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Major Accomplishments/ Intermediate and Potential Outcomes

Heavy Metals Surveillance Database

NJ state regulations require reporting of heavy metal test values from clinical laboratories, physicians, and hospitals.[1] During the grant period, the Adult Blood Lead project collected 436 unique, incident cases of employees (age 16+) with blood lead levels (BLL) between 10 µg/dL and 24 µg/dL; 61 cases between 25 µg/dL and 39 µg/dL; and 23 cases ≥ 40 µg/dL. Occupational Health Surveillance (OHS) staff conducted 49 interviews and mailed out 670 surveys (with educational materials). Staff updated all lead educational materials, alerts and brochures targeted at workers, employers, and parents. In addition, the mailed survey was translated into Spanish. As per an agreement with Occupational Safety and Health Administration (OSHA), staff refers all cases of BLL ≥ 40 µg/dL. For example, after conducting phone interviews with seven employees at a NJ shooting range with BLLs ≥ 40 µg/dL, the information was referred to OSHA and an inspection was initiated. NJDOH staff also provided additional information to the OSHA Compliance Officer. For the other heavy metals, 26 arsenic and 48 mercury cases were reported during the grant period.

Work-Related Burn Injuries

The primary purpose of the work-related burns project is to characterize work-related burns in hospital inpatient/emergency department discharge data and poison control center data. Analysis of the NJ hospital inpatient discharge data identified a total of 206 individuals aged 16 years and older with workers' compensation as a primary payer from 2010 to 2014. These patients were coded with ICD-9-CM codes 941-949.5 for primary diagnosis. Thirty percent of the burns were to the lower limb(s); 23% were to the face, head, and trunk; 19% were to the wrist(s) and hand(s); 17% involved the upper limb (except wrist and hand); 11% were to the trunk; and less than 1% involved burns in other locations. An additional 40 records were coded with burn injuries, although the primary diagnosis was not a burn ICD-9 code. The depth of the burn largely determines the healing potential and the need for surgical grafting. Burns are classified by severity and penetration through the layers of skin. The percentage of body surface involving third degree burn was specified for 192 (78%) of the 246 inpatients with burn injuries.

Occupational Eye Injuries

This project aims to utilize the occupational health indicators framework to characterize occupational eye injuries using hospital discharge data. At the Annual State Partners meeting in December 2016 in Atlanta, staff presented a proposal to include occupational eye injuries as an Occupational Health Indicator and was approved for pilot testing. Seven states volunteered to pilot test the new indicator, they were asked to pull cases based on whether the ocular injury-related ICD-9 code was the primary diagnosis or secondary diagnosis for patients aged 16 years and older with workers' compensation as a primary payer. The pilot states were given a few months to review the how-to-guide and pilot test it on their states inpatient hospital discharge data. After a few revisions of the how-to-guide, each state provided the total number of 2014 inpatient hospitalizations for occupational eye injuries. Numbers ranged from 5 to 161 cases. The pilot states where then asked to calculate the rate of work-related eye injuries. Denominator data was obtained from BLS Geographic Profile of Employment and Unemployment which contains the Current Population Survey estimates for state-specific numbers of employed persons. The average rate of inpatient hospitalizations for work-related eye injuries among the pilot states was 1.1. The results of the pilot test were presented at the Subcommittee meeting at the 2017 Annual CSTE Conference in Boise. Further revisions are still needed before approval. ICD-9-CM to ICD-10-CM conversion was completed for the next phase of the pilot-testing.

EpiCenter (Syndromic Surveillance)

Staff began evaluating the state syndromic surveillance system, EpiCenter, to create an occupational injury custom classifier to enhance surveillance of non-fatal injuries, illnesses, and poisonings in NJ. A pilot study was conducted and

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[1] N.J.A.C. 8:44-2.11, N.J.A.C. 8:58-1.5, 1.6, 1.7, and N.J.A.C. 8:58-1.4, 1.6, 1.7

11,919 (0.3%) possible work-related injuries were identified via EpiCenter in 2014. Of these visits 956 (8%) indicated Workman's Compensation as payer. Events that resulted in the greatest number of ED visits were falls, slips, trips (1,679, 14%). Nature of injury included cuts, lacerations (1,041, 9%), burns (255, 2%), and sprains, strains, tears (185, 2). The part of the body most affected were the back (1,414, 12%). This evaluation successfully demonstrated that the EpiCenter chief complaint reporting system can yield real-time knowledge of incidents and local conditions for use in identifying opportunities for prevention of work-related injuries. This work was presented at the CSTE Annual meeting in Boise, ID in June 2017. Also, a paper entitled, "Evaluation of a state based syndromic surveillance system for the classification and capture of non-fatal occupational injuries and illnesses in New Jersey" was published in the American Journal of Industrial Medicine. OHS staff also continue to receive automatic electronic notifications whenever three or more cases of chemical exposures present in NJ emergency departments, which provides an opportunity for the OHS Unit to partner with the NJDOH Public Employees Occupational Safety and Health Program (PEOSH) and the regional OSHA area offices to provide them with real-time data on work-related injuries occurring among NJ employees.

NJ Poison Information and Education System (NJPIES)
The OHS Unit continues to collaborate with NJPIES as an additional data source for occupational health surveillance. Occupational exposures are reportable under NJ state law. Thus, one of the areas NJPIES codes for is occupational exposure. NJPIES immediately notifies the OHS Unit of occupational poisonings, which has allowed us to further enhance the classification and capture of work-related non-fatal injuries with improved efforts in prevention. Also, in collaboration with the NJDOH Communicable Disease Service, Infectious, and Zoonotic Disease Program, OHS staff have been working with NJPIES to stream NJ poison data into EpiCenter in real-time. This is currently in the testing phase.

CSTE Occupational Health Subcommittee
The New Jersey Occupational Health Indicator Coordinator continues to serve as the state-representative co-chair for the CSTE/NIOSH Occupational Health Indicators Work Group. The Principal Investigator is a member of the Occupational Health Subcommittee Leadership Group.

Meetings
Staff attended various conferences and meeting to help build capacity for public health surveillance and develop strategies for incorporating the latest approaches, methodologies, and results into data driven programs. Staff presented:
- A poster on trenching and provided an oral presentation on the evaluation of a syndromic surveillance system to detect non-fatal occupational injuries and illnesses at the CSTE 2017 Conference in Boise, ID in June 2017.
- NJ's occupational surveillance activities such as Work-Related Burns and Occupational Eye Injuries; using EpiCenter real-time data for surveillance; and fatal occupational injuries were presented at the 2017 Northeast Regional Occupational Disease and Injury Surveillance (NEON) Conference in Chester, CT.
- Attended the CSTE, CDC, Safe States Alliance, and National Association of County and City Health Officials (NACCHO), 8th Annual Disaster Epidemiology Workshop May 16-17, 2017 in Atlanta, GA.
- A platform presentation was given at the New Jersey Emergency Preparedness Association's annual meeting on May 4, 2017, entitled, "Tree-care workers as first responders following Hurricane Sandy."
- Staff presented on the NIOSH NORA Services Sector Webinar on January 19, 2017, entitled, "Tree-care Workers in New Jersey: Surveillance and Regulatory Initiatives."
- Staff presented at the NJ Society of Public Health Education (NJSOPHE) on December 1, 2016 on the NJDOH Occupational Health Surveillance activities.

Major Outputs/Products

NJ SHAD (State Health Assessment Data) System
OHS staff continues to work with NJDOH Environmental Public Health Tracking (EPHT) researchers to incorporate OHIs into the NJDOH online indicator-based information system, NJ SHAD. This allows for increased visibility and integration into mainstream public health as the OHIs are now featured with all the leading NJ health indicators. Profiles with data analysis for eight OHIs were updated with 2013 data and maps, and published on the NJ SHAD website. Three OHIs, "Fatal Work-Related Injuries (OHI #3)," "Mortality from or with Pneumoconiosis (OHI #10)," and "Elevated Blood Lead

Levels among Adults (OHI #13)" were incorporated into Healthy NJ 2020 as Occupational Health and Safety objectives and referenced accordingly in the NJ SHAD indicator system.

NJDOH Occupational Health Indicators Webpage

Staff completed trend analyses for 20 NJ indicators from 2001-2013 and the data has been updated on the OHI webpage. Trend analysis shows that from 2001-2013 rates of asbestosis hospitalizations continue to be higher in NJ (152.1-256.7 hospitalizations per million residents) than the US (33.2-103.2 hospitalizations per million residents). Asbestosis also resulted in the greatest number of deaths from or with pneumoconiosis, over 900 from 2001-2013. This information is updated annually.

OHI Multi-State Report

The 2013 OHIs were submitted to NIOSH and posted to the CSTE website. The OHS Unit submitted 22 of the 24 OHIs for 2014 to NIOSH for QA, including a new OHI, #23 (Influenza Vaccination Coverage Among Hospital Care Personnel), for incorporation into their multi-state OHI report posted on the CSTE Website. Examples of NJ OHIs are provided in Table 1 below. OHS staff have also been working on two multi-state collaborative projects including: 1) a paper on asthma and cleaning agents and 2) investigating cases of silicosis hospitalizations and deaths (using OHI #9 and #10) in workers under the age of 55.

Table 1. Selected 2013 and 2014 New Jersey Occupational Health Indicators

Occupational Health Indicator	2013	2014
Annual average # of adults (civilian non-institutionalized) working in NJ[1]	4,153,000	4,221,000
Estimated annual total number of work-related injuries and illnesses[2]	78,000	77,900
Work-related hospitalizations[1]	3,937	3,900
Annual number of work-related traumatic fatalities[1]	102	87
Total amount of workers' compensation benefits paid[3]	$2,235,166,000	$2,269,156,000

Sources: [1]National Bureau of Labor Statistics, [2]NJ Department of Labor and Workforce Development, [3]National Academy of Social Insurance

As co-chair of the Occupational Health Indicators Workgroup, staff continue to work with state indicator leads to develop a list of ICD-10-CM codes for the 2018 How-to-Guide. A ICD-10-CM Transition subcommittee was formed and several states, including NJ, have been asked to pilot test the new codes. The subcommittee is also working on creating a list of work-related external codes in an effort to identify more work-related cases in the state hospitalization data.

Fatal Occupational Injuries

OHS Staff continues to conduct occupational health surveillance on fatal work-related injuries in NJ. During this grant period, seven investigations (two machine related, three struck by, and two fall fatalities) were initiated, updated, or published. Staff contributed to a NIOSH Science Blog regarding health and safety among tree workers in the landscaping services industry. Three Fatal Occupational Injuries Project reports were highlighted in the National Safety Council's *Safety + Health* Magazine in this grant period: FACEValue: Mechanic crushed to death under electrical cabinet; FACEValue: Plant manager crushed to death by steel beams; and FACEValue: Worker struck and killed by backhoe bucket which was also highlighted in the November-December 2016 NJDOH Health Matters (page 8).

Project Evaluation

An evaluation of the Adult Blood Lead Surveillance electronic lab reporting system for NJ, 2015-2016, was completed. The evaluation found that a computerized database management system used for communicable diseases can easily translate over to use in an occupational health surveillance system, in this case heavy metals/lead surveillance. This electronic reporting system saves a lot of manpower hours with its capability of quickly sorting through large amounts of data. The only fallback, is the inability to have a way to electronically identify occupational risk factors, which must be done manually by staff.

Resources:

The following is a summary of education and outreach projects and publications that were completed in this grant period:

- August 2016, a New Jersey clam fisherman inadvertently dredged up old munitions from the seafloor off the coast of New Jersey. Per reports, a munition appeared on the conveyor belt during clam processing shipboard and was recognized as a "bomb" by a crew member who then threw it back into the water. This clammer later developed painful blistering on the right lower and upper arms the same morning of this bomb exposure.   An infographic entitled, "What's Your Catch? - Dangers in dredging old bombs from the New Jersey ocean floor" was developed in collaboration with the NJDOH Food and Drug Safety Program, The Seafood and Shellfish Project and distributed, along with a survey, to NJ Shellfish Dealers and Harvesters.

- An infographic entitled, "Workplace Fatalities Involving Multiple Victims" was published that characterizes the 68 workplace incidents involving multiple victims that occurred in New Jersey between 1991 and 2015. It describes three cases studies, the number of fatal and nonfatal injuries involving both workers and bystanders. In addition, it provides the demographics for the 170 workers who died during these 68 incidents including the incident types and the industry sectors with 10 or more worker fatalities.

- Results from a pilot study to evaluate syndromic surveillance as an additional source of data for occupational health surveillance was published in the American Journal of Industrial Medicine: Evaluation of a state based syndromic surveillance system for the classification and capture of non-fatal occupational injuries and illnesses in New Jersey.

- Two published N.J. Department of Health workplace fatality investigation reports were chosen by the National Safety Council to be featured in the October and December 2016 issues of their monthly magazine (Safety + Health). The first report details how a 34-year-old Hispanic day laborer was killed on his first day on the job when a backhoe loader operator, not realizing the victim was working nearby, rotated the boom, hitting the victim with the bucket. The second report describes how a 62-year-old male mechanic was killed while removing salvageable equipment from a 993.5-pound electrical cabinet when the cabinet tipped over and crushed him between the floor and the cabinet. This effort was the subject of a The March 2017 NIOSH eNews.