A. OVERALL COVER PAGE

Project Title: Using the Ohio Bureau of Workers' Compensation claim and policy data systems for surveillance and prevention of occupational injuries, illnesses, fatalities, and exposures to occupational hazards.	
Grant Number: 5U60OH011141-03	**Project/Grant Period:** 08/01/2016 - 07/31/2019
Reporting Period: 08/01/2018 - 07/31/2019	**Requested Budget Period:** 08/01/2018 - 07/31/2019
Report Term Frequency: Annual	**Date Submitted:** 09/16/2021
Program Director/Principal Investigator Information: IBRAHEEM ALTARAWNEH , MS PHD MS BS **Phone Number:** 614-728-6468 **Email:** abe.tarawneh@bwc.state.oh.us	**Recipient Organization:** OHIO STATE BUREAU/WORKERS' COMPENSATION OHIO STATE BUREAU OF WORKERS' COMPENSATION 13430 YARMOUTH DR PICKERINGTON, OH 431478310 **DUNS:** 074859047 **EIN:** 1311334187A3 **RECIPIENT ID:**
Change of Contact PD/PI: NA	
Administrative Official: MICHAEL LAMPL 30 WEST SPRING STREET COLUMBUS, OH 432152256 **Phone number:** 614-995-1203 **Email:** Michael.lampl@bwc.state.oh.us	**Signing Official:** MICHAEL LAMPL 30 WEST SPRING STREET COLUMBUS, OH 432152256 **Phone number:** 614-995-1203 **Email:** Michael.lampl@bwc.state.oh.us
Human Subjects: NA	**Vertebrate Animals:** NA
hESC: No	**Inventions/Patents:** No

B. OVERALL ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

1.Combine state workers' compensation (WC) claim information with the number of employees from the Unemployment Insurance (UI) data adjusted with hours per industry data from the Labor Productivity and Costs program of the BLS for the purpose of developing rates of WC claims per full time equivalents (FTE) by specific North American Industry Classification System (NAICS) industries and employer sizes;

2.Calculate rates of Workers' Compensation (WC) claims of injury per full-time-equivalent employees (FTE) by employer size and industry sector according to the North American Industry Classification System (NAICS);

3.Utilize the data to better prioritize resources in Ohio dedicated to preventing occupational safety and health injuries and illnesses. Identify high-priority industries on which to focus injury-prevention efforts using injury-rate data;

4.Create a publicly accessible electronic WC case datasets including employer NAICS industry, coded fields for type of injury, etc.; and

5.Disseminate significant findings. Produce and publish collaborative research regarding injury cause and prevention using Ohio WC claims data and other data collected by OBWC for prevention purposes.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

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B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

For this reporting period, is there one or more Revision/Supplement associated with this award for which reporting is required?

No

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

NOTHING TO REPORT

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

As part of our research grant collaboration with NIOSH, we have published results from several joint studies and we continue to perform several other studies together. Below is a summary of several of our publications.

Wurzelbacher, S. J., Al-Tarawneh, I. S., Meyers, A. R., Bushnell, Timothy., Lampl, M. P., Robins, D. C., Tseng, C.-Y., Wei, C., Bertke, S. J., Raudabaugh, J. A., Haviland, T. M. and Schnorr, T. M. (2016), "Development of methods for using workers' compensation data for surveillance and prevention of occupational injuries among State-insured private employers in Ohio." Am. J. Ind. Med. 59: 1087–1104. This article discusses the methods of linking WC claims data to employment data and demonstrates that they can be used to prioritize industries for injury research and prevention activities among state-insured

private employers.

Meyers, A. R., Al-Tarawneh, I. S., Wurzelbacher, S. J., Bushnell, P. T., Lampl, M. P., Bell, J. L., ... & Raudabaugh, J. A. (2018). "Applying Machine Learning to Workers' Compensation Data to Identify Industry-Specific Ergonomic and Safety Prevention Priorities." Journal of Occupational and Environmental Medicine, 60(1), 55-73. This study leveraged a state workers' compensation claims database and machine learning techniques to target prevention efforts by injury causation and industry. Injury causation auto-coding methods were developed to code more than 1.2 million Ohio Bureau of Workers' Compensation claims for this study. Industry groups were ranked for soft-tissue musculoskeletal claims that may have been preventable with biomechanical ergonomic (ERGO) or slip/trip/fall (STF) interventions. On the basis of the average of claim count and rate ranks for more than 200 industry groups, Skilled Nursing Facilities (ERGO) and General Freight Trucking (STF) were the highest risk for lost-time claims (>7 days). This study created a third major causation-specific U.S. occupational injury surveillance system. These findings are being used to focus prevention resources on specific occupational injury types in specific industry groups, especially in Ohio. Other state bureaus or insurers may use similar methods.

Meyers A.R., Al-Tarawneh I.S., Bushnell P.T., Wurzelbacher, S.J., Lampl, M.P., Tseng, C.Y., Turner, D.M.. Morrison, C.A. Degree of integration between occupational safety and health programs and wellness programs: first-year results from an insurer-sponsored wellness grant for smaller employers. J Occup Environ Med. 2019;61(9):704-17. The aim of this study was to describe levels of integration between occupational safety and health (OSH) and workplace wellness programs/practices/policies ("programs") among participants in an insurer-sponsored wellness grant program. At least half of the employers (N = 220) reported some level of integration within five of seven categories of OSH-wellness integration. Employers sometimes considered ergonomics, safety, or substance exposure hazards while designing their wellness program (15%) or reduced such hazards to support their wellness program (24%). Few meaningful differences were observed by employer size.

Al-Tarawneh, I.S., Wurzelbacher, S.J., and Bertke, S.J. "Comparative analyses of workers' compensation claims of injury among temporary and permanent employed workers in Ohio." Am. J. of Ind Med 2019: 1-20. This study examines the risk of injury among Ohio's temporary workers and compares those risks to permanent employees. The study showed that injured temporary workers were on average younger and that the injury rates among temporary workers were higher than permanent employees, with rates varying by injury event, industry, and manual class.

Reichard, A.A., Al-Tarawneh, I.S., Konda, S., Wei, C., Wurzelbacher, S.J., Myers, A.A., Bertke, S.J., Bushnell P.T., Tseng, C.Y., Lampl, M.P., Robins, D.C. "Workers' compensation injury claims among workers in the private ambulance services industry—Ohio, 2001–2011." Am J Ind Med 61(12): . This study examined WC claims data for state-insured private-industry ambulance service workers. Evaluation of 5,882 claims showed that the majority of claims from these workers were medical-only, that sprains and strains accounted for 60% of all injuries, and that overexertion from patient handling was the leading cause of injury. The injury claim rate was 12.1 per 100 FTE.

Lowe, B.L., Albers, J., Hayden, M., Lampl, M.P., Naber, S.J., Wurzelbacher, S.J. "Equipment Interventions to Improve Construction Industry Safety and Health: A Review of Case Studies: Volume II: Safety and Health, Slips, Trips and Falls." Proceedings of the 20th Congress on IEA, 2018. This study undertook a review of 153 case studies of construction equipment interventions partially funded by the OBWC Safety Intervention Grant program. Data were drawn from employer reports prior to the grant and final reports provided two years after the grant award. Score were created that combined hazard reduction, cumulative trauma disorder risk reductions, and intervention quality. Results of the study showed that cable-pulling equipment and skid steer attachments ranked highest in risk reduction and quality.

OBWC collaborated with The State of Washington and NIOSH to calculate and present combined Ohio and Washington data related to workers' compensation claims that were included in the sixth edition of The Construction Chart Book – The U.S. Construction Industry and Its Workers, which is published by the Center for Construction Research and Training (CPWR). Information about workers' compensation claim costs, major cause of injury, age group, and subsector in the construction sector were presented in the Chart Book developed from this collaboration.

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

Not Applicable

Using the Ohio Bureau of Workers' Compensation (OBWC) Claim and Policy Data Systems for Injury Surveillance and Prevention

Accomplishments:

This report documents the results of the study to address the five aims of the grant agreement. It also addresses the collaboration between the NIOSH Center for Workers' Compensation Studies (CWSC) and the OBWC in achieving these results.

Injury Rates Calculations

Calculation of injury rates was accomplished by combining injury claims data from the OBWC data systems, which provided counts of injuries, with unemployment insurance (UI) data collected through the Quarterly Census of Employment and Wages (QCEW) program, which provided employment data. The BWC data included all non-combined, state fund allowed injury claims during the study period from non-self-insured employers in Ohio. The QCEW data consisted of quarterly extracts for the UI data through the third quarter of 2018, each of which contained about 300,000 records, one for each Ohio employer and one record for each of the individual locations for employers with multiple locations. The extracts contained reported employment data for the quarter. The UI data were adjusted with hours-per-industry data from the BLS Labor Productivity and Costs program to produce estimated FTEs.

OBWC does not collect NAICS codes for employers, so in order to be able to calculate injury rates by NAICS groups, we obtained NAICS information for each employer from the Ohio Department of Jobs and Family Services. ODJFS provided us with a download of employer data for each quarter from 2001 to the present. We determined NAICS codes at the six-digit level for each year using an algorithm to combine the quarterly values.

We combined the annual NAICS data with the OBWC claims data by matching employers using their Federal Employer Identification Numbers (FEIN), which was common to both databases. The datasets from OBWC and QCEW were each partitioned into private and public employers and into sub-categories corresponding to single-location or multiple-location employers, separately for each year. We combined the QCEW data with BWC claims data for calendar years 2013-2017. We calculated annual injury rates using the injury counts per NAICS group or NORA sectors as the numerator and the sum of adjusted FTEs by NAICS group and NORA sector.

Priority Industry Identification

Based on the methods of the previous section in estimating injury rates, OBWC conducted a study to determine high-priority employers based on 3-digit and 4-digit NAICS groups. Our approach was similar to the prevention-index approach promoted by NIOSH, although our index used only one of the two measures proposed for the prevention index while adding a different measure.

To aid in interpreting the data, we developed relative risks for each industry group based on claims rates and lost-time claims ratios as compared to the rates and ratios for Office Administrative Services (NAICS 5611). While helping to identify high-risk industries, these relative risks do not differentiate employers with better or worse experience within each high-risk industry group. In the future, examining common characteristics of good-performing employers within high-risk groups could be beneficial to identify workplace improvements for loss-prevention targeting.

OBWC is using the high-priority NAICS groups to target several employer and employee programs to improve safety. Three of these programs are Loss Prevention Services, a wellness program, and a safety advertising campaign. We provide a brief overview of these program below.

Loss Prevention Programs
The OBWC's Division of Safety and Hygiene (DSH) offers loss prevention services to Ohio employers. These services include ergonomics, industrial safety, and industrial hygiene consulting and occupational safety and

health training and education. Other employer services offered by DSH include Safety Congress and Expo (3-day conference) and sponsorship of local safety councils. These services are funded by policy-holder-paid premiums and assessments paid by self-insured companies in Ohio. The results of the priority NAICS study have been used to target DSH marketing and allocation of our employer consultation services. Consultants, loss prevention supervisors, and senior technical staff have been charged with identifying Ohio employers within the high-priority industries and contacting them with information about our services. Our hope is that by targeting the high-priority industries, we will get a greater benefit in terms of employee safety.

Wellness Program Initiative, Better You, Better Ohio!™
We also used the high-priority industry list, supplemented with employee count data, to identify employers with 150 or fewer employees in the high-risk industries for a new state-funded wellness program. Employees at these companies are eligible to participate in a program we began offering during 2018 that is called Better You, Better Ohio!™. This program, which is designed to help both workers and their employers at no cost, provides resources and support services to these workers to improve their overall health and wellness. This includes health assessments and biometric screenings for better understanding of health and well-being; a member-engagement website to develop health plans and tracking of progress to achieve health goals; as well as a mobile app and digital coaching. As of the writing of this report, there are more than 16,000 employees have enrolled in this program. A program brochure is shown below.

OBWC and NIOSH collaborated to create and publish interactive charts and graphs that display summaries of Ohio workers' compensation injury claims. These dashboards contain dynamic, interactive, user-friendly summaries of more than 1.2 million workers' compensation claims from Ohio, aggregated from 2001 to 2015, and broken down by industry sector. The public can create personalized views of the charts that display claim counts and rates by general cause of injury. This information can be used to target ergonomic and safety prevention activities by understanding injury trends by year, industry, and diagnosis or cause of injury. Future dashboards will be created with updated information.

As part of our research grant collaboration with NIOSH, we have published results from several joint studies and we continue to perform several other studies together. Our joint publications are shown below:

Wurzelbacher, S. J., Al-Tarawneh, I. S., Meyers, A. R., Bushnell, Timothy., Lampl, M. P., Robins, D. C., Tseng, C.-Y., Wei, C., Bertke, S. J., Raudabaugh, J. A., Haviland, T. M. and Schnorr, T. M. (2016), "Development of methods for using workers' compensation data for surveillance and prevention of occupational injuries among State-insured private employers in Ohio." *Am. J. Ind. Med*. 59: 1087–1104.

Meyers, A. R., Al-Tarawneh, I. S., Wurzelbacher, S. J., Bushnell, P. T., Lampl, M. P., Bell, J. L., ... & Raudabaugh, J. A. (2018). "Applying Machine Learning to Workers' Compensation Data to Identify Industry-Specific Ergonomic and Safety Prevention Priorities." *Journal of Occupational and Environmental Medicine*, 60(1), 55-73.

Meyers A.R., Al-Tarawneh I.S., Bushnell P.T., Wurzelbacher, S.J., Lampl, M.P., Tseng, C.Y., Turner, D.M.. Morrison, C.A. Degree of integration between occupational safety and health programs and wellness programs: first-year results from an insurer-sponsored wellness grant for smaller employers. *J Occup Environ Med*. 2019;61(9):704-17.

Al-Tarawneh, I.S., Wurzelbacher, S.J., and Bertke, S.J. "Comparative analyses of workers' compensation claims of injury among temporary and permanent employed workers in Ohio." *Am. J. of Ind Med* 2019: 1-20.

Reichard, A.A., Al-Tarawneh, I.S., Konda, S., Wei, C., Wurzelbacher, S.J., Myers, A.A., Bertke, S.J., Bushnell P.T., Tseng, C.Y., Lampl, M.P., Robins, D.C. "Workers' compensation injury claims among workers in the private ambulance services industry—Ohio, 2001–2011." *Am J Ind Med* 61(12).

C. OVERALL PRODUCTS

C.1 PUBLICATIONS

Are there publications or manuscripts accepted for publication in a journal or other publication (e.g., book, one-time publication, monograph) during the reporting period resulting directly from this award?

No

C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)

NOTHING TO REPORT

C.3 TECHNOLOGIES OR TECHNIQUES

NOTHING TO REPORT

C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES

Have inventions, patent applications and/or licenses resulted from the award during the reporting period? No

If yes, has this information been previously provided to the PHS or to the official responsible for patent matters at the grantee organization?

C.5 OTHER PRODUCTS AND RESOURCE SHARING

NOTHING TO REPORT

D. OVERALL PARTICIPANTS

D.1 WHAT INDIVIDUALS HAVE WORKED ON THE PROJECT?

Commons ID	S/K	Name	Degree(s)	Role	Cal	Aca	Sum	Foreign Org	Country	SS
ISTARAWNEH1	Y	Al-Tarawneh, Ibraheem	BS,MS,MS,PHD	PD/PI	1.0	0.0	0.0			NA
	N	Lampl, Michael	M.S.	Co-Investigator	4.0	0.0	0.0			NA
	N	Robins, David		Co-Investigator	4.0	0.0	0.0			NA
	N	Agboola, Samson	M.S.	Co-Investigator	2.0	0.0	0.0			NA
	N	Naber, Steven	Ph.D.	Co-Investigator	4.0	0.0	0.0			NA

Glossary of acronyms:
S/K - Senior/Key
DOB - Date of Birth
Cal - Person Months (Calendar)
Aca - Person Months (Academic)
Sum - Person Months (Summer)
Foreign Org - Foreign Organization Affiliation
SS - Supplement Support
RE - Reentry Supplement
DI - Diversity Supplement
OT - Other
NA - Not Applicable

D.2 PERSONNEL UPDATES

D.2.a Level of Effort

Not Applicable

D.2.b New Senior/Key Personnel

Not Applicable

D.2.c Changes in Other Support

Not Applicable

D.2.d New Other Significant Contributors

Not Applicable

D.2.e Multi-PI (MPI) Leadership Plan

Not Applicable

E. OVERALL IMPACT

E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES? Not Applicable
E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE? NOTHING TO REPORT
E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER? Not Applicable
E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)? NOTHING TO REPORT

G. OVERALL SPECIAL REPORTING REQUIREMENTS SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

NOTHING TO REPORT

G.2 RESPONSIBLE CONDUCT OF RESEARCH

Not Applicable

G.3 MENTOR'S REPORT OR SPONSOR COMMENTS

Not Applicable

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

Not Applicable

G.4.b Inclusion Enrollment Data

NOTHING TO REPORT

G.4.c ClinicalTrials.gov

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

NOT APPLICABLE

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Not Applicable

G.8 PROJECT/PERFORMANCE SITES

Not Applicable

G.9 FOREIGN COMPONENT No foreign component
G.10 ESTIMATED UNOBLIGATED BALANCE Not Applicable
G.11 PROGRAM INCOME Not Applicable
G.12 F&A COSTS Not Applicable

I. OVERALL OUTCOMES

I.1 What were the outcomes of the award?

The Ohio Bureau of Workers' Compensation (OBWC) received a grant from the National Institute of Occupational Safety and Health (NIOSH) to utilize the Ohio Bureau of Workers' Compensation claim and policy data systems for surveillance and for prevention of occupational injuries, illnesses, fatalities, and exposures to occupational hazards through collaborative research. The specific aims of the grant agreement were to:

1. Combine state workers' compensation (WC) claim information with the number of employees from the Unemployment Insurance (UI) data adjusted with hours per industry data from the Labor Productivity and Costs program of the BLS for the purpose of developing rates of WC claims per full time equivalents (FTE) by specific North American Industry Classification System (NAICS) industries and employer sizes.;

2. Calculate rates of Workers' Compensation (WC) claims of injury per full-time-equivalent employees (FTE) by employer size and industry sector according to the North American Industry Classification System (NAICS).;

3. Utilize the data to better prioritize resources in Ohio dedicated to preventing occupational safety and health injuries and illnesses. Identify high-priority industries on which to focus injury-prevention efforts using injury-rate data. The OBWC's Division of Safety and Hygiene (DSH) offers loss prevention services to Ohio employers. These services include ergonomics, industrial safety, and industrial hygiene consulting and occupational safety and health training and education. Other employer services offered by DSH include Safety Congress and Expo (3-day conference) and sponsorship of local safety councils. These services are funded by policy-holder-paid premiums and assessments paid by self-insured companies in Ohio. The data from this project was used to prioritize loss prevention services.;

4. Create a publicly accessible electronic WC case datasets including employer NAICS industry, coded fields for type of injury, etc. OBWC and NIOSH collaborated to create and publish interactive charts and graphs that display summaries of Ohio workers' compensation injury claims. These dashboards contain dynamic, interactive, user-friendly summaries of more than 1.2 million workers' compensation claims from Ohio, aggregated from 2001 to 2015, and broken down by industry sector.; and

5. Disseminate significant findings. Produce and publish collaborative research regarding injury cause and prevention using Ohio WC claims data and other data collected by OBWC for prevention purposes. Several journal articles were published as a result of collaboration between NIOSH and BWC utilizing the dataset developed during this project.