking cessation, blood pressure reduction and change in cholesterol levels. All but one of the studies reported results showing improvement after the interventions were implemented. Based on these findings, Anger suggests that interventions that come from both the health promotion and the occupational safety and health departments of a company and that address both injuries and chronic illness do improve the risk factors for overall health.

Opposition to TWH

As the TWH idea has grown, there has been some opposition. For instance, Lax (2016) disagrees that the above referenced 17 studies are truly TWH. Lax suggests that the corporate entity is using the TWH program to place the focus on individuals for their own health issues and that the cost savings associated with lower health care costs and increased productivity is the major incentive to implement the health promotion. This author goes on to suggest that a portion of safety professionals are against the idea of wellness programs and that the TWH places the majority of the responsibility back onto the individuals, thereby the program cannot be implemented in a meaningful way. The proposed solution from Lax is that employers should use employees as a captive audience, and backed by the strength of the Affordable Care Act, which promotes preventative programs to control health care costs and execute programs with positive consequences. However, Lax does recognize that if research finds that work and health interactives are credible, TWH has the potential to influence change (Lax, 2016). However, Pomeranz points out that the legislation supporting

workplace wellness programs might not be strong enough to affect change on the health of employees or financial benefits for the employers due to the flexibility written into the regulation (Pomeranz, 2014).

Other studies suggest that merely being gainfully employed contributes significantly to the overall health of a person, in that the issues listed as being relevant to TWH are addressed by having a job (reference list in Figure 1~~Figure 1~~). Even self-employment contributes to worker well-being under this model, versus unemployment. (Sepulveda, 2014, Merchant, 2014).

Some employees have the same challenges as the unemployed as well in that they lack both a safety program and a health promotion program. For example, home health care workers face this issue and have a significantly higher injury rate than the average U.S. occupation (Olson, 2015). A TWH program, such as the COMPASS pilot study, that provides a supportive network with these services to the home health care community could influence the injury rate of these workers in a positive manner (Olson, 2015). The efforts in that study included improving both the work practices and life behaviors of home health workers. Participants were incentivized to attend meetings and contribute their own skills to the new programs. At each meeting members contributed their knowledge, skills and efforts and were provided new tasks based on a group consensus of what was needed. All tasks were designed to be performed outside of normal work hours (Olson, 2015).

Support for the Synergistic Effect of Safety and Wellness

Schmidt et al. brings in the idea of synergism to create a program greater than what safety or wellness contribute individually. With a synergistic approach, safety is a key component to developing a successful TWH program in the workplace, but it should also be paired with a health promotion program. The notion of combining these resources has been around since 1984 with the idea of using prevention to decrease worker illness and injuries. The Schmidt study suggests that integration should emphasize personal health along with the correction of workplace hazards for reaching the key goal of improving overall health. Schmidt reasons that health promotion programs alone tend not to be as successful in affecting changes in worker health (Schmidt, 2014).

Current Goal of TWH

Current efforts are being made to connect industry, researchers, government, insurance companies and trainers to expand the reach of evidence-based interventions to keep people safe. The hope is that safety professionals and health professionals work together (McGarvey, 2016) and further identify resources to spread the word about TWH (CPWR, 2016). These efforts support the notion that safety does not begin and end with the established work day, but takes into account how work can affect your well-being at home and how behaviors outside of work can affect the work day (McGarvey, 2016).

Studies Related to TWH, but not TWH

Numerous studies are published or under development that examine individual wellness topics for a variety of populations or professions (Sharma, 2016; Arias, 2015; Pomeranz, 2014). For example, Sharma et al recently published a cross-sectional study that identified over 78% of hospital workers as overweight or obese (Sharma, 2016). While this study, and others, are critical for examining wellness issues, the focus of TWH research is on the cumulative effect of both work and non-work related risk factors. The specific goal of this dissertation was to fill this gap in the literature concerning the safety professionals' interactions and responsibilities in the workplace that may also involve TWH.

Public Health Significance

The main focus of current workplace safety practices resides within the workplace setting and concerns workplace hazards and exposures. While companies are required to manage safety within their place of business, they are not required to manage wellness (Sorenson, 2006). Yet human behavior outside of the workplace has the potential to affect the health status of all employees. Addressing the behaviors that occur outside of the workplace, in conjunction with workplace safety practices, has the potential to significantly decrease workplace injury rates.

A recent study by Fabius et al. examined companies with a known focus on health and safety, based on the Corporate Health Achievement (CHA) Award, to assess how they performed compared to the Standard & Poor average, using stock market portfolios. The CHA Award winners outperformed the average on all tests (Fabius, 2015). Thus, company

programs that include a wellness component could increase the earning potential of a company. Over the past few decades, fatalities in the workplace have decreased by 65% and recorded injuries and illnesses have fallen by 67% (Fabius, 2015). Despite these declines, injury and illness rates are still concerning and carry a high cost, as demonstrated in the table below from Leigh, 2011. In fact, the associated medical and indirect costs are similar to what is spent on cancer, and more than those spent on diabetes (Leigh, 2011) (Table 2).

Table 2. Summary Table of Costs for Combination of Worker Injuries and Diseases for 2007 (Leigh, 2011)

TABLE 4
Estimated Medical and Indirect Costs of Fatal and Nonfatal Occupational Injuries and Diseases, 2007

Category	Number	Medical Costs in $Billions and Percentage (for row)	Indirect Costs in $Billions and Percentage (for row)	Total Costs for Row in $Billions and Percentage (in column)
Injuries	8,564,619	$46.26 (24.1%)	$145.56 (75.9%)	$191.83 (76.8%)
Fatalities	5,657	$0.31 (5.2%)	$5.68 (94.8%)	$5.99
Nonfatalities	8,558,962	$45.95 (24.7%)	$139.89 (75.3%)	$185.84
Diseases	516,149	$20.83 (36.0%)	$36.98 (64.0%)	$57.81 (23.2%)
Fatalities	53,445	$17.66 (38.8%)	$27.89 (61.2%)	$45.55
Nonfatalities	462,704	$3.17 (25.9%)	$9.09 (74.1%)	$12.26
Total costs for injuries and diseases		$67.09 (26.9%)	$182.54 (73.1%)	$249.64

Note: Owing to rounding, columns and rows may not sum.

Sources: For fatal diseases, AHRQ 2010; CDC 2009; Hartman et al. 2009; Rice, Hodgson, and Kopstein 1985; Schappert and Rechtsteiner 2008; Steenland et al. 2003. For nonfatal cases: NCCI 2008; U.S. Bureau of Labor Statistics 2010a, 2010b, 2010c, 2010d, 2011a.

With the introduction and incorporation of TWH programs, it is conceivable that these rates could decrease further and overcome the next plateau. However, the resources and employees responsible for these programs should not only be familiar with, but

competent in the broader range of TWH topics. With the desire to build this program on the strength of traditional safety programs and reach across departments, studies have yet to ask working safety professionals about their potential role in the TWH initiative. Identifying the involvement and competency level of these employees is central to developing and implementing TWH programs nationwide.

Objective of Dissertation

This dissertation aimed to gather data on the safety professionals' knowledge of the TWH Program, their involvement with TWH or wellness efforts in their workplace, and their competency level for implementing and enforcing these programs within the workplace. To gain a better sense of the level of safety professional involvement with workplace wellness programs, we administered a survey to:

- Measure the prevalence of the safety professionals' knowledge of TWH and their experience with workplace programs that are within the TWH purview;
- Establish the level of involvement safety professionals have with their institutions' workplace wellness programs;
- Identify training or certifications that safety professionals have, if any, in wellness topics; and
- Examine the associations between outcomes (knowledge, involvement and competency level) and selected covariates/determinants (age, gender, smoking status, ethnicity, self-reported health, years of work experience, years of

experience in safety, years of experience in wellness, field of work and number of employees at place of employment).

Specific Aims

Since improving health and safety outcomes are considered a measure of effectiveness of TWH interventions (Feltner, 2015), we must understand the role safety professionals could play within the TWH paradigm. We conducted a survey of safety professionals to help identify gaps between safety and wellness programs, and gain insight as to how the two could work synergistically to continue reducing workplace injury and fatality rates. Specifically, we measured the knowledge level of safety professionals in terms of their understanding and awareness of TWH within the safety community, assessed if and how safety is involved with integrating TWH into their workplaces, and clarified the competency level of safety professionals that are promoting wellness initiatives. The results of this study can assist with the development of intervention materials, guidance and education specifically designed for safety professionals who may be tasked with responsibilities for workplace wellness programs. Results could also serve to develop one or more professional training courses and/or certificate programs in TWH, offered through the University of Texas School of Public Health.

Through a cooperative arrangement with the American Society of Safety Engineers (ASSE) Region III, a web-based survey was provided to its approximately 5150 members in Texas, Arkansas, and Oklahoma to examine the following specific aims:

1. Measure the prevalence of the safety professionals' knowledge of wellness programs in general and specifically the TWH initiative;
2. Establish what level of involvement, if any, safety professionals have with their institutions' workplace wellness programs;
3. Identify training or credentialing safety professionals have, if any, in wellness topics; and
4. Examine the associations between outcomes (knowledge, involvement and competency level) and selected covariates/determinants (age, gender, smoking status, ethnicity, self-reported health, years of work experience, years of experience in safety, years of experience in wellness, field of work and number of employees at place of employment).

METHODS

We collected data on safety professionals' knowledge of the TWH Program, their involvement with TWH or wellness efforts in their workplace, and their competency level for implementing and enforcing these programs within the workplace.

Study Design

This cross-sectional study was an online survey of safety professionals. Members of the ASSE Region III were contacted through email for participation. Region III includes three states: Texas, Oklahoma and Arkansas. This regional ASSE branch had entered into a collaborative agreement with The University of Texas Health Science Center at Houston School of Public Health to support the academic pursuits of students researching safety concepts. A Letter of Support can be found in Appendix A. The survey combined common demographic questions and newly formulated questions constructed to examine the aims of this particular research. These questions probed a safety professionals' knowledge of TWH and wellness definitions, their participation in implementing related programs and their competency level for doing so, based on certifications, experience and level of comfort. Demographic questions included participant age, gender and education level, years of safety experience, current working status, and interest in personal exercise and health. The other four sections of the survey included questions on knowledge of wellness programs and in relation to TWH topics (24 questions), involvement with these programs (24 questions), training in these programs (25 questions), and eight questions posing potential TWH

scenarios and the safety professionals' comfort level addressing the issues. Survey questions are provided in Appendix B.

We conducted a pilot of the survey instrument to examine the feasibility and comprehension of the proposed questions. This test group consisted of 21 volunteers from the University of Texas Health Science Center at Houston staff employed in a field based in or related to safety, and some outside safety professionals. Feedback from the pilot was used to refine the questions and the length of the research survey, aiming for a completion time of no more than 15 minutes.

The survey was created and formatted using the Research Electronic Data Capture (REDCap) (Vanderbilt University, Nashville, TN) tool hosted at The University of Texas School of Biomedical Informatics (SBMI) at Houston. REDCap is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources (Harris, 2009). The survey was then distributed electronically by email to the Region III ASSE membership through the Region III leadership; there were no hard copies. At the beginning of the survey, participants were provided an information paragraph that explained the purpose, procedure, risks, alternatives to participation, and voluntary nature of participation; completion of the survey implied informed consent. Those that did not continue on to the survey were considered as having elected not to participate. We were unable to distinguish between those who simply deleted the email invitation and those who, after reading the

introduction information paragraph, elected not to continue. No names or other personal identifiers were collected during the survey.

Study Setting

The survey was launched on September 14, 2017. There were a total of four email contact waves. The first reminder email was sent on September 25, 2017. This was followed by a reminder on October 5 and a survey reminder and close out announcement on October 9. The survey was officially closed to the participants on October 13, having allowed 30 days for completion of the survey. All email communications included the link to the survey, a description of the purpose of the study, benefits to the target population, a statement demonstrating the support of the ASSE Region III Board, and appreciation for taking the time to complete the survey and support students pursuing safety related degrees. This survey was promoted by regional ASSE members at the annual Region III Professional Development Conference meeting in Hurst, Texas on September 13, 2017. In addition, all participants who completed the survey within the open survey timeframe had the option of receiving a $5 Starbucks gift card, which was sent to them electronically, via a separate channel, once the data collection period had ended.

Study Subjects

Safety professionals that held a membership in ASSE Region III as of September 14, 2017, were the target group for this survey. At that time Region III had approximately 5150 members. Email addresses are collected with membership registration, with Region III

having the capability to email these members. The survey was introduced to members at ASSE membership events, including the local Gulf Coast Chapter meeting and the annual Region III Professional Development Conference (PDC). No one was required to take the survey. The principal investigator did not have access to this email distribution list as the emails were distributed by the ASSE Regional leadership.

Sample Size Calculation

Region III has 5150 members. The minimum desired number of responses for this population was 246 completed surveys. The first aim of this dissertation relates to the prevalence of safety professionals' knowledge of TWH; therefore, the sample size calculation for the study was based on knowledge prevalence. The following factors were taken into consideration for calculating the sample size. The conventional 95% level of confidence was chosen, providing a Z value of 1.96. The P, or expected proportion of persons with prior knowledge of TWH, was determined to be 0.2, based on preliminary questioning at the 2016 Environmental, Health, & Safety Seminar in Galveston, Texas and the 2016 ASSE Region III PDC in Austin, Texas. At both seminars, about 20% of the safety employees had prior knowledge of the TWH concept or program; similar estimates were not found in the literature. The precision (d) was set at 0.05 to obtain a limited width confidence interval. The sample size calculation used was:

$$n = ((1.96)^2(0.2)(1-0.2))/(0.05)^2 = 245.86$$

Thus, the calculation resulted in a goal sample size of at least 246 respondents (Naing, 2006). This result is in agreement with population size estimates described by Dillman (2014) in his

book *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method* (Dillman, 2014).

Data Collection and Analysis

Quality checks (e.g., range and logic checks, percentage of missing responses) of the data were performed for completeness and accuracy. Statistical analysis was conducted using Excel (Microsoft Corp, Seattle, WA) and Stata (StatCorp, College Station, TX) software.

Descriptive statistics were generated for the analysis of the first three aims of this project, which were based on prevalence. For questions with dichotomous responses, frequencies were calculated. For the fourth aim, the main outcome variables (employee knowledge, involvement, and competency) were binary (Yes/No). Associations of these outcome variables with the main independent variables (age, gender, ethnicity, number of employees at the place of employment, years of work experience, years of experience in safety, years of experience in wellness, smoking status, personal health rating) were tested using simple logistic regression to determine the crude odds ratios, 95% confidence intervals and the p-values. Variables were selected for the final multivariate regression models based on a p-value of <0.20 in the bivariate analysis or on the literature. We calculated the adjusted odds ratios and corresponding 95% confidence intervals. Goodness of fit using the Hosmer-Lemeshow method (Hosmer, 2013).

Table 3 summarizes the characteristics of both the independent and dependent variables.

Table 3. Table of variables.

Variable	Independent (I) or Dependent (D)	Continuous (Cont) or Categorical (Cat)	Possible Responses
Age	I	Cat	< 40; 40-54; 55and over
Gender	I	Cat	Male; Female
Ethnicity	I	Cat	White; African-American; Hispanic; Other (Native American, Asian/Pacific, Other)
Currently Employed Safety Professional	I	Cat	Other
Number of Employees	I	Cat	Yes; No
Years of Work	I	Cat	<100; 101-500; 501-5,000; >5,000-
Years of Safety Experience	I	Cat	1-10; 11-20; 21-30; > 30
Years of Wellness Experience		Cat	1-10; 11-20; 21-30; > 30
Smoker	I	Cat	None; 1-10; 11-20; 21-30; > 30
Health Rating	I	Cat	Yes; No
Type of Employer	I	Cat	Excellent; Very Good; Good; Fair; Poor
			Agriculture; Chemical; Communications; Computer; Construction; Government; Healthcare; Insurance; Manufacturing; Mining; Nonprofit; Gas; Services Retail; Services Travel; Services Other; Transportation; Utilities;

			Wholesale Trades; Other
Safety Professional	I	Cat	Yes; No
Wellness Knowledge	D	Cat	Yes; No; Don't Know
Wellness Involvement	D	Cat	Yes; No; Don't Know
Wellness Competency	D	Cat	Yes; No; Don't Know
TWH Definition	D	Cat	Yes; No; Don't Know

Space to collect additional free text comments by the participants was provided. These comments are compiled in Appendix D, but were not further analyzed as part of this dissertation.

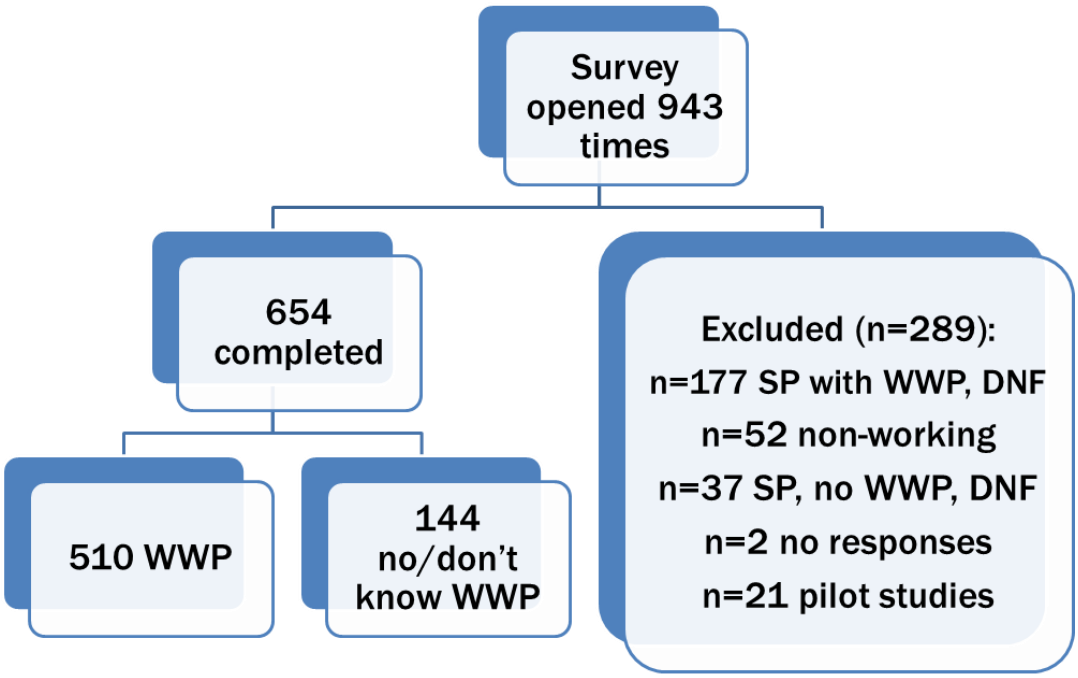
Human Subjects and Safety Considerations

Participants had the opportunity to read the information sheet explaining the study at the beginning of the survey. Completion of the survey implied consent. All responses were confidential. All results were presented in aggregate form and summaries, and no individual results or identifiers were disclosed. The study protocol and survey questionnaire were reviewed by the Committee for the Protection of Human Subjects (CPHS) at The University of Texas Health Science Center at Houston, and considered exempt from further review (IRB case number HSC-SPH-17-0359).

RESULTS

The survey participation link was sent to all 5150 members of ASSE Region III. The survey site was accessed 943 times, resulting in an 18.3% overall response rate. Of the 943 responses, 289 respondents (5.6%) did not complete the questionnaire. Of these, 177 responses (3.4%) were eliminated for not completing the survey, although they indicated being working safety professionals with knowledge of workplace wellness programs. Another 42 participants (0.82%) responded they were not working safety professionals and were removed, along with 10 participants (0.19%) who did not know if they were a working safety professional. Another 37 surveys (0.72%) were begun, but not completed by safety professionals who claimed they had no knowledge of workplace wellness programs or were unsure. In two instances (0.04%), the survey was opened and no responses were provided to any questions. The survey was accessed 21 times for pilot testing; these were also removed from analysis. Of the remaining 654 (12.7%) completed surveys considered suitable for analysis, 510 (9.9%) answered that their place of work had a wellness program, 126 (2.5%) did not have such a program, and 18 (0.35%) were unsure. This final sample size well exceeded the minimum desired sample size of 246 completed responses.

Figure 2. Flow diagram depicting final survey response rate.



SP = Safety Professional
DNF = Did not finish
WWP = Workplace Wellness Program

Descriptive statistics

Table 4 summarizes the demographic, employment and workplace characteristics of the study population. The majority of respondents were male (n= 438, 67%), White (n=545, 83%), non-current smokers (n=614, 95.2%) with generally good, very good or excellent self-reported health (87%). The prevalent age group was 40 to 55 years (38%). Nearly all participants were currently employed (98%). The largest proportion (47%) had worked for over 30 years, but the number of years working in safety was distributed fairly uniformly across the four time period categories. Slightly under one quarter of respondents (22%) indicated having no experience in workplace wellness, but 55% of total respondents reported

between 1 and 10 years of experience in this area. The majority (54%) worked in companies with between 100 and 500 employees, and 78% indicated their employer had established a workplace wellness program.

Approximately 40% of participants indicated both having received prior training (43%) and being involved (39%) in workplace wellness. However, with respect to TWH only 27% indicated familiarity with the term or NIOSH initiative. In other words, over 70% of respondents were unaware of TWH.

Table 4. Study population characteristics (n=654). ASSE Region III Survey, 2017.

Demographics		
Sex (n, %)		
	Male	438 (67.0%)
	Female	216 (33.0%)
Age (n, %) (years)		
	< 40	169 (25.9%)
	40 to <55	247 (37.9%)
	≥55	236 (36.2%)
Race/Ethnicity (n, %)		
	White	545 (83.3%)
	African-American	29 (4.4%)
	Hispanic	46 (7.0%)
	Other	34 (5.2%)
Smoking (n, %)		
	Nonsmoker	615 (95.2%)
	Current smoker	31 (4.8%)
Self-reported health (n, %)		
	Excellent/Very Good	320 (48.9%)
	Good	255 (39.0%)
	Fair/Poor	79 (12.1%)
Employment		
Currently employed (n, %)		
	No	12 (1.9%)
	Yes	637 (98.2%)
Workforce participation (years)		
	1-10	82 (12.6%)
	11-20	113 (17.3%)
	21-30	154(23.6%)
	>30	303 (46.5%)
Safety-related experience (years)		
	1-10	191 (29.2%)
	11-20	174 (26.6%)
	21-30	156 (23.9%)
	>30	133 (20.3%)
Wellness-related experience (years)		
	None	141 (21.7%)
	1-10	358 (55.0%)

	11-20	86 (13.2%)
	21-30	39 (6.0%)
	>30	27 (4.2%)
Workplace		
Company size (n, %)		
	≤ 100	116 (17.7%)
	101-500	352 (53.8%)
	501-5000	173 (26.5%)
	>5000	13 (2.0%)
Workplace wellness program (n, %)		
	No/Don't Know	144 (22.0%)
	Yes	510 (78.0%)
Main outcomes (participant-centered)		
Involved in workplace wellness		
	No/Don't Know	320 (60.6%)
	Yes	208 (39.4%)
Prior training in workplace wellness		
	No/Don't Know	370 (56.6%)
	Yes	284 (43.4%)
Familiar with Total Worker Health		
	No/Don't Know	478 (73.1%)
	Yes	208 (26.9%)

n- number of units, % - percentage

Univariate Analysis

Table 5 summarizes the results of the univariate analysis, in which associations between each of the three main outcomes (wellness involvement, training and familiarity with TWH) and each independent demographic, employment and workplace variable were tested.

For involvement with workplace wellness, associations with a p-value <0.20 were found with female gender (p=0.11), increasing years of experience with workplace wellness (p<0.0001), decreasing company size (p=0.0001), and presence of a workplace wellness program.

For prior training in workplace wellness, associations with a p-value<0.20 were limited to increasing years of experience with workplace wellness (p<0.0001).

Finally, for knowledge of the NIOSH TWH initiative, associations with a p-value<0.20 were identified for female gender (p=0.03), race/ethnicity (p=0.04), inversely related with self-reported health (p=0.01), higher number of years of safety-related experience (p=0.19), increasing years of experience with workplace wellness (p<0.0001), increasing company size (p=0.19) and the presence of a workplace wellness program (p=0.06).

Table 5. Univariate analysis of associations between main participant-centered outcomes, demographics, employment and workplace variables (N=654). ASSE Region III Survey, 2017.*

	Involvement in Workplace Wellness			Prior training in Workplace Wellness			Knowledge of TWH		
Variable	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Demographics									
Gender (female)	1.34	0.93 - 1.93	**0.11**	0.89	0.65 – 1.25	0.52	1.50	1.05 – 2.15	**0.03**
Age group			0.71			0.59			0.64
<40	-			-			-		
41-54	1.07	0.69 – 1.66	0.78	0.81	0.55 – 1.21	0.31	1.16	0.74 – 1.82	0.51
>55	1.20	0.77 – 1.89	0.42	0.87	0.58 – 1.29	0.48	1.24	0.79 – 1.94	0.35
Race/ethnicity			0.52			0.64			**0.04**
White	-			-			-		
African-American	1.30	0.60 – 2.85	0.51	1.22	0.58 – 2.58	0.60	3.07	1.45 – 6.52	**0.004**
Hispanic	1.27	0.61 – 2.61	0.52	0.77	0.41 – 1.43	0.41	0.90	0.45 – 1.82	0.77
Other	1.63	0.78 – 3.42	0.20	0.31	0.65 – 2.62	0.45	1.03	0.47 – 2.26	0.94
Current smoking	1.29	0.55 – 3.05	0.56	1.07	0.52 – 2.22	0.84	1.56	0.73 – 3.33	0.23
Self-reported health			0.36			0.30			**0.01**
Excellent/Very Good	-			-			-		
Good	0.77	0.53 – 1.12	**0.18**	0.98	0.71 – 1.37	0.93	1.10	0.77 – 1.58	0.60
Fair/Poor	0.79	0.44 – 1.43	0.44	0.68	0.41 – 1.13	0.41	0.42	0.21 – 0.83	**0.01**
Employment									
Workforce participation			0.42			0.50			0.40
1-10	-			-			-		
11-20	1.71	0.90 – 3.28	**0.10**	1.13	0.64 – 2.00	0.68	0.69	0.36 – 1.32	0.26
21-30	1.25	0.67 – 2.31	0.48	0.79	0.46 – 1.37	0.41	0.79	0.43 – 1.44	0.45
>30	1.30	0.74 – 2.29	0.36	1.03	0.63 – 1.68	0.92	1.00	0.59 – 1.72	0.99

Safety-related experience			0.59			0.35			**0.19**
1-10	-			-			-		
11-20	0.99	0.62 – 1.57	0.96	1.44	0.95 – 2.19	**0.09**	1.24	0.77 – 1.98	0.34
21-30	0.75	0.46 – 1.21	0.24	1.28	0.83 – 1.97	0.23	1.04	0.64 – 1.71	0.86
>30	0.83	0.50 – 1.39	**0.06**	1.33	0.85 – 2.08	**0.001**	1.66	1.02 – 2.71	**0.04**
Wellness-related experience			**0.00**			**0.00**			**0.00**
None	-			-			-		
1-10	15.46	6.11 – 39.10	**0.00**	3.60	2.21 – 5.85	**0.00**	1.86	1.13 – 3.06	**0.01**
11-20	30.27	11.06 – 82.84	**0.00**	9.10	4.88 – 16.99	**0.00**	2.00	1.05 – 3.79	**0.03**
21-30	25.84	8.39 – 79.54	**0.00**	12.41	5.44 – 28.29	**0.00**	2.44	1.10 – 5.41	**0.03**
>30	36.27	10.78 – 122.06	**0.00**	17.06	6.23 – 46.75	**0.00**	6.09	2.54 – 14.65	**0.00**
Workplace									
Company size			**0.0001**			0.26			**0.19**
≤100	-			-			-		
101-500	0.51	0.29 – 0.89	**0.02**	0.68	0.44 – 1.03	**0.07**	0.74	0.47 – 1.19	0.22
501-5000	0.28	0.15 – 0.51	**0.00**	0.80	0.50 – 1.29	0.36	1.09	0.66 – 1.83	0.73
>5000	0.18	0.03 – 2.35	**0.00**	1.17	0.37 – 3.68	0.79	1.51	0.46 – 4.94	0.50
Workplace wellness program	11.61	1.53 – 87.95	**0.02**	1.18	0.81 – 1.72	0.39	1.52	0.98 – 2.38	**0.06**

(*) Variables with a p-value =<0.20 were selected for final multivariate models.

Multivariate Analysis

Table 6 presents the results of the multivariate analysis, in which associations between each of the three main outcomes (wellness involvement, training and familiarity with TWH) and the variables selected from the univariate analysis were tested. In addition, for all models, the variables gender and age group were also included.

For involvement with workplace wellness, the adjusted odds ratios (aOR) that remained significant at $p < 0.05$ were: a) increasing years of experience with workplace wellness (with aORs ranging from 15 for those with 1-10 years of experience, to nearly 38 for those with more than 30 years of experience; b) decreasing company size, reflected in an inverse dose-response pattern, and the presence of a workplace wellness program (aOR, 13.43; 95% CI, 1.61 to 111.69).

Prior training in workplace wellness was associated with: a) increasing age group, inverse association, (41-54 years, aOR, 0.63; 95%CI, 0.41-0.96, and for >55 years, aOR, 0.50; 95%CI, 0.32-0.79); and b) increasing years of experience with workplace wellness (with aORs ranging from 3.5 for those with 1-10 years of experience, to 21.77 for those with more than 30 years of experience.

Knowledge of TWH was significantly associated with: a) female gender (aOR, 1.59; 95% CI, 1.08-2.35), b) being African-American (aOR, 3.54; 95%CI, 1.60-7.82); c) inversely associated with poor reported health (aOR, 0.45; 95% CI, 0.22-0.92); and d) increasing years of experience with workplace wellness (with aORs ranging from 1.85 for those with 1-10 years of experience, to 5.42 for those with more than 30 years of experience.

All multivariate models fit well, as evidenced by goodness-of-fit p-values above 0.05.

Table 6. Multivariable models of associations between main participant-centered outcomes, demographics, employment and workplace variables. Results presented as adjusted odds ratios (aOR) and 95% confidence intervals (CI). ASSE Region III Survey, 2017.

Variable	Involvement		Prior training		Knowledge of TWH	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Demographics						
Gender (female)	1.49	0.98-2.27	0.81	0.56-1.16	**1.59**	**1.08-2.35**
Age group						
<40	-	-	-	-	-	-
41-54	0.98	0.59-1.63	**0.63**	**0.41-0.96**	1.12	0.63-2.00
>55	0.92	0.53-1.59	**0.50**	**0.32-0.79**	1.00	0.49-2.01
Race/ethnicity						
White	-	-	-	-	-	-
African-American	-	-	-	-	**3.54**	**1.60-7.82**
Hispanic	-	-	-	-	1.15	0.55-2.44
Other	-	-	-	-	0.95	0.41-2.17
Current smoking	-	-	-	-	-	-
Self-reported health						
Excellent/Very Good	-	-	-	-	-	-
Good	-	-	-	-	1.24	0.84-1.82
Fair/Poor	-	-	-	-	**0.45**	**0.22-0.92**
Employment						
Workforce participation	-	-	-	-	-	-
1-10	-	-	-	-	-	-

11-20	-	-	-	-	-	-
21-30	-	-	-	-	-	-
>30	-	-	-	-	-	-
Safety-related experience						
1-10	-	-	-	-	-	-
11-20	-	-	-	-	1.36	0.76-2.42
21-30	-	-	-	-	1.17	0.60-2.30
>30	-	-	-	-	1.60	0.74-3.49
Wellness-related experience						
None	-		-		-	
1-10	**15.03**	**5.89-38.36**	**3.49**	**2.14-5.70**	**1.85**	**1.10-3.11**
11-20	**28.84**	**10.36-80.24**	**10.20**	**5.40-19.26**	1.77	0.90-3.48
21-30	**27.24**	**8.57-86.63**	**15.16**	**6.53-35.24**	**2.45**	**1.04-5.77**
>30	**37.97**	**10.55-136.69**	**21.77**	**7.72-61.39**	**5.42**	**2.09-14.07**
Workplace						
Company size						
≤100	-				-	
101-500	0.54	0.29-1.02	-	-	0.66	0.40-1.11
501-5000	**0.27**	**0.14-0.53**	-	-	0.91	0.51-1.61
>5000	**0.17**	**0.03-0.95**	-	-	1.62	0.45-5.74
Workplace wellness program	**13.43**	**1.61-111.69**	-	-	1.30	0.79-2.16

Goodness of fit, p>0.05 for all models.

Finally, Table 7 presents the final fully reduced multivariable models, after removing those variables that were not statistically significant in the models presented in Table 6. In all three models, the variables found to be statistically significant in Table 6 remained significant, with slight reductions in the adjusted ORs. All of the models fit well, by the goodness-of-fit test.

Table 7. Final reduced multivariable models of associations between main participant-centered outcomes, demographics, and employment and workplace variables. Results presented as adjusted odds ratios (aOR) and 95% confidence intervals (CI). ASSE Region III Survey, 2017.

Outcome	Variable	aOR	95% CI
Involvement	Wellness-related experience		
	None	-	
	1-10	**15.12**	**5.94-38.54**
	11-20	**28.45**	**10.28-78.76**
	21-30	**25.57**	**8.17-80.01**
	>30	**35.55**	**10.17-124.23**
	Company size		
	≤100	-	
	101-500	0.56	0.30-1.04
	501-5000	**0.27**	**0.14-0.53**
	>5000	**0.19**	**0.03-1.07**
	Workplace wellness program	**11.46**	**1.42-92.58**
Prior training	Age group		
	<40	-	
	40-54	**0.64**	**0.42-0.98**
	>55	**0.53**	**0.34-0.83**
	Wellness-related experience		
	None	-	
	1-10	**3.5**	**2.13-5.67**
	11-20	**9.97**	**5.29-18.79**
	21-30	**15.03**	**6.48-34.89**
	>30	**21.30**	**7.56-59.97**
Knowledge of TWH	Gender (Female)	**1.49**	**1.02-2.16**
	Race/ethnicity		
	White	-	
	African-American	**3.33**	**1.53-7.23**
	Hispanic	1.07	0.51-2.23
	Other	0.92	0.41-2.09
	Self-rated health		
	Excellent/Very Good	-	
	Good	1.26	0.86-1.85

Fair/Poor	**0.44**	**0.22-0.89**
Wellness-related experience		
None	-	
1-10	**1.76**	**1.06-2.91**
11-20	**1.94**	**1.01-3.73**
21-30	**2.72**	**1.19-6.18**
>30	**6.37**	**2.60-15.61**

Goodness of fit, p>0.05 for all models.

Sensitivity Analysis

Given the high odds ratios for years of wellness experience in the models for involvement and training, we questioned whether this variable might be highly correlated with either or both of these, acting more as a proxy or surrogate of the outcome variable rather than a "true" independent variable. To explore this further, we ran a sensitivity analysis in which the final multivariate models for involvement and training were run without including years of wellness experience. Table 8 presents the results for involvement and training after this sensitivity analysis. For the involvement outcome all categories of company size were significant. For the training outcome the age categories did not remain significant. These models had a high goodness of fit.

Table 8. Reduced multivariable models of associations between involvement and training in wellness, demographics, and employment and workplace variables, without "years in wellness" input (sensitivity analysis). Results presented as adjusted odds ratios (aOR) and 95% confidence intervals (CI). ASSE Region III Survey, 2017.

Outcome	Variable	aOR	95% CI
Involvement	Company size		
	≤100	-	
	101-500	**0.43**	**0.24-0.77**
	501-5000	**0.23**	**0.12-0.43**
	>5000	**0.17**	**0.03-0.94**
	Workplace wellness program	**16.90**	**2.13-133.84**
Prior training	Age group		
	<40	-	
	40-54	0.81	0.54-1.20
	>55	0.84	0.56-1.26

Knowledge

Participants that indicated having a workplace wellness program (510, 78%) were then asked to identify specific topics included in that program. Table 9 summarizes the frequency distribution of TWH-related topics. Those most commonly present related mostly to "traditional" cardiovascular risk factors (e.g., blood pressure, cholesterol, weight management, physical activity). More safety-related topics such as injury prevention, personal safety, ergonomics, noise and unsafe driving fell into the middle of the frequencies. In contrast, more recent and traditionally less occupationally-related topics, such as aging, violence prevention, pregnancy, skin and oral health, or risky hobbies occupied the lower end of the distribution, present in less than half of programs. It is also interesting to know that, as the frequency of "Yes" responses decreased, the percentage of "Don't Know" answers increased.

Table 9. Distribution of company wellness program content related to Total Worker Health™. Results presented as percent of responses among participants indicating their company had a wellness program (n=510). ASSE Region III Survey, 2017.

Topic	Yes	No	Don't Know
Physical Activity	87.3%	9.2%	3.5%
Cold/Flu Prevention	83.9%	10.8%	5.3%
Blood Pressure	82.5%	13.3%	4.1%
Weight Management	80.8%	13.9%	5.3%
Smoking Cessation	79.6%	14.5%	5.9%
Heart Health	79.2%	15.1%	5.7%
Cholesterol	78.6%	15.7%	5.7%
Nutrition	78.0%	16.3%	5.7%
Stress Management	74.3%	19.4%	6.3%
Injury Prevention	73.7%	18.8%	7.5%
Substance Abuse	72.0%	19.4%	8.6%
Personal Safety	66.9%	23.5%	9.6%
Ergonomics	64.1%	27.5%	8.4%
Work/Family Balance	60.2%	28.8%	11.0%
Noise	52.9%	34.7%	12.4%
Unsafe Driving	52.5%	33.7%	13.7%
Disease Management	52.2%	30.6%	17.3%
Violence Prevention	44.5%	37.6%	17.8%
Aging	42.2%	36.1%	21.8%
Pregnancy	40.2%	39.0%	20.8%
Skin Health	38.2%	38.8%	22.9%
Oral Health	36.7%	42.7%	20.6%
Risky Hobbies	12.4%	61.4%	26.3%

Involvement

Participants that responded being involved in either the implementation of or training in wellness (208, 32%) were asked to identify specific topics included in those programs. Table 10 summarizes the frequency distribution of TWH-related topics. Safety-related topics (injury prevention, personal safety, ergonomics, noise and unsafe driving) were identified by more than 64% of respondents. In contrast, cardiovascular risk factors and behaviors were indicated by only 25%-27%. With the exception of violence, which was identified by 41%, the less occupationally-related topics of aging, risky hobbies, dental/oral health and pregnancy were mentioned by only about 20% or less.

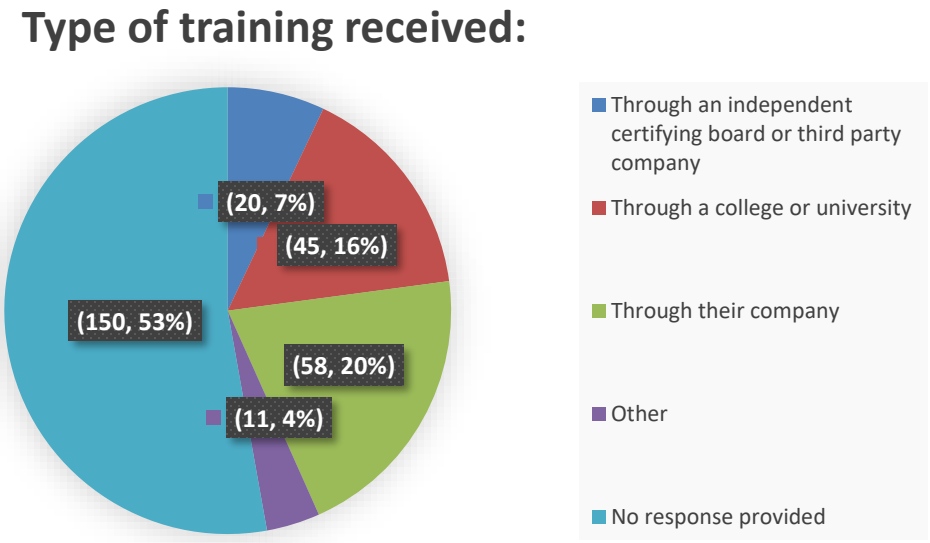
Table 10. Distribution of company wellness program content related to Total Worker Health™. Results presented as percent of responses among participants indicating they involved in the implementation of or training in wellness (n=208). ASSE Region III Survey, 2017.

Topic	Yes	No	Don't Know
Injury Prevention	88.5%	10.1%	1.4%
Personal Safety	85.1%	13.5%	1.4%
Ergonomics	82.7%	16.8%	0.5%
Noise	76.0%	21.6%	2.4%
Unsafe Driving	64.4%	34.1%	1.4%
Cold/Flu Prevention	46.6%	51.4%	1.9%
Physical Activity	45.2%	52.9%	1.9%
Violence Prevention	41.3%	56.3%	2.4%
Stress Management	34.6%	63.0%	2.4%
Blood Pressure	32.2%	65.9%	1.9%
Substance Abuse	32.2%	65.4%	2.4%
Heart Health	31.3%	66.8%	1.9%
Nutrition	26.9%	71.2%	1.9%
Weight Management	26.4%	71.2%	2.4%
Cholesterol	25.0%	72.6%	2.4%
Work/Family Balance	24.5%	73.1%	2.4%
Disease Management	23.6%	72.6%	3.8%
Smoking Cessation	22.6%	75.0%	2.4%
Skin Health	21.6%	75.5%	2.9%
Aging	19.2%	77.9%	2.9%
Risky Hobbies	16.3%	79.8%	3.8%
Oral Health	10.6%	86.5%	2.9%
Pregnancy	10.1%	87.0%	2.9%

Training

A total of 284 respondents indicated having received some form of training in workplace wellness. Figure 3 summarizes the distribution of training by where they had received this training. The greatest proportion (20%) of those who responded had been trained through their company, followed by college or university (16%). Less common (7%) was wellness training obtained through a third party. Over half (53%) did not respond as to what type of training they had received.

Figure 3. Distribution of wellness training by source of training. Results presented as percent of responses among participants indicating they had received some level of training in wellness (n=284). ASSE Region III Survey, 2017.



Comfort Level with TWH-Related Wellness Topics

All 654 survey participants were also asked, regardless of whether or not they are involved in their employers' wellness programs, to indicate their level of comfort for providing guidance on the TWH-related topics as part of their work responsibilities. Table 11~~Table 11~~ displays the results, sorted in descending order of frequency of the "Very Comfortable" response. Not surprisingly, over 50% felt most comfortable providing guidance on traditional safety topics, and much less often with others.

Table 11. Comfort level of safety professionals with these TWH topics sorted by percent of "very comfortable" responses. Results presented as percent of responses among all participants (n=654). ASSE Region III Survey, 2017.

Topic	Not at all comfortable	Not very comfortable	Neutral	Somewhat comfortable	Very comfortable
Injury Prevention	1.2%	1.5%	2.6%	18.5%	76.1%
Personal Safety	2.3%	1.5%	4.4%	19.1%	72.6%
Noise	1.5%	2.4%	4.9%	19.6%	71.6%
Ergonomics	2.0%	2.6%	6.4%	26.3%	62.7%
Unsafe Driving	4.1%	4.3%	9.9%	24.0%	57.6%
Physical Activity	6.7%	7.5%	19.0%	30.9%	35.9%
Violence Prevention	9.8%	11.6%	19.7%	27.1%	31.8%
Cold/Flu Prevention	9.2%	8.6%	16.4%	35.6%	30.3%
Risky Hobbies	12.5%	13.1%	24.5%	28.1%	21.7%
Work/Family Balance	12.5%	12.8%	27.8%	25.1%	21.7%
Blood Pressure	15.9%	17.6%	17.7%	27.2%	21.6%
Stress Management	11.2%	12.2%	28.6%	27.2%	20.8%
Substance Abuse	18.8%	18.7%	24.5%	17.7%	20.3%
Smoking Cessation	17.9%	19.3%	25.4%	17.6%	19.9%
Weight Management	15.7%	17.1%	24.0%	23.2%	19.9%
Heart Health	14.4%	16.5%	23.1%	26.8%	19.3%
Nutrition	13.0%	17.6%	23.4%	26.8%	19.3%
Cholesterol	17.6%	20.5%	20.2%	24.9%	16.8%
Skin Health	16.1%	19.6%	24.8%	23.7%	15.9%
Aging	19.0%	21.9%	22.6%	22.3%	14.2%
Disease Management	21.9%	22.0%	24.2%	19.4%	12.5%
Oral Health	20.0%	22.5%	28.9%	17.0%	11.6%
Pregnancy	34.6%	22.3%	22.9%	10.9%	9.3%

DISCUSSION

In this survey we asked a straightforward question of safety professionals: *Are you familiar with NIOSH's Total Worker Health Initiative?* The results revealed that the majority of safety professionals, over 70%, are not familiar with the TWH program. The main correlates of TWH knowledge were being female, African-American and having increasing years of experience in wellness. Poor self-rated health was inversely associated with knowledge of TWH.

The TWH initiative, which ideally is meant to protect and improve the lives of workers and have a firm grounding in and connection to health and safety, should not go unrecognized by the safety professional. Safety struggles to measure the impact, while TWH works on measuring and assessing the well-being of the individual employee (Chari, 2018), without burdening the employee with undue responsibility for company outcomes by stressing individual worker health behaviors. Focusing on organization of work is an employer responsibility (Howard, 2016). While research that includes safety in forwarding the TWH agenda is increasing (Aryal, 2019; Watkins, 2018), we were unable to find any prior literature addressing the levels of knowledge, involvement or training of safety professionals in this topic.

Women and African Americans were more likely to be familiar with TWH. Women tend to be cognizant of their health and how it affects aspects of their lives and their families' lives, including economic well-being, education and employment. They tend to be the central point of care for their families as well (Institute for Women's Policy Research, 2015).

Perhaps their interest in these health and well-being aspects has led them to be more aware of TWH than males. Review of the literature did not uncover reasons as to why African Americans would be more familiar with TWH than other ethnicities. This remains unclear. It would be interesting to further explore why and how these safety professionals are more likely to know about TWH, as compared to men and other ethnicities.

In our study, knowledge of the TWH initiative was correlated with self-reported health. Poor diet and low physical activity are behavioral risk factors that can lead to chronic health conditions (Sangachin, 2018). It may be that persons with suboptimal health and unhealthy lifestyle factors isolate themselves from receiving the support and education required to modify the risky behaviors and improve their health (Sangachin, 2018). Yet interventions targeting psychosocial risk factors, smoking cessation, dietary habits and ergonomic improvements can reverse these behavioral risk factors and improve overall employee health (Feltner, 2016; Sangachin, 2018). Concerted attempts to increase awareness of TWH among this subgroup of safety professionals, which addresses many of these lifestyle factors, could be an important step towards better health,

The number of years of experience in wellness was a strong correlate of knowledge of TWH. Perhaps this is because being regularly involved in wellness increases opportunities for exposure to this new concept as professionals try to stay updated in the wellness field. As such, this would argue for employers making a greater commitment to embrace the TWH concept and making it more visible company-wide, going beyond a relegation to the wellness program.

There were few statistically significant determinants of both involvement in wellness program activities and training in wellness in this study, especially after removing the variable "wellness-related experience" in the sensitivity analysis. For involvement in wellness activities, the strongest correlate was having a workplace wellness program, which is intuitive. However, increasing company size showed an inverse relationship with this outcome, i.e., the larger the company, the less likely safety professionals were to be involved in wellness activities. Although we were unable to identify any literature that could explain this finding, one possibility is that large companies, because of their greater resources, have persons specifically trained in wellness who bear the full responsibility for carrying out this program, and thus rely less on safety professionals contributing to it. In the final model for prior training in wellness, increasing age was associated with a decreased likelihood of having previously received wellness training (although this significance later disappeared in the sensitivity analysis). The popularity of TWH and greater focus on worker well-being are on the rise, but it is a new topic. In recent years, tools have been developed to implement TWH agenda items. One of these tools focuses on younger workers, aged 15 to 24 years, offering a training program as they begin their career. Entitled *Promoting U through Safety and Health (PUSH)*, NIOSH developed this program for all workers and not just safety professionals (Aryal, 2019). The recent genesis of the TWH initiative and these tools could partially explain the correlation between younger age and having had training in wellness. Designing TWH programs and activities that are inclusive and/or use tools that appeal to older age groups could help increase awareness and engagement of TWH.

Within the spectrum of wellness topics, survey respondents identified several that merit further comments. Several have been the target of intervention studies that show how addressing both occupational and nonoccupational risk factors can improve well-being and get us closer to the TWH goal. Improved dietary and physical activity habits are part of the TWH spectrum of well-being objectives, and a number of workplace intervention studies have been published. Two recent intervention studies for increasing worksite-based health promotion used the construction industry as their focus group, which makes sense since construction injuries and fatalities tend to run higher rates than general industry [https://www.osha.gov/oshstats/commonstats.html]. Peters et al (2018) conducted a matched-pair cluster randomized control trial over 10 worksites, in which the intervention consisted of improving ergonomic practice on the worksite and health coaching. This particular outreach was done through an ergonomics program, a traditional safety topic. While the group of workers that received the intervention reported less new pain and fewer injuries, there were added benefits, including better diet and more physical activity. Anger (2018) studied the effects of an intervention using computer based training for supervisors with scripted training "Get Healthier" cards for supervisors and employees to discuss, self-monitoring and participating in small work groups outside of the workplace (Kirkpatrick, 2016). Thirty-five workers participated with the aim of showing positive impacts using Kirpatrick's four levels of training evaluation (Kirkpatrick, 2016). Results showed that the interventions led to significant improvement in making good dietary decisions and increased physical exercise and muscle toning, while including family lifestyle support tactics over a 14 week period (Anger, 2018).

Ergonomics and exercise are a common theme in workplace intervention research. Carr et al. (2016) also performed a three week intervention using ergonomic workstations. The intervention included securing an elliptical training device to an office chair so that an employee could pedal throughout the workday. In combination with rest and variations of posture, they were able to increase the overall physical activity of the treatment group and light physical activity was significantly higher than the control group by the end of the study (Carr, 2016).

The previously mentioned intervention studies were all conducted by researchers, not employees of the company. This could limit generalizability of their findings. It was not identified which employees or department would continue these programs, if at all, in the companies after the research was completed.

Integration studies, i.e. those that bring together safety and wellness, are scarce. One case study examined this at a large aluminum rolling plant in a rural area (Watkins, 2018). The questionnaire and follow up interview found that wellness representatives and safety representatives did not spend enough time, nor did they have the time, to create a fully integrated program, but believed that working together would lower injury rates and associated costs, as well as improve employee health. However, this study included one lone company with one wellness employee and one safety employee. Further research is needed to determine the effectiveness of this effort.

Stress is not only an important risk factor of workers' compensation claims and associated costs (Schwatka, 2017), but also a predictor of whether someone will participate in workplace wellness programs (Sangachin, 2018). Our results show that stress is addressed

in workplace wellness programs about 2/3 of the time, but that less than 35% of safety professionals are involved with stress management in their own programs. Furthermore, since less than half of safety professionals feel comfortable with this topic, this supports the idea that TWH should have more of a holistic company approach.

The low rates of knowledge and training in TWH found in our study underscore the need for increased awareness of TWH. Safety professionals' involvement with TWH is moderately high for traditional safety topics, but low in other areas. Training opportunities in TWH are minimal and credentialing is non-existent. Our findings reveal an opportunity to develop materials and training specifically targeting safety professionals, perhaps leading to some level of credentialing in TWH or adding TWH content into an existing credentialing program.

Safety professionals may face barriers when trying to incorporate TWH. Of the TWH topics we examined, 39% of respondents reported being involved with the training or implementation of programs in their company. The top four topics that over 75% of safety professionals participated in are "classical" safety topics: injury prevention, personal safety, ergonomics, and noise. Five of the less frequently reported topics, yet also aligned with overall worker well-being, included skin health, aging, risky hobbies, oral health and pregnancy. Violence prevention, a "nontraditional" safety topic was ranked in the top ten. However, the 42% of respondents who indicated being involved in training on this topic was similar to the 44% who reported there was a violence prevention program in their workplace. This suggests that violence prevention is being incorporated into employer training procedures. Increased training and training materials are becoming more frequent and

relevant to the average worker with the increase of active shooter awareness (NFPA 3000, 2018).

Approximately 44% (n=284) of respondents said they had received some training in wellness. But it is possible that some respondents considered some of the traditional safety topics as being a part of wellness. Of those receiving wellness training, the largest proportion (43%) did so through their employer. What we were unable to elucidate, though, is whether this employer-based training included concepts of TWH intentionally or unintentionally, or supported continued education to bring TWH topics into the company. Thirty-four per cent indicated receiving wellness training through a college or university, suggesting that perhaps it was part of a formal academic degree program. If this were true, since TWH is a relatively new NIOSH initiative (2012), it is likely that only the most recent graduates would have had an opportunity to have received some content in TWH. Many schools are only now developing their TWH academic programs (Tamers, 2019). Recent graduates would suggest a younger age group, although many older workers have returned to school, as recent articles have reported (He, 2016). This is supported by our findings of increasing age being inversely associated with prior training in wellness.

Formal academic training in TWH in the U.S. is currently limited to TWH certificate programs at the University of Colorado [http://www.ucdenver.edu/academics/colleges/PublicHealth/Academics/degreesandprograms/certificate/Pages/TotalWorkerHealth.aspx] and Northern Kentucky University [https://inside.nku.edu/artsci/departments/psychology/graduate/total-worker-health-

certificate.html] (Tamers, 2019) and a recently approved (2018) doctoral training program in TWH at The University of Texas School of Public Health in Houston.

There are other opportunities to obtain training in TWH, including professional safety conferences and a NIOSH-sponsored TWH webinar series [https://www.cdc.gov/niosh/twh/webinar.html]. It is likely that more formal training programs will emerge in coming years (Tamers, 2019).

Who should carry the mantle for increasing awareness and training in TWH? There has been discussion that TWH should lie within the disciplines of occupational medicine and occupational nursing, specifically the occupational health nurse (Campbell, 2015). The rationale is that nurses are educated in science, have clinical backgrounds, experience in training workers in healthy lifestyles and are patient advocates. The inclusion of several health-related TWH topics, including obesity, sleep disorders, cardiovascular disease, and depression, that typically do not fall within the realm of safety, would lend further support to occupational health taking the lead. Yet TWH thought leaders continually note that TWH should not be focus on the individual worker, but rather on creating a safe work environment that supports healthy choices (Schill, 2016), with the goal of achieving worker well-being so that when workers do leave the workplace for the day, they are truly as healthy or healthier than when they arrived. This implies a more holistic approach that integrates medicine, nursing, safety, health promotion and wellness, and should not be "owned" by any single group (Schill, 2017). In our study, the single strongest correlate of knowledge of TWH was the number of years that safety professionals had been involved in wellness activities. This

finding is critical, as it underscores a role for these professionals in this interdisciplinary approach to TWH.

This survey had several strengths. Among these, the large sample size (more than twice the desired minimum sample size) was sufficient to perform meaningful statistical analyses. In addition, the study was conducted with the participation of the ASSE Region III, which includes the states of Texas, Oklahoma and Arkansas. ASSE is the largest professional association for safety professionals in the United States and was a valuable recruitment source of participants, further bolstered by support from the local ASSE chapter, encouraging regional participation. There were also limitations to this study population. Since ASSE does not provide demographic information on its members, we were unable to determine how representative the study sample was of the target ASSE membership. Moreover, despite being such a large organization, ASSE Region III (and the results) may not be reflective of the entire United States. In addition, it is possible that we could have received multiple completed surveys from safety professionals employed by the same companies or industries. Although information on type of industry was collected, specific company names and locations were not, so we were unable to determine whether the distribution by employer was representative.

When discussing health issues that affect people both at home and work, the lines between safety and healthcare begin to blur. Involving safety professionals in TWH matters brings up potential HIPAA issues, such as confidentiality of worker medical information, which were not addressed in this survey. Workers, when being asked about their personal well-being, may be wary of providing this data to safety personal or other nonmedical staff at

their companies. It may also become too oppressive or taxing if having to report what they consider to be personal health information on a regular basis to their employer (Tamers, 2018). We did not address how, in an attempt to change a company culture towards "better health", wellness initiatives and participation are enforced, especially those that may spill over into the home environment, such as smoking cessation. Many workplace wellness programs offer incentives such as reduced insurance premiums for completing healthcare actions, regularly undergoing preventive medical examinations and/or participating in exercise programs. We did not address the implications that employees may feel pressured or coerced into participating in wellness for the sake of increased health benefits and/or monetary awards.

In addition to the limitations mentioned regarding the representativeness of the study population, other limitations should be considered. Timing of the survey administration may have had an effect, as it coincided with recovery from the impact of Hurricane Harvey in August and September 2017; this affected much of ASSE Region III. Participation in ASSE events (e.g., regular meetings), which are outside of normal job duties, was likely lower than average during this time. In some cases, traditional meeting places had been shut down due to damage and often people could not travel due to recovery efforts or effects of the hurricane. This may have impacted whether the announcement of the survey reached a potential participant in a timely manner and the time available for survey completion as well, although we were unable to determine the magnitude of this impact, if any. Another limitation could stem from the degree of thoroughness of the survey items, which may not have included all of the potential determinants of wellness or TWH knowledge. Not asking

about these could result in missing some important associations, confounders or effect modifiers in the multivariate regression analyses. The cross-sectional survey also allowed for ease of dropping out of the survey or not responding at all.

In conclusion, assuming these results are generalizable to the U.S. professional safety community, the study has interesting findings with important implications. Despite three-quarters of safety professionals reporting formal wellness activities in their company, most had never heard of the TWH initiative. This identifies the need for increasing awareness and training in TWH. Secondly, within TWH, safety professionals are mainly involved with topics that are typically "safety" in nature, but are not engaged in topics relating to more health-oriented topics. Both of these findings present an opportunity for a greater degree of inter-professional engagement of safety professionals with colleagues in occupational health, wellness and health promotion. Safety professionals either need further training, since over 55% have no formal training in these additional TWH topics, or their role in TWH needs to be further defined by their expertise or combined with the expertise of other professionals.

These conclusions suggest the following needs and opportunities:

- NIOSH should increase efforts and educational outreach resources towards the safety professional community in regards to its TWH initiative, as the results suggest there is a significant lack of awareness. In particular, the existing NIOSH Education and Research Center (ERC) infrastructure should be actively engaged and incentivized to address this important educational outreach need.
- Professional organizations (such as ASSE and perhaps others) could specifically target the topic of TWH as part of its professional education outreach mission for its

membership. Specific emphasis should be placed on what topics are appropriate to be involved with and which should reside within occupational medicine or other specialties.

- An opportunity exists for safety professionals to become a resource for bridging the siloes in companies to further the TWH cause.

The TWH initiative holds the potential for protecting and improving the overall health of workers by addressing health-related issues that span the workplace and home. But safety professionals appear to be in need of training and education about the broader range of health and safety considerations and the boundaries wherein their span of control appropriately resides. Through aggressive training and education, and a greater degree of inter-professional collaboration, the safety professional profession holds the potential to augment the TWH initiative to improve the lives of workers across the country.

Appendix A: SURVEY[2]

Current instrument: **Dissertation Survey** Preview instrument Return to edit view

NOTE: Please be aware that branching logic and calculated fields will not function on this page. They only work on the survey pages and data entry forms.

* This field will NOT be displayed on the survey page.

Participant ID

Welcome

As a member of ASSE Region III, you are invited to take part in this doctoral student research project being conducted by Jennifer Laine, MPH, CPH, CFI and DrPH candidate at The University of Texas School of Public Health. Your decision to take part in this survey is voluntary. You may opt not to take the survey or stop the survey at any time.

This research project has been reviewed and approved by the University of Texas Health Science Center at Houston Committee for the Protection of Human Subjects (IRB) and has been assigned the approval number HSC-SPH-17-0359.

The total amount of time required to complete this survey is 10-14 minutes.

There are no anticipated or intended risks due to participation in this survey.

Participant names and other personal identifiers will not be collected. Any written responses that indicate institution names or other identifiers will be redacted. Only the survey results will be tallied and analyzed for the purpose of this study, which may eventually be published in a peer reviewed journal such as Professional Safety.

As a thank you for completing the survey, you have the option to receive a $5 gift card from Starbucks. Agreeing to receiving the gift card is separate from your survey responses. Your responses will remain confidential.

If you have any questions about this survey, please feel free to contact Jennifer Laine at jennifer.c.laine@uth.tmc.edu. Please note that a circle or box must be checked for questions that are marked with "must provide value". You can change your answers by marking another circle or box, or by clicking on "reset".

Thank you for considering donating your time and effort to strengthen our collective body of knowledge as Safety Professionals and aid students in completing their research goals.

Are you a currently practicing safety professional?
* must provide value

Yes

No [End Survey]

[2] The majority of the wellness topics listed and the question on personal health were taken from the EMC Insurance Wellness Survey (Employers Mutual Casualty Company, 2014).

Don't know

reset

Do you know if your place of employment has a wellness program of any sort for its employees?
* must provide value

Yes
No
Don't know

reset

Does your wellness program address the following topics?

	Yes	No	Don't know	
Aging * must provide value				reset
Blood Pressure * must provide value				reset
Cholesterol * must provide value				reset
Cold/Flu Prevention * must provide value				reset
Skin Health * must provide value				reset
Disease Management * must provide value				reset
Ergonomics * must provide value				reset

Heart Health * must provide value				reset
Injury Prevention * must provide value				reset
Noise * must provide value				reset
Nutrition * must provide value				reset
Oral Health * must provide value				reset
Personal Safety * must provide value				reset
Physical Activity * must provide value				reset
Pregnancy * must provide value				reset
Risky Hobbies * must provide value				reset
Smoking Cessation * must provide value				reset

Stress Management
* must provide value

reset

Substance Abuse
* must provide value

reset

Unsafe Driving
* must provide value

reset

Violence Prevention
* must provide value

reset

Weight Management
* must provide value

reset

Work/Family Balance
* must provide value

reset

Other topics your wellness program addresses:

Are you involved with training or implementing the wellness program at your place of employment?
* must provide value

Yes
No
Don't know

reset

Please check which of the following wellness areas that you are training or implementing programs for as a practicing safety professional at your place of work:

	Yes	No	Don't know
Aging * must provide value			

reset

Blood Pressure
* must provide value

reset

Cholesterol
* must provide value

reset

Cold/Flu Prevention
* must provide value

reset

Skin Health
* must provide value

reset

Disease Management
* must provide value

reset

Ergonomics
* must provide value

reset

Heart Health
* must provide value

reset

Injury Prevention
* must provide value

reset

Noise
* must provide value

reset

Nutrition
* must provide value

reset

Oral Health
* must provide value

reset

Personal Safety
* must provide value

reset

Physical Activity
* must provide value

reset

Pregnancy
* must provide value

reset

Risky Hobbies
* must provide value

reset

Smoking Cessation
* must provide value

reset

Stress Management
* must provide value

reset

Substance Abuse
* must provide value

reset

Unsafe Driving
* must provide value

reset

Violence Prevention
* must provide value

reset

Weight Management
* must provide value

reset

Work/Family Balance
* must provide value

reset

Other wellness topics that you are training or implementing at your place of work:

Have you received any formal training in wellness?
* must provide value

Yes
No
Don't know

reset

Please select the type of training you ha received:
* must provide value

Through your company
Through a college or university
Through an independent certifying board or third party company
Other

reset

Whether or not you are involved in wellness for your employer, how comfortable would you be providing guidance on the following topics to other employees at your place of business?

	Not at all comfortable	Not very comfortable	Neutral	Somewhat comfortable	Very comfortable
Aging * must provide value					

reset

Blood Pressure * must provide value						reset
Cholesterol * must provide value						reset
Cold/Flu Prevention * must provide value						reset
Skin Health * must provide value						reset
Disease Management * must provide value						reset
Ergonomics * must provide value						reset
Heart Health * must provide value						reset
Injury Prevention * must provide value						reset
Noise * must provide value						reset
Nutrition * must provide value						reset

	Oral Health * must provide value					reset
	Personal Safety * must provide value					reset
	Physical Activity * must provide value					reset
	Pregnancy * must provide value					reset
	Risky Hobbies * must provide value					reset
	Smoking Cessation * must provide value					reset
	Stress Management * must provide value					reset
	Substance Abuse * must provide value					reset
	Unsafe Driving * must provide value					reset
	Violence Prevention * must provide value					reset

Weight Management
* must provide value

reset

Work/Family Balance
* must provide value

reset

Other wellness topics that you feel comfortable providing guidance on:

For the next set of questions, please answer whether the presented scenario would prompt you to take action:

If, in the course of your work as a safety professional, you came upon a worker w... improper posture while sitting at their desk, would you do anything?
* must provide value

- No
- Yes
- Don't know

reset

If yes, select your best choice from this list of actions:
* must provide value

- Discuss the issue with the employee
- Discuss your thoughts on the issue with your supervisor
- Participate in the development of an outreach program to address with the department or company at large
- Refer the employee to a safety or wellness program
- Don't know
- Other
- None of the above

reset

Please describe "other" action that you might take:

If, in the course of your work as a safety professional, you came upon a worker using improper lifting techniques, would you do anything?
* must provide value

- No
- Yes
- Don't know

reset

If yes, select your best choice from this list of actions:
* must provide value

- Discuss the issue with the employee
- Discuss your thoughts on the issue with your supervisor
- Participate in the development of an outreach program to address with the department or company at large
- Refer the employee to a safety or wellness program
- Don't know
- Other
- None of the above

reset

Please describe "other" action that you might take:

If, in the course of your work as a safety professional, you noticed a worker eating foods generally known to be unhealthy, would you do anything?
* must provide value

- No
- Yes
- Don't know

reset

If yes, select your best choice from this list of actions:
* must provide value

- Discuss the issue with the employee
- Discuss your thoughts on the issue with your supervisor
- Participate in the development of an outreach program to address with the department or company at large
- Refer the employee to a safety or wellness program
- Don't know
- Other
- None of the above

reset

Please describe "other" action that you might take:

If, in the course of your work as a safety professional, you heard a worker listening to music at a high volume, would you do anything?
* must provide value

- No
- Yes
- Don't know

reset

If yes, select your best choice from this list of actions:
* must provide value

- Discuss the issue with the employee
- Discuss your thoughts on the issue with your supervisor
- Participate in the development of an outreach program to address with the department or company at large
- Refer the employee to a safety or wellness program
- Don't know
- Other
- None of the above

reset

Please describe "other" action that you might take:

If, in the course of your work as a safety professional, you encounter an employe that you believe has experienced a noticeable weight gain or loss, would yo do anything?
* must provide value

- No
- Yes
- Don't know

reset

If yes, select your best choice from this list of actions:
* must provide value

- Discuss the issue with the employee
- Discuss your thoughts on the issue with your supervisor
- Participate in the development of an outreach program to address with the department or company at large
- Refer the employee to a safety or wellness program
- Don't know
- Other
- None of the above

reset

Please describe "other" action that you might take:

If, in the course of your work as a safety professional, you noticed a worker with a noticeably altered gait, would you do anything?
* must provide value

- No
- Yes

	Don't know reset
If yes, select your best choice from this list of actions: * must provide value	Discuss the issue with the employee Discuss your thoughts on the issue with your supervisor Participate in the development of an outreach program to address with the department or company at large Refer the employee to a safety or wellness program Don't know Other None of the above reset
Please describe "other" action that you might take:	
If, in the course of your work as a safety professional, you came upon a worker smoking in a designated smoking area, would you do anything? * must provide value	No Yes Don't know reset
If yes, select your best choice from this list of actions: * must provide value	Discuss the issue with the employee Discuss your thoughts on the issue with your supervisor Participate in the development of an outreach program to address with the department or company at large Refer the employee to a safety or wellness program Don't know Other None of the above reset
Please describe "other" action that you might take:	
If, in the course of your work as a safety professional, a worker confided in you that they suspected another worker was beir treated badly outside of the workplace h	No

friend(s) or a family member(s), would y... do anything?
* must provide value

- Yes
- Don't know

reset

If yes, select your best choice from this list of actions:
* must provide value

- Discuss the issue with the employee
- Discuss your thoughts on the issue with your supervisor
- Participate in the development of an outreach program to address with the department or company at large
- Refer the employee to a safety or wellness program
- Don't know
- Other
- None of the above

reset

Please describe "other" action that you might take:

Are you familiar with NIOSH's Total Wor... Health initiative?
* must provide value

- Yes
- No
- Don't know

reset

How would you rate your personal overa... health compared to other people your ag...
* must provide value

- Excellent
- Very good
- Good
- Fair
- Poor

reset

Please answer the following demographic questions:

What is your age group?
* must provide value

What is your gender?
* must provide value

What best describes your ethnic background? * must provide value	
Are you currently employed?	Yes No reset
How many years have you been in the workforce? * must provide value	
How many years of experience do you have working in safety? * must provide value	
How many years of experience do you have working in wellness? * must provide value	
Do you smoke?	Yes No reset
What kind of business or industry do you work for? * must provide value	
What is the approximate number of employees at your company? * must provide value	

Appendix B: ASSE REGION III SUPPORT FOR RESEARCH LETTER

TO: Robert Emery, DrPH, CSP
Professor of Occupational Health
The University of Texas School of Public Health

FROM: Gerry Luther, CIE, OHST
Assistant Regional Vice President, ASSE Region III Committee on Professional Development

DATE: December 21, 2016

RE: Support for Ms. Jennifer Laine's Doctoral Research Proposal

I am writing on behalf of the leadership team of the American Society of Safety Engineers (ASSE) Region III to express our endorsement for Ms. Jennifer Laine's proposal to conduct an email research survey of our membership regarding their awareness and involvement with workplace wellness initiatives. ASSE Region 3 represents over 4,200 safety professionals who work in the states of Texas, Oklahoma, and Arkansas. Anecdotal evidence suggests that the safety professionals we serve are becoming more involved with wellness efforts, and an objective assessment of this level of involvement could serve to help us devise professional training programs to assist the profession in the improvement of overall worker health.

Once Ms. Laine's research proposal is approved through the necessary university review boards, we will work with her to circulate the survey web link to our members. Once the data is collected and analyzed we will arrange for her to make a presentation to describe her findings and recommendations. We will also encourage membership participation through our regular web- based communications to our members.

If any additional information may be need from ASSE Region III in support of Ms. Laine's project, please do not hesitate to contact me. We truly appreciate The University of Texas School of Public Health's dedication to helping us improve the health and safety of the communities we serve.

Gerry
Luther
Assistant RVP, Professional
Development
Region 3
ASSE

CC: Steven Gray, Region III Vice
President

Appendix C: IRB DOCUMENTATION

UTHealth
The University of Texas
Health Science Center at Houston

Committee for the Protection of Human Subjects
6410 Fannin Street, Suite 1100
Houston, Texas 77030

Dr. Jennifer Laine
UT-H - School of Public Health - Doctor of Public Health (Occup & Environ Hlth/Aeorspace Med)

May 03, 2017

HSC-SPH-17-0359 - *The Prevalence of Practicing Safety Professionals' Knowledge, Involvement, and Competency Associated with Workplace Wellness Programs*

The above named project is determined to qualify for exempt status according to 45 CFR 46.101(b)

CATEGORY #2 *: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:*

a. information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; AND ,

b. any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

CHANGES: Should you choose to make any changes to the protocol that would involve the inclusion of human subjects or identified data from humans, please submit the change via iRIS to the Committee for the Protection of Human Subjects for review.

INFORMED CONSENT DETERMINATION:
Waiver of Documentation of Informed Consent

INFORMED CONSENT: When Informed consent is required, it must be obtained by the PI or designee(s), using the format and procedures approved by the CPHS. The PI is responsible to instruct the designee in the methods approved by the CPHS for the consent process. The individual obtaining informed consent must also sign the consent document. Please note that only copies of the stamped approved informed consent form can be used when obtaining consent.

HEALTH INSURANCE PORTABILITY and ACCOUNTABILITY ACT (HIPAA):
Exempt from HIPAA

STUDY CLOSURES: Upon completion of your project, submission of a study closure report is required. The study closure report should be submitted once all data has been collected and analyzed.

Should you have any questions, please contact the Office of Research Support Committees at 713-500-7943.

Appendix D: PRESENTATIONS AND POSTERS

- 2018 Region III ASSP PDC, “Results from Safety Professional Survey on Wellness Programs”, Oklahoma City, OK, August, 2018
- 8th Annual Public Health Camp at UT Health San Antonio, “Public Health Preparedness with Fire and Life Safety”, July 2018
- 12th Annual Alaska Occupational Safety Summit, “The Prevalence of Practicing Safety Professionals’ Knowledge and Involvement with Workplace Wellness Programs”, October 2017
- “Fire and Life Safety”, UTHealth Classified Staff Council, June 2017
- Proposal Defense, “The Prevalence of Practicing Safety Professionals’ Knowledge, Involvement, and Competency Associated with Workplace Wellness Programs”, April 2017
- ASSE Region III PDC, “The Prevalence of Safety Professionals’ Knowledge and Involvement with Workplace Wellness Programs”, San Antonio, TX, August 2016
- Environmental Health and Safety Trade Seminar, “The Prevalence of Practicing Safety Professionals’ Knowledge and Involvement with Workplace Wellness Programs”, Galveston, TX, June 2016
- Occupational Medicine Journal Club Presenter, Houston, Texas, April 2014
- AIHce 2014, “Ergonomic Evaluation of the New Chemical Protective Suit for Military Emergency Responders”, San Antonio, Texas, May 2014 (poster-award)
- Safety and Industrial Hygiene Professional Development Conference, Houston, Texas, April 2014
- Greater Houston Industrial Hygiene Council, Heat Stress Evaluation of New Fabric Technology Houston, Texas, October 2013
- Environmental and Occupational Health Science Seminar Series, Heat Stress Evaluation of New Fabric Technology, University of Texas School of Public Health, September 2013
- AIHce 2013, “Hydration Measurements Before and After Heat Stress Testing Using a Freezing Point Osmometer and a Personal Hydration Management System”, Montreal, Canada, May 2013 (poster-award)
- Occupational Medicine Journal Club Presenter, NIOSH Trainee, Houston, Texas, February 2013

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