

Highlights from occupational safety and health continuing education needs assessment

Joshua G. Scott PhD^{1,2}  | Erin Shore MPH^{1,2} | Carol Brown PhD^{1,2} |
Carisa Harris PhD^{3,4} | Mitchel A. Rosen PhD⁵

¹Center for Health, Work & Environment at the Colorado School of Public Health, Aurora, Colorado

²University of Colorado Denver, Anschutz Medical Campus, Aurora, Colorado

³Department of Medicine, University of California, San Francisco, California

⁴School of Public Health, University of California, Berkeley, California

⁵Rutgers School of Public Health, Piscataway, New Jersey

Correspondence

Joshua G. Scott, CU Anschutz Medical Campus, 13001 E. 17th Place, Ste W3111, Aurora, CO.

Email: joshua.scott@cuanschutz.edu

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Abstract

Background: There is a lack of trained Occupational Safety and Health (OSH) professionals able to meet the current and future demand for such expertise in the United States. Many OSH professionals are required to perform duties, which are outside of their primary area of expertise; thus, expansion of continuing education (CE) may be necessary to properly train individuals for new OSH responsibilities.

Methods: The National Institute for Occupational Safety and Health-funded Education and Research Centers collectively developed and distributed an internet-based survey to gauge the CE needs and interests of the OSH workforce.

Results: A total of 2064 responses were received. The most common primary professions represented were safety (28%), occupational health nursing (18%), and industrial hygiene (12%). The majority of respondents (61%) reported that they perform work activities outside of those associated with their primary OSH profession. The CE offerings with the highest interest among respondents were related to safety. Other courses with high levels of interest included topics such as legal issues in OSH (88%), compliance (88%), risk management (85%), OSH management (83%), risk communication (83%), and communication in accident prevention (81%). Health and safety leadership (82%), health and safety culture (78%) and total worker health (74%) were also significant interests.

Conclusions: It is important to be responsive to the evolving needs of the OS&H community. Developing relevant courses will help ensure that OS&H professionals have access to the training they need to perform essential job functions and keep employees healthy and safe.

KEYWORDS

continuing education, interdisciplinary, occupational safety and health, professional development, total worker health, training

1 | INTRODUCTION

The Occupational Safety and Health (OSH) Act of 1970 mandated that the National Institute for Occupational Safety and Health (NIOSH) aid in the education, training and “supply” of health and safety personnel to successfully carry out all of the provisions of the

Act.¹ In 1977 NIOSH funded the first nine Education and Research Centers (ERCs) as an initial step toward the mandate to play a key role in workforce development. There are now 18 funded centers that span the United States.²

Continuing education (CE) or professional development courses delivered to working and nonworking professionals outside of the traditional undergraduate and graduate OSH academic programs is one core mechanism the ERCs use to develop the workforce in OSH. In 2011 The National Assessment of the Occupational Safety and Health Workforce Report (also known as the WESTAT Report) documented a deficiency in the supply of trained OSH professionals to meet the current and future demand in the United States.³ Many ERCs and other training centers used the information provided in this report to design and develop new CE programs.² The WESTAT report identified a shift in the interdisciplinary nature of safety and health education, noting that many professionals were required to perform duties outside of their primary area of training. In addition, a recent publication by Peckham and colleagues called for a more “holistic and public health-oriented” training model, reiterating the need for more interdisciplinary educational efforts.⁴ However, the data for the WESTAT Report were collected nearly a decade ago; new data are needed to describe current workforce training needs and interests to identify if previously identified trends persist.

In June 2011, NIOSH launched the Total Worker Health (TWH) Program, with the assertion that “scientific evidence now supports... that risk factors in the workplace can contribute to health problems previously considered unrelated to work.”⁵ Nearly a decade earlier, in June 2003, TWH was introduced through the Steps to a Healthier Workforce Initiative, which funded the first three Centers of Excellence and several inaugural TWH white papers. In the WESTAT survey, some options were available for respondents to indicate training needs in wellness and health promotion, but nothing on TWH or peripheral topics such as organizational culture or health leadership were asked. In addition, relatively few education and academic professionals were obtaining cross-disciplinary training on these topics.³ Given the changing and evolving needs of OSH professions and professionals, it is important to periodically assess uptake and demands for CME to provide relevant and timely educational experiences.

NIOSH-funded ERCs are required to periodically collect state- and regional-level CE needs and interest data to demonstrate the demands for specific training, the resources needed, and to help guide their programming. In the last decade, there has not been funding for a national CE survey. Recognizing this need, NIOSH-funded ERCs developed and distributed a national CE needs assessment in 2017 (The full needs assessment is located in Appendix A). The purpose of this survey was to assess the national training and education needs and preferences of OSH and associated professions to inform CE development and dissemination. This study highlights trends derived from the survey and reports key findings that can be used for future OSH CE course planning.

2 | METHODS

The 2017 ERC Continuing Education Needs and Interest Assessment aimed to answer several important questions, including:

- What is the local, regional, and national landscape for CE needs and interests?
- Are professionals seeking CE outside of their primary work?
- What industries, occupations, and professions are most interested in CE?
- What CE topics and review courses are most relevant to OSH professionals?
- What type of courses and course content do professionals prefer?
- How do professionals search for and receive CE information?
- What costs do professionals expect for various types of CE offerings?

To inform question development, the researchers created a draft question set by pulling previously-used items from a smaller, unpublished 2015 national ERC needs assessment, incorporating items from the 2011 WESTAT Report, and adding additional items on emerging educational topics. Items identifying industry, primary profession, and secondary profession were cross-referenced and mapped to the National Occupational Research Agenda Sectors and Cross Sectors to confirm results could be applied, where applicable, to the NIOSH Burden, Need and Impact framework. A draft of the needs assessment was distributed to all 18 ERCs for feedback before being finalized. The final survey was formatted in Qualtrics (Provo, Utah) survey software for online distribution, and consisted of 27 questions on the demographics of the respondents, an extensive list of CE topics of potential interest, the organizational resources devoted to CE, and preferences for different learning modalities. A copy of the original survey can be found in Appendix A.

All ERCs distributed the online survey to their contacts and listservs. The needs assessment was distributed to NIOSH-funded TWH Centers of Excellence, and TWH Affiliates. Other partner organizations including local American Industrial Hygiene Association chapters, the Association of Occupational Health Professionals in Healthcare, the American College of Occupational and Environmental Medicine, the American Society of Safety Professionals, and the Society for Human Resource Management also distributed the survey to their networks. No formal marketing or dedicated advertising dollars were used to distribute the survey or solicit responses. The survey was open from August 29, 2017 to December 31, 2017. Due to the use of a convenience sample and the difficulty of calculating a response rate using open rates from emailed surveys, a sampling frame could not be determined. In addition, as the survey was distributed online through a variety of partners, it was not possible to calculate an accurate response rate, either overall or by sub-groups.

Data were cleaned and analyzed using SAS Version 9.4 (SAS Institute, Cary NC). A member of the research team examined all the “Other, please specify” results and recoded them if responses

appeared to fit into one of the answer choices. After examining responses, three categories were added to the business sector categories: academia/higher education/research; consulting; and public health. Four categories were added to the primary profession categories: environment, health, and safety professionals; health care professionals (other than occupational medicine or occupational health nursing); public health practitioners; and educators/researchers. It is important to note that the respondent's primary profession as well as the answer to a second question inquiring about additional work outside of the primary occupation in which time is spent, were all self-reported.

Additional analyses examined the respondents' perceptions of the interdisciplinary nature of their work. Individuals who responded "yes" that their work was interdisciplinary in nature and who also selected at least one additional task performed outside of their primary profession were considered a positive answer. While some respondents indicated that they were a TWH professional, we noted that others may be practicing, but not identifying with TWH. A practical example of TWH is the integration of OSH promotion or business-related functions. To understand the evolving relation of OSH professions to TWH, primary and secondary professions were coded to identify individuals that indicated primary work in an occupational safety-related profession (industrial hygiene, occupational medicine, occupational safety, etc.) together with a primarily health-promotion-related profession (eg, worksite wellness, occupational health psychology, human resources, benefits and compensation), recognizing that within any of these professions overlap may occur.

Potential CE topics were organized into four categories: (a) management and legal issues; (b) information tools and communication resources; (c) general occupational practice; and (d) workplace concerns. Respondents could indicate an interest in both basic and advanced offerings for each topic. The number of responses for each answer choice and the percentage of that number represents are presented for each question. For the questions where respondents could select more than one response or all that apply, the percentages may add up to more than 100%, as respondents had the option to select multiple answers.

3 | RESULTS

3.1 | Respondents

There were 2064 responses to the survey with 1501 complete responses. Full completion was not mandatory to submit the survey. The number of responses and percent responses for a particular question are reported.

Respondents were from 48 states and Washington, DC. A little over half of the responses (53%) were concentrated among 10 states: Michigan (12%), Texas (8%), Washington (8%), California (5%), Florida (5%), Colorado (4%), North Carolina (4%), New Jersey (3%), Ohio (3%), and Iowa (2%). The over-representation of certain states in the response likely reflects the key survey distribution channel of ERCs. The majority of respondents were from private industry (46%), over

the age of 50 (63%), and either decided for themselves or made decisions for others around CE participation (66%). Almost all respondents (85%) indicated that their organizations had resources dedicated to CE. The most commonly selected resource was the provision of time for employees to participate in CE (68%), followed by funding for tuition (59%) and funding for travel to attend CE activities (49%). The demographics of respondents are presented in Table 1.

The most common primary professions reported by respondents were safety (28%), occupational health nursing (18%), and industrial hygiene (12%). Nearly two-thirds of respondents (61%) indicated that they perform work outside of their primary professions. The most frequently reported secondary areas of OSH work were safety (23%), ergonomics (15%), and workplace wellness (14%). Table 2 lists the primary and secondary professions reported by the respondents. A total of 8% of primary and 10% of secondary professions were classified as "other" and include jobs such as firefighting or emergency medical services, engineering, consulting, and administrative work.

There are more interdisciplinary requirements for employees working in smaller organizations, as seen in Table 3 which presents interdisciplinary work by organization size respondents from small employers were more likely to be engaged in interdisciplinary work than those with larger employers.

TABLE 1 Respondent demographics

<i>Employer type of respondents</i>	
Industry (N = 1975)	N (%)
Private industry	889 (46)
Federal government	143 (7)
State government	223 (11)
Local government	151 (8)
Higher education	286 (15)
Not for profit (ie nonprofit)	232 (12)
Foreign government	5 (0.3)
Nongovernmental organization	35 (2)
Tribal government	1 (0.1)
<i>Age ranges of respondents</i>	
Age range (N = 1528)	N (%)
18–29	65 (4)
30–39	183 (12)
40–49	310 (20)
50–59	534 (35)
60–69	386 (25)
70 or older	50 (3)
<i>Decision making for CE</i>	
Response (N = 1541)	N (%)
I don't decide (directed by others)	96 (6)
I decide (informed by others – eg, professional society, supervisor)	434 (28)
I decide (completely self-directed)	771 (50)
I decide and am responsible for others	240 (16)

TABLE 2 Primary and secondary professions of respondents

Response	Primary profession, N = 1984 N (%)	Secondary profession, N = 1984 N (%)
Safety	553 (28)	473 (23)
Occupational health nursing	360 (18)	58 (3)
Industrial hygiene	236 (12)	265 (13)
Occupational medicine	165 (8)	91 (4)
Epidemiology	74 (4)	115 (6)
Environmental health and safety (EHS)	59 (3)	19 (1)
Total worker health	49 (3)	165 (8)
Human resources	46 (2)	163 (8)
Education/research	45 (2)	23 (1)
Health care	43 (2)	34 (2)
Environmental engineering	41 (2)	125 (6)
Ergonomics	32 (2)	314 (15)
Workplace wellness	31 (2)	285 (14)
Public health practitioner	19 (1)	11 (1)
Health physics	17 (1)	55 (3)
Occupational health psychology	16 (1)	49 (2)
Toxicology	14 (1)	105 (5)
Benefits and compensation professional	11 (1)	85 (4)
Physical therapist	7 (0.4)	9 (0.4)
Other	166 (8)	196 (10)

Of the two-thirds of respondents that indicated their work is interdisciplinary in nature, 14% directly selected TWH as a secondary profession. Furthermore, an additional 587 individuals or 60%, were classified as practicing TWH based on having both safety and health promotion job responsibilities.

3.2 | Continuing education preferences

Most respondents (77%) had participated in an online or hybrid course, though only 52% preferred these delivery methods. The

TABLE 3 Interdisciplinary work by organization size

Response	300 or fewer employees N = 597	More than 300 employees N = 898
Yes	417 (70%)	564 (63%)
No	180 (30%)	334 (37%)

$P < .01$ by chi-squared test.

most preferred course format was live or in-person courses, with 77% of respondents indicating a preference for this type of format. A large majority of respondents (89%) were willing to travel, typically within the county, state, or region (65%). Fewer respondents indicated the willingness to travel nationally (28%) or internationally (8%).

The preference for price varied by the level and type of CE courses. Most respondents were willing to pay between \$50 and \$499 for basic courses and \$100 and \$499 for advanced courses. In general, respondents were willing to pay more for live, in-person courses. Respondents most often learned of new CE courses from emails (49%), local professional societies (41%), and advertisements or announcements in publications (36%) (Table 4).

3.3 | Identified needs for continuing education

Table 5 presents topics for which at least 70% of respondents indicated an interest. See Appendix B for full results. While this needs assessment was designed to be comprehensive, there are many other potential OSH topics that were not included, mainly due to the length of the assessment. Results stratified by profession are presented in Appendix C. The results for professions with the largest number of respondents are shown; these included: safety (N = 553), occupational health nursing (N = 360), industrial hygiene (N = 236), and occupational medicine (N = 165).

3.4 | Professional review courses

There was high interest in a full-length professional certification review course, either online or in-person. Of respondents who were Safety Professionals (Certified Safety Professional and Certified Hazardous Materials Manager), Health Physicists (Health Physics Society), and Ergonomists (Certified Professional

TABLE 4 Sources of information for continuing education offerings

Communication mechanism	N (%)
Email listservs	1014 (49)
Local professional society announcements	841 (41)
Advertisements or announcements in publications	747 (36)
From colleagues	737 (36)
Direct mailing	660 (32)
Online search	585 (28)
Word of mouth	455 (22)
Conference expos	445 (22)
Employer	365 (18)
Social media	216 (11)
ERC website	127 (6)
Other	42 (2)

TABLE 5 Continuing education topics of greatest interest

Topic	Percent interest (N = 1501)
Management and legal issues	
Legal issues in occupational safety and health	88%
Compliance with new standards (OSHA, state, other)	88%
Risk management/risk assessment	85%
Health and safety system management issues	83%
Leadership skills for occupational safety and health professionals	75%
Workers' compensation	70%
Information tools and communication resources	
Communications in accident prevention	81%
Risk communication	83%
Right to know and hazard communication	76%
Use of social media in occupational safety and health	75%
Workplace health promotion	72%
General occupational practice	
Occupational safety	84%
Ergonomics	79%
Total worker health	74%
Industrial hygiene	73%
Workplace concerns for which CE courses are needed	
Exposure assessment	83%
Safety culture	83%
Injury prevention (including traumatic injuries)	82%
Back injury prevention	80%
Occupational stress	80%
Disaster preparedness and emergency response	79%
Musculoskeletal health	75%
Respiratory health (including respiratory protection)	75%
Hearing loss/conservation program	74%
Workplace violence	70%

Abbreviations: CE, continuing education; OSHA, Occupational Safety and Health Administration.

Ergonomist) over 60% of respondents in each profession indicated interest in professional certification review CE. Nearly half of Occupational Health Nurses (Certified Occupational Health Nurse (COHN and COHN-Specialist) and Industrial Hygienists (Certified Industrial Hygienist) wanted professional review courses. Interest in online professional review courses was slightly higher than live and in-person courses. Of the respondents who indicated interest in these courses, 64% preferred online delivery (or both), and 36% selected live offerings (or both).

4 | DISCUSSION

The 2017 national CE needs assessment identified overall training needs and preferences for respondents from a variety of OSH professions. The types of training identified as most needed fall within several broad topic areas, including management and legal issues, compliance with new standards, communication tools and skills, risk management and assessment, and safety training. The CE topics with the most interest included injury prevention (back injury prevention), occupational stress, exposure assessment, and safety culture. These overlapping topics, along with the number of individuals who indicated that they perform work outside of their primary profession show a clear need for cross-training and demonstrate the continued interdisciplinary shift of OSH professionals.

Interdisciplinary work activity was significantly higher among those working at small employers, indicating that OSH professionals working in small business are often asked to perform tasks outside of the areas in which they have been professionally trained. Given that small employers make up nearly 80% of the businesses in the United States and 50% of employment,⁶ cross-training should be specifically designed and developed for those working in small enterprises.

Compared to the WESTAT Report, there was also a shift towards organization culture, and health promotion, along with the elements of TWH that was launched programatically that same year. The WESTAT report indicated that health promotion was not being covered in OSH programs and that employers were not requesting it. In the current survey, a large percent of respondents (37%) were performing tasks related to health promotion, human resources or TWH. With nearly 60% of respondents classified as practicing TWH, providing cross-training opportunities for a variety of professions on integrated health and safety topics is important. Regardless of profession, leadership skills were indicated as a top training need. The age demographic of respondents in this survey confirm anecdotal reports of a large gap between young health and safety professionals and those close to retirement age. It will be important to deliver CE for developing leadership skills to train the next generation to replace seasoned professionals as they retire.

It is generally agreed that OSH management systems should be in place at all workplaces to prevent injuries and illnesses from occurring in the workplace. OSHA's Injury and Illness Prevention Program (I2P2) includes management leadership, worker participation, hazard identification and assessment, hazard prevention and control, education and training, and program evaluation and improvement.⁷ Training the workforce in OSH management systems will address the broad topics identified in the survey. Implementing effective management systems will lead to improved safety culture, decreased injuries and illnesses, and better communication skills for employees. Training OSH professionals to develop and implement OSH management systems will also uncover additional types of training needed by individuals and their employers. Understanding the vital role of training in improving worker safety and health is an ongoing process. Having OSH management systems in place will

allow employers to identify these needs, and address them through a comprehensive training program.

It is important to note that no marketing dollars were spent administering, distributing, and collecting and analyzing survey responses. As such, the respondents in this study consisted of a convenience sample prompted by various partner listservs, social media posts and direct outreach at events. Although the current survey does have a large national geographic reach, some areas are less represented and the results may not apply to all OSH and related occupations broadly. Future training and education survey research should expand findings to include responses from employers—that is, what training do they need and what skills are they looking for, professional societies, and academic institutions who are the traditional mechanism for training professionals.

Continuing to develop and deliver training opportunities for professionals using a variety of instructional design methods ranging from asynchronous online courses to live, in-person training events is critically important. Respondents indicated a mix of preferences in CE delivery; location and cost emerged as the most significant barriers to participation. Although many respondents indicated they were willing to travel for CE, the distance was often limited to regional travel. This trend validates the need for regional NIOSH-funded ERCs, that focus on serving local, state and regional training needs. The ERC CE programs are a valuable resource to help OSH professionals identify training needs and to develop courses to meet those needs, in addition to the valuable CE opportunities that are provided by other organizations, including professional societies, academic institutions, and private vendors. The ERC CE programs can provide both broad approaches and specific training that will increase the effectiveness of OSH professionals to meet the challenges they face.

5 | CONCLUSIONS

The success of ERCs and TWH Centers of Excellence to develop and deliver relevant CE courses hinges on their ability to respond to evolving workforce needs and preferences. Developing relevant, tailored, and cross-cutting courses will help ensure that OSH professionals have access to the training they need.

A more significant national survey effort should include more responses from other associated professionals who are engaged with OSH at work, such as human resource professionals. As indicated in these survey results, the interdisciplinary demands on employees continue to grow, especially for those working for small employers. This trend is anticipated to continue as the nature of work is evolving. The way individuals experience work—for example, work that is contingent, part-time, contract, or remote, will continue to impact OSH as well as other emerging problems such as disaster preparedness and response, cultural shifts, and the opioid crisis. These may not be traditional core OSH topics, but they certainly intersect with the workplace in a dramatic and unavoidable way. As these themes rise to the level of key business decisions for organizations, the need for training high quality OSH professionals that can aid in complex problem solving will remain important.

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CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests.

DISCLOSURE BY AJIM EDITOR OF RECORD

John Meyer declares that he has no conflict of interest in the review and publication decision regarding this article.

AUTHORS' CONTRIBUTIONS

Joshua Scott was the lead author of this manuscript and collaborated directly with Mitch Rosen on the concept, design, and outline. He lead the data collection and assisted in the interpretation of analysis. Josh contributed significantly to the writing, editing, and final approval of the manuscript and is accountable for all aspects of the work. Erin Shore contributed significantly to data collection and survey design. She was the primary statistician who performed data analysis. Erin also wrote part of the methods and results section as well as edited the full manuscript. Carol Brown played a critical role in the design of the original data collection tool. She also helped draft the manuscript outline and played a major role in interpreting results and performing a full edit of the manuscript. Carisa Harris was a member of the manuscript writing team and played a critical role in revising and editing the manuscript and contributed intellectual content. Mitchel Rosen played a key role in most aspects of the manuscript. He aided in the concept and design as well as interpreting results. He wrote key sections of the manuscript and edited the final version.

INSTITUTION AND ETHICS APPROVAL AND INFORMED CONSENT

The University of Colorado IRB Investigator Manual HRP-103, was reviewed to determine if our study met the criteria for human subjects. The HRP-103 uses the Department of Health and Human Services (DHHS) Humans Subjects Definition of “a living individual

about whom a research investigator (whether a professional or a student) obtains data through intervention or interaction with the individual or from individually identifiable information.” Although according to the definition, our work did not meet the criteria for human subjects, University of Colorado IRB Worksheet HRP-310: Human Research Determination, was consulted and phone correspondence with IRB confirmed our internal nonhuman subjects/exempt determination and was therefore not submitted for IRB approval. No informed consent was obtained.

ORCID

Joshua G. Scott  <http://orcid.org/0000-0001-8797-9829>

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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