information on approximately 4,500 on-the-job construction deaths, of which approximately 1,500 were fatal falls. Geographically, fatal falls occurred across the entire United States with clustering in and around densely populated cities. On average, data were obtained for an estimated 73% of the actual number of construction fatalities that occurred annually in the U.S. since 2011. The maps continue to be a frequently used resource with over 130,000 total views.

Discussion: The fatality maps have helped to achieve the campaign's goal of raising awareness about the unacceptable number lives being lost in the construction industry, particularly as a result of fatal falls. Users have provided positive feedback on the maps and accompanying data sets, which have been used in Workers' Memorial Day events and reports, fall prevention campaign efforts at the local level, worker training; and to access specific information (e.g., recent information about deaths of female construction workers in California, fatalities in which construction workers were backed over by heavy equipment, struck-by deaths where excavator buckets became detached, and confined space deaths involving would-be rescuers).

E1.4
Title: Recommendations for Construction Safety and Injury Prevention: Findings from the Construction FACE Database

Authors: Rebecca Katz, Xiuwen Sue Dong, Xuanwen Wang

Background: This study analyzed the Construction FACE Database (CFD), a quantitative database developed by CPWR from reports of the Fatality Assessment and Control Evaluation (FACE) program conducted by the National Institute for Occupational Safety and Health (NIOSH). The CFD contains detailed data on 768 fatalities in the construction industry reported by NIOSH and individual states from 1982 through June 30, 2015. In addition to information on workers' demographics and employment characteristics, the CFD includes information on the victim's employer and the overall job environment and safety climate when the incident occurred, such as use of personal protective equipment (PPE), safety training, etc. Recommendations from the FACE investigators, which may be unavailable in most existing data sources, were also categorized and coded in the CFD. This study focused on FACE recommendations.

Methods: Recommendations fell into five main categories: PPE (including provide functional personal fall arrest system or PFAS), Equipment (e.g., install safety protection, enforce proper use of equipment), Training (such as safety training or job training), Organizational Factors (e.g., conduct Job Safety/ Hazard Analysis), and Violations (such as enforce child labor laws). These recommendations were stratified by characteristics of the victim workers (e.g., race, gender, age, occupation, job tenure), and their employers (e.g., construction subsectors, years in business), as well as type of injuries (e.g., fall or struck-by injuries). SAS 9.4 was used for analyses.

Results: Of the 768 fatalities in the CFD, 42.3% were from falling, 17.7% were due to contact with electricity, and 17.3% were from being struck by objects, equipment, or vehicles. The majority of the victims were male, and one in five died within the first two months on the job. PFAS were not available to more than half of the fall decedents (54%). Lack of access to PFAS was particularly high among residential building contractors as well as roofing, siding, and sheet metal industry sectors (~70%). The FACE investigators gave specific recommendations to each case. Among deaths due to falls, 79% of reports recommended providing safety training and 54% recommended installing safety protections. Providing safety training and ensuring safe worksite conditions was recommended for 75% and 49% of the electrocution cases, respectively. For fatalities due to struck-by injuries, 64% of reports recommended providing safety training, and 42% called for installing safety protections. Conducting a job safety analysis was recommended more frequently for smaller businesses than larger businesses. Newly established businesses were more likely to receive recommendations for providing functional PFAS and proper equipment for the task. Providing safety training was also more likely to be recommended for workers under 25 years of age (> 85%) than for older workers (68% for workers 65+). Overall, the most common recommendations were providing safety training (75%) and installing safety protections (43%).

Discussion: Comprehensive research using FACE reports may improve understanding of work-related fatalities and provide much-needed information on injury prevention. Although the findings may not represent the entire construction industry today, they provide strong evidence in favor of protection requirements by the Occupational Safety and Health Administration (OSHA). In addition to stronger enforcement, educating employers

and workers about the importance and effectiveness of safety protection is crucial for compliance and injury prevention. (The CFD is freely accessible online: https://www.cpwr.com/research/construction-face-database.)

Session E2
Title: Young Worker Injuries/Fatalities
Moderator: Kimberly Rauscher

E2.1
Title: An Overview of Young Worker Deaths in the U.S.
Author: Kitty Hendricks

Background: Fatality rates and characteristics can differ significantly by industry and age of the decedent. Previous research has suggested that young workers are at increased risk for work-related injuries and fatalities. The National Institute for Occupational Safety and Health (NIOSH) has worked to advance workplace safety for young workers through surveillance, investigations, curriculum development, and research into risk factors and intervention evaluations.

Methods: Data from the Bureau of Labor Statistics', Census of Fatal Occupational Injuries will be examined for work-related fatalities for young workers less than 18 years of age. Employment data from the Current Population Survey will also be utilized to calculate fatality rates.

Results: Between the years 2011 and 2016, 142 working youth less than 18 years of age died in the United States. In 2016, there were an estimated 1.96 million young workers between 15 and 17 years of age employed across all industries. Although youth less than 18 years of age make up a small percentage of the overall workforce (<1.5%), their employment is often concentrated in specific industries, such as services, retail trade, construction, and agriculture. Between 1994 and 2013, services (12,821,000) and retail trade (5,851,000) industries had the highest full-time equivalent (FTE) counts for youth 15 to 17 years of age. However, the agricultural production and construction industries had the highest fatality rate for youth, with 19.7 and 16.5 deaths per 100,000 FTE, respectively. This presentation will examine young worker fatality rates by industry sector, injury characteristics, and demographic characteristics of the decedent.

Discussion: This review of young worker fatalities will build on previous NIOSH research in this area. The results will display recent trends in young worker deaths, identify factors common among workplace deaths for young workers, and assist policy makers and researchers in further efforts to reduce fatal injuries to young workers in the U.S.

E2.2
Title: Young Worker Reported Injuries in New Jersey for FY 2017 and Time Trends 1999-2017
Authors: Derek Shendell, Daniel Uhiara, Judith Graber, Lauren Gonzalez, Maryanne Fakeh

Background: New Jersey Department of Education (NJDOE) law requires accidents or incidents (injury) involving career-technical-vocational education (CTE) students, and/or staff, to be reported to the Commissioner of Education within five business days. Incidents (de-identified) get reported directly to NJ Safe Schools Program (NJSS) for analyses. Reporting began with original paper forms (I) in December 1998-January 1999, then a one-page revised print form 2005-2010 (II) followed by a two-page version for enhanced readability 2010-2012 (III). Starting in 2012, and mandated by law starting fall 2013, a newer online form was implemented (in PsychData); it also collects race and ethnicity data in addition to 23 other data fields.

Methods: 2016-2017 school year data were analyzed; specific variables were also compared to 1999-2016 data to examine trends in reported injuries. Variables examined included age, gender, race/ ethnicity, injury treatment received at hospital versus doctor's clinic, personal protective equipment use, and existence of an individualized education plan, an indicator of a student with special health care needs, e.g., various disabilities.

Results: After 1208 (I), 140 (II) and 594 (III) print form injury reports, as of 12/31/2017 there have been 324 reported incidents meeting NJ law criteria in the online form, 22 during phase-in period (1/2012-8/2013) and 302 during mandatory reporting period (9/2013-12/2017). Other detailed data summaries and descriptive time trends will be presented.

Discussion: NJSS/ NJDOE state law-based online injury surveillance for young workers in approved CTE programs improves upon the former paper-based system, allows examination of potential disparities, and enhances reporting completeness, accuracy and precision.

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