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Characterization of Foreign-Born vs. U.S. Native-Born Worker Fatalities in Kentucky, 2001-2014

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CHARACTERIZATION OF FOREIGN-BORN VS. U.S. NATIVE-BORN WORKER
FATALITIES IN KENTUCKY, 2001-2014.

CAPSTONE PROJECT PAPER

A paper submitted in partial fulfillment of the
requirements for the degree of
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in the
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By
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Abstract

Background: Foreign-born workers may be more vulnerable to fatal and nonfatal work injuries. Available information on the differences that exist between foreign-born and U.S. native-born worker fatal injuries is scarce. This study aims to describe and characterize occupational fatal injuries in foreign-born and U.S. native-born workers in Kentucky.

Methods: A retrospective descriptive analysis of foreign-born vs. U.S. native-born worker fatalities was performed over a 14-year period from 2001-2014 using Kentucky Fatality Assessment and Control Evaluation (FACE) program worker fatality surveillance data.

Results: From 2001-2014, there were a total of 87 foreign-born and 1,361 native-born worker fatalities. The average age of foreign-born worker death was 38 year of age compared to 47 years of age in native-born workers. The majority of foreign-born workers were employed in the construction, services and transportation, warehousing and utilities industries at time of death. In contrast, native-born workers were primarily employed in transportation, warehousing and utilities and agriculture, forestry and fishing industries at time of death. The top external causes of fatal injury incurred by foreign-born workers were motor vehicle accidents, accidental falls, homicide and injury purposely inflicted by other persons and other accidents. The top external causes of fatal injury in native-born workers were motor vehicle traffic accidents, accidental falls and other accidents. Foreign-born workers were employed in the transportation and material moving and construction and extraction occupations compared to

transportation and material moving and management, business and financial occupations in native-born workers.

Conclusions: A large percentage of occupational fatalities occurred in the transportation industries and occupations, regardless of worker country of birth.

Employers should establish and implement company driver safety programs and ensure that both native-born and foreign-born employees receive driver safety training in their appropriate language focused on defensive and safe driving. A proactive approach by employers using concurrent safety training and safety performance monitoring may reduce both native-born and foreign-born worker injuries and fatalities.

Keywords: foreign-born, native-born

Introduction

In 2014, foreign-born workers represented 16.5 percent of the U.S. labor force, up from 14.8 percent in 2005.¹ U.S. native-born workers accounted for 83.5 percent of the labor force in 2014. In 2014, the fatal work injury for all US workers was 3.3 per 100,000 workers. Comparatively, the fatal work injury rate for foreign-born workers was similar at 3.4 per 100,000 workers.² There were 827 fatal work injuries involving foreign-born workers in 2014 of which the greatest share (334 or 40%) was born in Mexico. Of the 789 fatal work injuries incurred by Hispanic or Latino workers, 64 percent involved foreign-born workers.² Of the 134 fatal work injuries incurred by non-Hispanic Asian workers, a higher percentage (87%) of non-Hispanic Asian worker fatalities involved foreign-born workers compared to total Hispanic worker fatalities.²

Research conducted by the Centers for Disease Control and Prevention (CDC) reported that Hispanics and foreign-born workers had the highest work-related fatal injury rates of 4.4 per 100,000 workers, and 4.0, respectively, from 2004 to 2009.³ From 1995 through 2000, 4,167 Hispanic workers died as a result of fatal injury. The most frequent types of events were transportation incidents followed by assaults, contact with objects or equipment and falls. Homicides in Hispanics represented a higher proportion of total fatalities than for all workers.⁴ Foreign-born workers experienced higher annual fatality rates than native-born workers in sales occupations and handler, equipment cleaner, helper, and laborer occupations.⁵

A new study conducted by the Center for Injury Research and Policy (CIRP) found that while the rate of non-fatal injuries was lower among foreign-born workers, the severity of their injuries was greater. Injuries from foreign-born workers resulted in

hospitalization and six days or more missed work than U.S.-born workers.⁶ The leading cause of nonfatal injuries from 2003 through 2008 among Hispanic workers was due to contact with objects in the construction industry.⁷ Nonfatal injuries and illnesses data from 1998 through 2000 revealed that construction and non-construction laborers, truck drivers, farm workers, grounds keepers and gardeners were most often injured.⁴

The primary objective of this study was to characterize fatal injury patterns that exist between foreign-born and native-born workers in Kentucky. Fatal injury trends and proportions between foreign-born and native-born worker injury fatalities were determined, and demographic characteristics, industry, occupation, external causes of injuries and incident type were identified.

Methods

Definitions

Foreign-born. Foreign-born refers to persons who reside in the United States but were born outside the country or one of its outlying areas like Puerto Rico or Guam, including legally admitted immigrants, refugees, temporary residents such as students and temporary workers, and undocumented immigrants. If born abroad to parents who were not U.S. citizens, then the person is considered foreign-born.⁸

Native-born. Native-born refers to persons born in the United States or in one of its outlying areas like Puerto Rico or Guam.

The data on occupational injury deaths for this study was obtained from Kentucky Fatality Assessment and Control Evaluation (FACE) program data. The Ky FACE Program is an occupational fatality surveillance program that is funded by the National Institute for Occupational Safety and Health. Multiple information sources used to

identify occupational fatality cases include interviews of employers, coworkers, witnesses; examination of the work site and equipment; review of Occupational Safety and Health Administration (OSHA) and Mining Safety and Health Administration reports, and police reports; death certificates; workers' compensation reports, among others.⁹

Work-related fatality inclusion criteria included the requirements that the fatal injury occurred in Kentucky and that the person was performing work tasks at the time of the fatal injury. Demographic characteristics examined were age, gender, race, ethnicity, education, marital status, primary language and country of origin. Also, employment industry, occupation at the time of death, external cause of injury and incident type were analyzed. A chi-square analysis using SAS 9.3 software was performed to identify differences between foreign-born and native-born worker fatality groups. The study excluded Kentucky resident worker fatalities where the fatal injury occurred outside the state of Kentucky.

North American Industry Classification System (NAICS)¹⁰ codes were used to identify the employment industry. This is the standard used by Federal agencies to classify business establishments. The Standard Occupational Classification System (SOC)¹¹ was used to code and classify occupation. Industries with low cell values were merged into the "other industries" category including (e.g., mining, oil and gas extraction, public safety, healthcare and trade). Occupations including computer, engineering, science, education, legal, community service, arts and media, healthcare practitioners and technical, sales and related, office and administrative support, and military specific were also merged into the "other occupations" category.

Fatality rates were calculated for each year and plotted to compare foreign-born

and native-born worker fatalities. Denominator numbers were obtained from the United States Census Bureau to calculate fatality rates. All annual fatality rates were calculated per 100,000 employed workers. To determine fatality rates between foreign-born and U.S. native-born workers, fatality numerators were identified using data from the BLS Census of Fatal Occupational Injuries (CFOI) and employment data were derived from the Current Population Survey (CPS).^{12,13} Fatality rate denominator data was also obtained from the BLS Current Population Survey (CPS) data. Average annual rates of foreign-born and native-born worker fatalities were calculated by dividing the number of fatalities by the total employed population during years 2001 to 2014. The fatality rates were divided into three time periods: years 2001 to 2005, 2006 to 2010, and 2011 to 2014 (Figure 1).

When classifying incident type, machine/agricultural machines, electrocution, explosion, suicide, drowning, poisoning, overexertion, suffocation, animal related, caught in, crushed by, and confined space injuries were collapsed into the “other” category due to low cell values (Table 3). International Classification of Diseases, Clinical Modification (ICD-9-CM) was used to code external causes of injuries.

Results

From 2001-2014, there were 1,448 total worker fatality cases. Of the total worker fatality cases, 87 were foreign-born (6.0%) and 1,361 (94.0%) were native-born. The average age of foreign-born workers was 38 years of age compared to 47 years of age in native-born workers (Table 1). Nearly all workers in both groups (foreign-born and native-born workers) were male (95% and 93%, respectively) and white (85% and 95%, respectively). There was a statistically significant difference between the two groups for

race ($p < .0001$) but no statistically significant difference was found for gender ($p = 0.5612$). Higher percentages of fatally injured foreign-born workers were black and Asian/American Indian.

There was a statistically significant difference between the two groups for ethnicity ($p < .0001$). Out of the total foreign-born workers, 51.7% were of Hispanic origin while only 1% of the total native-born workers were of Hispanic origin. There was a statistically significant difference in completed education between the two groups ($p < .0001$). Foreign-born workers were less educated than native-born workers. Fifty-one percent of the foreign-born workers did not complete high school. In comparison, only 22% of native-born workers had not completed high school.

Of the foreign-born workers, 47.1% were from Mexico, and 12.6% were from Central America and the Caribbean. More than half of the foreign-born workers spoke Spanish as their first language (62.8%). For native-born workers, English was the first language of almost all (greater than 99%).

There was a statistically significant difference between foreign-born and native-born worker fatality industries ($p = 0.0082$) (Table 2). The majority of foreign-born workers who died on the job were employed in the following industries at their time of death: Construction (26.4%), Services (21.8%) and Transportation, Warehousing and Utilities (20.7%). On the other hand, native-born workers were primarily employed in Services (21.6%), Transportation, Warehousing and Utilities (18.4%) and Agriculture, Forestry and Fishing (18.2%). A higher percentage of foreign-born workers were employed in the construction industry, and a higher percentage was employed in the manufacturing industry, compared to native-born workers.

Occupations also differed between both groups (Table 2). Foreign-born workers were most frequently employed in transportation and material moving (27.6%), construction and extraction (26.4%), and management, business, and financial (11.5%) occupations. Native-born workers differed from foreign-born workers in their percentages of primary occupations (25.4% native-born vs. 27.6% foreign-born in transportation and material moving; 19.6% native-born vs. 11.5% foreign-born in management, business and financial; and 17.5% native-born vs. 26.4% foreign-born in construction and extraction occupations).

There was a statistically significant difference between both groups in their external causes of injuries ($p < .0001$) (Table 3). The major causes of external injuries in foreign-born workers were motor vehicle traffic accidents (25.9%) compared to 28.5% in native-born workers. Accidental falls were higher for foreign-born workers (23.5%) compared to 9.4% in native-born workers. Homicide and injury purposely inflicted by other persons was higher (14.1%) for foreign-born workers than native-born workers 5.8%.

A statistically significant difference ($p < .0001$) (Table 3) in incident type was found. The most frequent type of incidents in foreign-born workers was motor vehicle crashes (25.6%) compared with 29.9% in native-born workers. Falls were higher for foreign-born workers (24.4%) compared with 10.2% in native-born workers. Homicides were elevated for foreign-born workers (15.1%) compared with 6.1% in native-born workers. Struck bys were lower for foreign-born workers (5.8%) compared with 13.3% in native-born occupational fatalities.

Fatality rates for Kentucky foreign-born workers were significantly elevated over the study period compared to all U.S. foreign-born worker rates, and Kentucky and U.S. native-born fatality rates. Foreign-born fatality rates were almost double the U.S. foreign-born fatality rates and one-third higher than Kentucky native-born fatality rates over the study period (Figure 1). Native-born Kentucky worker fatality rates were also about 50% higher than the overall U.S. native-born worker fatality rates over the study period.

Approximately 24 cases (28.5%) of foreign-born workers and 198 cases (14.6%) of native-born workers were non-Kentucky residents (data not shown).

Discussion

The findings in this study show significantly elevated overall foreign-born worker fatality rates in Kentucky compared to overall U.S. worker fatality rates (regardless of whether the U.S. workers were foreign-born or native-born). Both Kentucky native-born and foreign-born fatality rates declined over the study period. Construction and transportation and material moving industries were the primary employment industries accounting for approximately 30% of fatalities and both industries are considered at high risk for occupational fatalities.

Motor vehicle crashes were the primary external cause of injury in both foreign-born and native-born workers. Motor vehicle crashes cost employers \$60 billion annually in medical care, legal expenses, property damage, and lost productivity.¹⁴ Motor vehicle crashes and related injuries can be prevented and employers should consider establishing or enhancing company driver safety programs and assure that driver safety training is appropriate for their needs. ANSI/ASSE Z15.1-2012¹⁵, Safe

Practices for Motor Vehicle Operations, outlines the minimum requirements for workplace motor vehicle safety programs that include seven major sections on (1) scope, purpose, applications, exceptions, and interpretations, (2) definitions, (3) management, leadership, and administration, (4) operational environment, (5) driver, (6) vehicle, and (7) incident reporting and analysis. This standard is applicable to both regulated and non-regulated fleets and provides similar management processes to the Federal Motor Carrier Safety Administration (FMCSA) ¹⁵ safety management cycle that contains six components: (1) policies and procedures, (2) roles and responsibilities, (3) qualification and hiring, (4) training and communication, (5) monitoring and tracking and (6) meaningful action.

Consistent with previous studies, our study found that falls continue to be a high risk in the workplace. According to OSHA in 2014 the leading cause of worker deaths on construction sites was due to falls, followed by electrocution, struck by, and caught-in/between injuries.¹⁶ Lack of fall protection was one of the most cited violations by Federal OSHA in fiscal year 2015.¹⁶ Implementing effective fall protection plans, improving work safety culture through continuous improvement, and worker education play a key role in fall prevention. The National Institute for Occupational Safety and Health (NIOSH) has a safety mobile app called “Ladder Safety Research and Innovations” that can be downloaded in English and Spanish for slip-trip-fall (STF) safety and control that can be used in the construction industry. The public health approach that NIOSH applies includes incident surveillance, risk identification, intervention, and implementation.¹⁷ This process helps understand the causes and sources of slip-trip-fall prevention and provides strategy interventions.

Our study found an elevated percentage of foreign-born worker fatalities due to homicides (15.1%). The majority of these cases involved a firearm. According to the BLS CFOI, in 2014 9% of fatal workplace injuries were workplace homicides.¹⁸ Workplace violence is a major concern and employers should consider establishing workplace violence prevention programs. An independent study by the Department of Homeland Security (DHS) entitled “Active Shooter: What You Can Do” on active shooter preparedness, is available through the Federal Emergency Management Institute.^{19,20} Webinars, workshop series, materials, videos and other helpful resources are also available for employers to use in the workplace.

More than half of foreign-born workers were Hispanic who spoke Spanish. OSHA, the main federal agency charged with establishment and enforcement of safety and health regulations, has the majority of their regulations in English. Employers with Spanish speaking employees face challenges when training their workers, and additional OSHA guidance and regulation documents in Spanish may be useful in gaining better foreign-born worker understanding of OSHA rules and regulations. Spanish speaking employers also may face greater challenges in understanding relevant OSHA rules and regulations. Additional resource materials in multiple languages, as well as language translating services and devices may contribute to greater understanding and compliance with worker safety rules and regulations.

Limitations to this study

There were limitations to our study. Not all Kentucky resident deaths may have been accounted for since fatal occupational injuries that occurred outside of Kentucky were not included in the data. The number of cases collected by the FACE program

represents Kentucky and non-Kentucky residents who died in Kentucky. However, information on Kentucky residents who died out of state is not available. Another limitation to this study is that the 2014 United States Census data used to calculate fatality rate numerators contained only preliminary data.

Conclusions

These findings highlight the importance of workplace safety and health. Regardless of industry, every employer should ensure that employees understand the hazards and risks present on their job site. During orientation training employees should be made aware of the commitment to safety and health in the workplace. Furthermore, establishing a proactive approach in the prevention of injuries and fatalities should be of primary importance. Worker safety training on rules and regulations in appropriate languages is key to maintaining a healthy and strong workforce.

The transportation industry, in particular, is at high risk for worker fatalities and driver safety training in appropriate languages may reduce motor vehicle crashes.

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Tables and Figures

Table 1. Demographic Characteristics of Foreign-born vs. Native-born Worker Fatalities in Kentucky, 2001-2014.

Demographic Characteristic	Foreign-born	Native-born	P-Value
Mean age (years)	38	47	
Gender			0.5612
Male	82 (94.3%)	1260 (92.6%)	
Female	5 (5.7%)	101 (7.4%)	
Total (gender)	87 (100%)	1361 (100%)	
Race			<.0001
White	73 (84.9%)	1260 (94.6%)	
Black	7 (8.1%)	69 (5.2%)	
Asian/American Indian	6 (7.0%)	3 (0.2%)	
Total (race)	86 (100%)	1332 (100%)	
Ethnicity			<.0001
Hispanic Origin	45 (51.7%)	13 (1.0%)	
Not of Hispanic Origin	42 (48.3%)	1322 (99.0%)	
Total (ethnicity)	87 (100%)	1335 (100%)	
Education			<.0001
Less than High School	38 (51.4%)	251 (21.5%)	
Finished High School	22 (29.7%)	625 (53.6%)	
Some College/ Completed College	14 (18.9%)	291 (24.9%)	
Total (education)	74 (100%)	1167 (100%)	
Marital Status			<.0001
Married	54 (65.1%)	861 (65.6%)	
Never Married	25 (30.1%)	187 (14.3%)	
Widowed/Divorced	4 (4.8%)	264 (20.1%)	
Total (marital status)	83 (100%)	1312 (100%)	
Primary Language			<.0001
English	6 (7.7%)	1355 (99.9%)	
Spanish	49 (62.8%)	1 (0.1%)	
Other	23 (29.5%)	1 (0.1%)	
Total (primary language)	78 (100%)	1357 (100%)	
Country of Origin			
U.S.A	0	1361 (100%)	
Mexico	41 (47.1%)		
Canada	4 (4.6%)		
Central America/Caribbean	11 (12.6%)		
Eastern Europe	6 (6.9%)		
Western Europe	7 (8.0%)		
Asia	9 (10.3%)		
Africa/Middle East	9 (10.3%)		
Total (country of origin)	87 (100%)	1361 (100%)	

Table 2. Kentucky Foreign-born vs. Native-born Worker Fatalities by Industry and Occupation, 2001-2014.

	Foreign-born	Native-born	P-Value
Industry			0.0082
Agriculture, Forestry, & Fishing	7 (8.0%)	246 (18.2%)	
Construction	23 (26.4%)	202 (14.9%)	
Manufacturing	11 (12.6%)	126 (9.3%)	
Transportation, Warehousing & Utilities	18 (20.7%)	249 (18.4%)	
Services	19 (21.8%)	292 (21.6%)	
Other*	9 (10.3%)	237 (17.5%)	
Total	87 (100%)	1352 (100%)	
Occupation			0.1052
Management, Business, and Financial	10 (11.5%)	265 (19.6%)	
Service	9 (10.3%)	134 (9.9%)	
Farming, Fishing, and Forestry	6 (6.9%)	76 (5.6%)	
Construction and Extraction	23 (26.4%)	236 (17.5%)	
Production	7 (8.0%)	74 (5.5%)	
Transportation and Material Moving	24 (27.6%)	343 (25.4%)	
Other*	8 (9.2%)	222 (16.4%)	
Total	87 (100%)	1350 (100%)	

*The following industries and occupations were merged into the other due to low cell values (mining, oil and gas extraction, public safety, healthcare and trade industries) and (computer, engineering, science, education, legal, community service, arts and media, healthcare practitioners and technical, sales and related, office and administrative support, and military specific occupations).

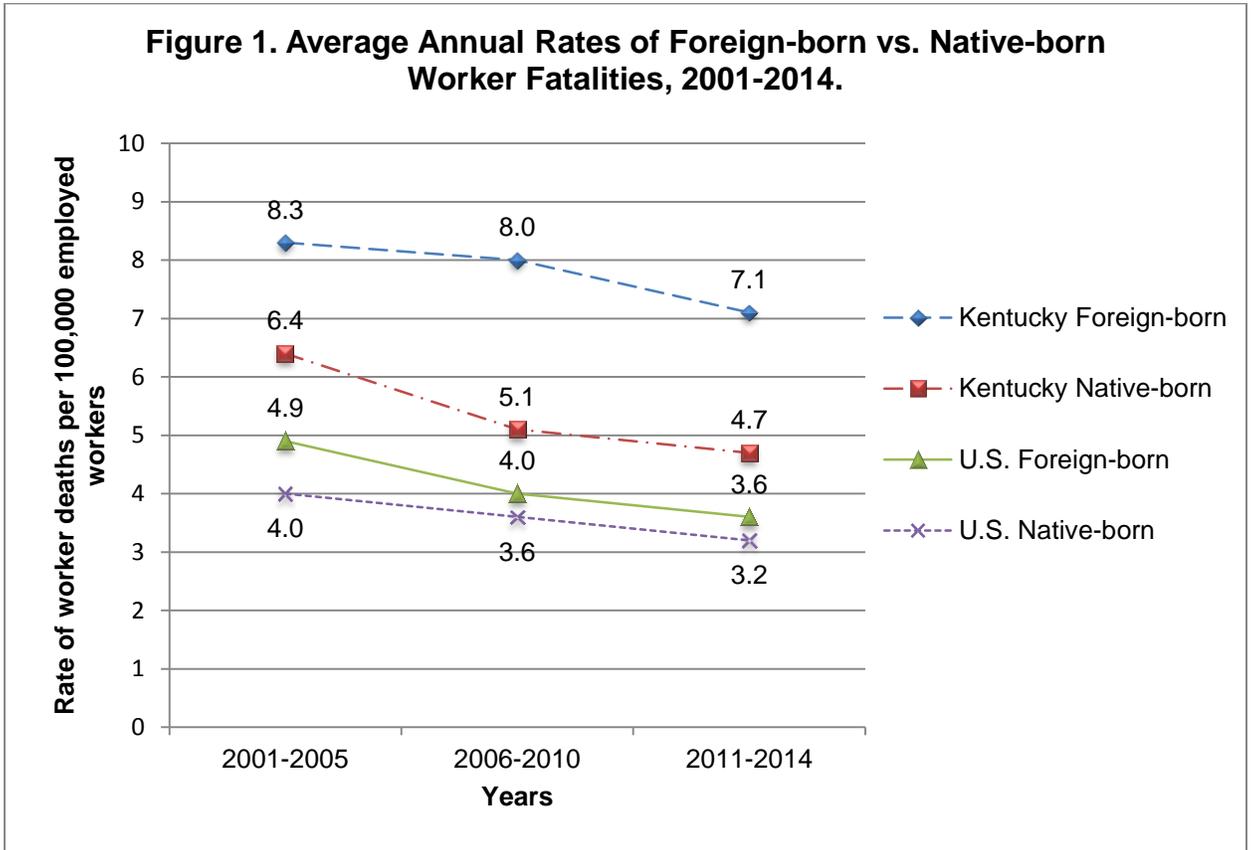
Table 3. External cause of fatal injury and incident type in Foreign-born vs. Native-born Workers in Kentucky, 2001-2014.

	Foreign-Born	Native-Born	P-Value
External Cause of Injury			<.0001
Railway accidents (E800-E807)	0	4 (0.3%)	
Motor vehicle traffic accidents (E810-E819)	22 (25.9%)	384 (28.5%)	
Motor vehicle traffic accident due to loss of control, without collision on the highway	7 (8.2%)	120 (8.9%)	
Water transport accidents (E830-E838)	0	6 (0.4%)	
Air and space transport accidents (E840-E845)	5 (5.9%)	34 (2.5%)	
Vehicle accidents not elsewhere classifiable (E846-E848)	0	9 (0.7%)	
Accidental poisoning by drugs, medicinal substances, and biologicals (E850-E858)	0	11 (0.8%)	
Accidental falls (E880-E888)	20 (23.5%)	127 (9.4%)	
Fall from or out of building or other structure	9 (10.6%)	38 (2.8%)	
Accidents caused by fire and flames (E890-E899)	0	12 (0.9%)	
Other accidents (E916-E928)	12 (14.1%)	497 (36.8%)	
Late effects of accidental injury (E929)	0	21 (1.6%)	
Suicide and self-inflicted injury (E950-E959)	4 (4.7%)	58 (4.3%)	
Homicide and injury purposely inflicted by other persons (E960-E969)	12 (14.1%)	78 (5.8%)	
Handgun (pistol, revolver)	11 (12.9%)	61 (4.5%)	
Injury undetermined whether accidentally or purposely inflicted (E980-E989)	0	5 (0.4%)	
All other external causes of injury*	10 (11.8%)	103 (7.6%)	
Total	85 (100%)	1349 (100%)	
Incident Type			<.0001
Fall	21 (24.4%)	137 (10.2%)	
MVC	22 (25.6%)	404 (29.9%)	
Air/Space Transport	5 (5.8%)	34 (2.5%)	
Struck by	5 (5.8%)	180 (13.3%)	
Homicide	13 (15.1%)	82 (6.1%)	
Other*	20 (23.3%)	512 (38.0%)	
Total	86 (100%)	1349 (100%)	

*All other external causes of injury includes Motor vehicle nontraffic accidents (E820-E825), Accidents due to natural and environmental factors (E900-E909), Accidents caused by submersion, suffocation, and foreign bodies (E910-E915), Drugs, medicinal and biological substances causing adverse effects in therapeutic use (E930-E949), and Injury resulting from operation of war (E990-E999).

* Other incident type includes machine/agricultural machines, electrocution, explosion, suicide, drowning, poisoning, overexertion, suffocation, animal related, caught in, crushed by, and confined space injuries were collapsed into the other category due to low cell values.

Figure 1. Average Annual Rates of Foreign-born vs. Native-born Worker Fatalities in Kentucky vs. U.S., 2001-2014.



Data obtained from Census of Fatal Occupational Injuries (CFOI) and Current Population Survey (CPS).^{12, 13}

Biographical Sketch

Yaillet Cruz Galardy received her Bachelor of Science in Aerospace and Occupational Safety from Embry-Riddle Aeronautical University in 2014. She is currently a Master of Public Health (MPH) candidate in Environmental Health at the University of Kentucky.

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