Work-related Injuries among Immigrant Workers

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List of Terms and Abbreviations

ACS = American Community Survey
CI = Confidence Intervals
MEPS = Medical Expenditure Panel Survey
NCHS = National Center for Health Statistics
NESARC = National Epidemiologic Survey on Alcohol and Related Conditions
NHIS = National Health Interview Survey
ICF= International Classification of Functioning, Disability, and Health
ICD-9-CM = International Classification of Disease, Ninth Revision, Clinical Modification
OR= Odds Ratio
PR = Prevalence Ratio
PSU = Primary Sampling Units
SE= Standard Error

Note: The terms "foreign-born" and "immigrant" are used interchangeably through the text and in our study publications as are the terms "US-born" and "native born".

Abstract

Background: Immigrants are an important and fast growing segment of the US population, approximately 12% of the total population. Immigrant workers comprise a sizable proportion of the total US workforce, and their numbers are growing. In recent years, safety and injury prevention at work have been raised as an issue among the US immigrant population, in part, because low skill immigrants are often employed in dangerous sectors such as agriculture and construction industries.

Methods: This research project investigated nonfatal injuries and work-related injuries among immigrants and US-born adults in the United States. We used three national propability sample survey data: 1997-2005 National Health Interview Survey (NHIS), 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), and 2000-2005 Medical Expenditure Panel Survey (MEPS). The NHIS data were used to compare prevelance and patterns of work-related injuries between immigrant and US-born workers (Specific Aim 1). The NESARC data were used to compare the prevalence of unintentional nonfatal injuries and risk-taking behaviors between immigrant and US-born respondents (Specific Aim 1). The MEPS data were used to study medical expenditures of nonfatal occupational injuries and to describe potential differences between immigrant and US-born workers in medical utilization and expenditures after work-related injuries (Specific Aims 2-3).

Results: Immigrant workers reported a lower rate of work-related injuries than US-born workers, 50/10,000 (95% CI=45-56) versus 89/10,000 (95% CI=86-93). In all industrial categories, foreign-born workers reported a significantly lower rate of work-related injuries than US-born workers. Patterns of work-related injuries with regard to external cause of injury, nature of injury, and injured body region were similar between the two groups. Injury severity measures suggested that foreign-born workers may have suffered more severe injuries than US-born workers. The total annual medical expenditures for work-related injuries were $13.9 billion (95% CI: $12.4-$15.5 billion) for US-born workers (88.5%) and $1.8 billion (95% CI: $1.5-$2.2 billion) for immigrant workers (11.5%). The mean medical expenditures per injured worker were comparable between the two groups ($2066 for the US-born vs. $1956 for immigrant workers). Although 52.3% of the medical expenditures of immigrant workers were office-based, only 38.1% of US-born workers' expenditures were office-based. Immigrant and US born workers paid similar percentages of medical expenditures out-of-pocket. Results from the NESARCH data indicated immigrants were less likely to have risk-taking behaviors than their US-born counterparts, which is perhaps why immigrant workers had a lower work-related injury risk.

Conclusions: National health survey data indicated that immigrant workers have an overall lower risk of non-fatal work-related injuries compared with the US-born workers. Injury patterns and medical expenditures of work-related injuries are comparable between two groups. Overall, immigrants are less likely to have risk-taking behaviors than their US-born counterparts.

SECTION 1

Highlights/Significant Findings

- Foreign-born workers had a lower rate of work-related injuries than US-born workers, 50/10,000 (95% CI=45-56) versus 89/10,000 (95% CI=86-93). The injury rates among foreign-born workers did not differ significantly by years of residence in the US.

- In all industrial categories, foreign-born workers reported a significantly lower rate of work-related injuries than US-born workers. Rankings by industry were similar for foreign-born and US-born workers.

- Those industries showing higher injury rates were construction (104/10,000 in foreign-born workers versus 214/10,000 in US-born workers), agriculture/forestry and fisheries (80/10,000 in foreign-born workers versus 170/10,000 in US-born workers), and manufacturing (80/10,000 in foreign-born workers versus 133/10,000 in US-born workers).

- The patterns for the external causes were similar between foreign-born and US-born workers. Overexertion/strenuous activities ranked first among injuries of US-born workers. Falls ranked first among the injuries of foreign-born workers, but the proportion of injuries due to falls and overexertion/strenuous activity were similar between the two populations.

- For both foreign-born and US-born injured workers, sprains and strains were the most common type of injury, followed by open wound. Injury patterns by affected body region were also similar for foreign-born and US-born workers. Injury to the extremities accounted for more than 84% of total work-related injuries, followed by injuries to the torso, head and neck.

- Work-related injuries suffered by foreign-born workers were more likely to result in hospitalization, and a larger proportion of those injuries to foreign-born workers resulted in more than 6 days or more of missed work. The two groups of workers did not differ in length of hospital stay after injury.

- Prevalence of victimization among immigrants was comparable to that among US-born adults. Employment status and industry/occupation overall were not significant risk factors for becoming victims of violence.

- The total annual medical expenditures for work-related injuries were $13.9 billion (95% CI: $12.4-$15.5 billion) for U.S.-born workers (88.5%) and $1.8 billion (95% CI: $1.5-$2.2 billion) for immigrant workers (11.5%).

- The mean medical expenditures per injured worker were comparable between the two groups ($2066 for the U.S.-born vs. $1956 for immigrant workers).

- Although 52.3% of the medical expenditures of immigrant workers were office-based, only 38.1% of U.S.-born workers' expenditures were office-based.

- Immigrant and U.S born workers paid similar percentages of medical expenditures out-of-pocket.

- Immigrants were less likely than their US-born counterparts to be involved in all ten risk-taking behaviors (P-value <0.05 from χ^2 test). However, when immigrants engaged in more than four risk-taking behaviors, the difference in injury prevalence between the two groups was not statistically significant (P-value >0.05).

- Immigrants with disabilities have greater rates of employment than US-born persons with disabilities. They also have different patterns of employment with respect to occupation, industry, and wage/salary income when compared with US-born persons with disabilities. Much remains to be learned regarding disabilities, general health, and occupational safety among US working-age immigrants with disabilities.

Translation of Findings

Contrary to general assumptions, results from this project provided consistent evidence that immigrant workers have an overall lower risk of non-fatal work-related injuries compared with the US-born workers. Injury patterns and medical expenditures of work-related injuries are comparable between the two groups. Immigrants are less likely to involve risk-taking behaviors than their US-born counterparts. Our findings have the potential to guide future occupational safety and health policies and research funding in the areas of immigrant safety and health.

Outcomes/Relevance/Impact

Findings from this project provide answers to important occupational safety questions about whether immigrant workers in the US face a significantly higher risk of occupational injuries than US-born workers and whether patterns of injuries and medical expenditures differ between the two groups. This study concludes that immigrant workers have an overall lower risk of non-fatal work-related injuries compared with the US-born workers. Injury patterns and medical expenditures of work-related injuries are comparable between two groups. However, the following issues warrant future research:

- Future research needs to investigate why immigrant workers suffer more severe work-related injuries than US-born workers.

- Given the findings from our research that adults with disabilities have a substantially higher risk of injury than adults with no disability, and immigrants with disabilities have greater rates of employment than US-born persons with disabilities, much remains to be learned regarding disabilities, general health, and occupational safety among US workers and immigrants with disabilities.

SECTION 2 - Scientific Report

Background

Research on the occupational safety and health of foreign-born workers in the United States is limited despite the fact that in 2002, an estimated 25.9 million immigrants (80.4% of the total foreign-born population in the US) were of working age (aged 18-64 years). Many foreign-born persons are employed in the most hazardous sectors of the workforce, including the agriculture, construction, and service industries. Between 1999 and 2000, while the overall number of work-related fatal injuries in the US decreased, there was a 5% increase in the number of work-related fatalities among foreign-born workers. However, national information is lacking on nonfatal work-related injuries among foreign-born persons in the US and on the medical treatment of these injuries. With more immigrants joining the US workforce, it is critically important to understand the nature, frequency, and consequences of work-related injuries among foreign-born persons.

Our long-term research goal is to study work-related injuries among immigrant workers in the US. The three specific aims are:

Specific Aim 1: To compare prevelance, injury patterns and risk factors of work-related injuries between immigrant and US-born workers in the US;

Specific Aim 2: To examine the medical service expenditures for treating nonfatal work-related injuries among immigrant and US-born workers in the US;

Specific Aim 3: To describe potential differences between immigrant and US-born workers in medical utilization and expenditures after work-related injuries

Study Design and Methods

1. Overall Study Design

This research project used three national propability sample survey data: 1997-2005 National Health Interview Survey (NHIS), 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), and 2000-2005 Medical Expenditure Panel Survey (MEPS). The NHIS data were used to compare prevelance and patterns of work-related injuries between immigrant and US-born workers (Specific Aim 1). The NESARC data were used to compare the prevalence of unintentional nonfatal injuries and risk-taking behaviors between immigrant and US-born respondents (Specific Aim 1). The MEPS data were used to study medical expenditures of nonfatal occupational injuries and to describe potential differences between immigrant and US-born workers in medical utilization and expenditures after work-related injuries (Specific Aims 2-3). In addition, we used the 2007 American Community Survey data to investigate disability and employment among immigrant and US-born adults and used 2004-2008 NHIS data to compare overall nonfatal injuries between US adults with and without disabilities.

2. Data Sources

National Health Interview Survey (NHIS)

The 1997-2005 National Health Interview Survey (NHIS), which is a survey of the civilian, non-institutionalized population administered by the US Census Bureau for the National Center for Health Statistics (NCHS). The NHIS uses a complex survey design involving stratification, clustering, and oversampling of certain populations (e.g., racial/ethnic minorities) to ensure a sufficient sample size of underrepresented groups. Sample weights provided by NCHS take into account the complex sampling design and non-response. The NHIS interviews are conducted year-round to eliminate seasonal influences on responses.

Trained interviewers conducted computer-assisted personal interviews in participants' homes. All adult household members who were present at the time of the interview were invited to participate. One adult family member was chosen to provide information for all children and for any adults not home at the time of the interview. Interviewers made a number of attempts to contact family members before excluding a household. In most cases, one or two attempts were sufficient to obtain an interview. The overall household response rates for the NHIS ranged from 86.5% to 90.0% between 1997 and 2005.

The NHIS includes a personal file, an adult sample file, an injury file, and other data files. We used the personal file and the injury file for the majority of the statistical results presented in this paper. In order to evaluate alcohol use and worker's industry/occupation, the adult sample file data were used. Response rates for the adult sample files ranged from 69.0% in 2005 to 80.4% in 1997.

National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)

The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) is a survey conducted among the US civilian noninstitutionalized adult population. Data used in this study came from the cross-sectional NESARC survey conducted in 2001-2002. The field data collection for NESARC was conducted by the US Census Bureau, under the direction of the staff of the National Institute on Alcohol Abuse and Alcoholism. Interviewers for the NESARC were professionally trained survey interviewers with an average of five years experience. All potential survey respondents were informed in writing of the nature of the survey, use of the data, confidentiality protection and rights regarding voluntary participation or withdrawal from the study. Quality control procedures were implemented throughout the interviewing process. Blacks, Hispanics, and young adults ages 18 to 24 years were oversampled to ensure appropriate representation of minority population. One individual per household was randomly chosen for participation, and consenting individuals were interviewed. A total of 43,093 adults completed interviews with an overall response rate of 81% in the 2001-2002 NESARC survey.

The NESARC survey data were weighted to adjust for the probabilities of sample selection, nonresponse, and oversampling of subgroups. The weighted results were representative of the US civilian noninstitutionalized adult population for region, age, gender and race/ethnicity.

Medical Expenditure Panel Survey (MEPS)

The sampling frame of MEPS is drawn from respondents to NHIS. Immigration information is not contained in MEPS so we used the NHIS data to identify immigrant workers in MEPS. We pooled and linked data from the 1998-2004 NHIS and the 2000-2005 MEPS to construct a database to investigate medical utilization and medical expenditures of nonfatal occupational injuries in the US.

The MEPS is conducted annually and cosponsored by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Health Statistics (NCHS). It provides nationally representative estimates of health care use, insurance coverage, medical expenditures and sources of payment for the civilian non-institutionalized population. The MEPS has two major components: the household component (MEPS-HC) and the insurance component (MEPS-IC). MEPS-HC obtains data from a nationally representative sample of households through an overlapping panel design in which new respondents are sampled and recruited from NHIS respondents each year and are interviewed 5 times over a 2.5-year period. This provides continuous and current estimates of health care expenditures at both the person and household level for each calendar year. A third component of MEPS, the medical provider component (MPC) supplements and corroborates information received from the MEPS-HC component; the information from the MPC is incorporated into the MEPS-HC data files. MEPS-IC is an annual survey of employers that collects information on the employer's health insurance offerings

In the MEPS, expenditures were defined as the sum of payments paid for medical care services, including out-of-pocket payments, payments from private insurance, from Medicare and Medicaid, or from other sources. Payments for over-the-counter medications and for alternative medicine (e.g., acupuncture or chiropractic care) are not included. The AHRQ applies imputation methods using available charge and payment data in either the MEPS Household Component or the MEPS Medical Provider Component to replace missing expenditure data. After weighting for survey design and adjusting for omissions, MEPS estimates of national health expenditures agree very well with national health expenditures from the US Department of Health and Human Services' National Health Accounts.

American Community Survey (ACS)

The ACS is a nationwide community survey conducted by the US Census Bureau. The ACS provides critical economic, social, demographic, and housing information about US communities every year. The survey has a high response rate, generally between 95% and 97%. This study used data from the 2007 ACS *Public Use Microdata Sample* (PUMS) to describe disability and employment characteristics among US-born and foreign-born individuals in the United States. The 2007 PUMS data contains 1,293,393 housing unit records, 2,946,342 person records from households, and 81,679 person records from group quarters. We chose to analyze the US working-age population – those individuals 18-64 years of age – for a total of 1,838,934 person records. More information about the ACS can be found in the ACS Design and Methodology report. The Census Bureau's internal Disclosure Review Board sets the confidentiality rules for all public data releases.

3. Definitions

- ***Immigrants***

In NHIS and MEPS, immigrant status was determined by responses to the question, "Where were you born?" The NHIS categorized respondents born in US territories as foreign-born because they were likely to have a culture different from mainstream US culture. Therefore in our analysis, US-born workers included only those individuals born in one of the 50 states or the District of Columbia. Another variable included in our study was the number of years of residency in the US. Foreign-born respondents were categorized into four groups: <5 years, 5-9 years, 10-14 years, and ≥15 years. These data were obtained from responses to the question, "About how long have you been in the United States?"

Nativity (foreign-born vs. US-born) and years of residence in the US were both reported in the NESARC survey. In our study, a respondent was defined as an immigrant if they were born outside the US. This was determined by the answer to the question "Were you born in the United States?" Immigrant respondents were arbitrarily categorized into three groups according to years of residence (<5 years, 5-14 years, and 15+ years), based on the answer to the question "How many years have you lived in the United States?"

When the 2007 ACS data were analyzed, we divided the subjects into the following two categories: foreign-born and US-born. Immigrants were defined as individuals born in countries/districts other than the United States. This was based on the ACS survey question: "Where was this person born?" Two answers were possible: (1) In the United States, or (2) Outside the United States. Respondents who were born in the United States, Puerto Rico, an US Island Area, or abroad to parents who are US citizens are considered citizens at birth. Foreign-born people who stated that they were US citizens through naturalization are also considered US citizens. Those considered non-citizens indicated that they were not US citizens at the time of the survey.

The terms "foreign-born" and "immigrant" were used interchangeably in our publications as were the terms "US-born" and "native born."

- ***Overall Nonfatal Injuries***

Respondents of the NESARC were asked about injury-related hospitalizations during the previous 12 months. Respondents who reported at least 1 injury episode were considered injury cases in our study. This was determined by the survey question: "In the past 12 months, how many injuries have you had that caused you to seek medical help or to cut down your usual activities for more than half a day?"

- ***Work-related Injuries***

The NHIS data included questions about medically consulted injuries that occurred for any member of the family within a three-month reference period. A medically consulted injury episode refers to a traumatic event in which a person is injured from an external cause (e.g., fall,

motor vehicle traffic accident) and seeks medical help (e.g., call to a poison control center, use of an emergency vehicle, visit to an emergency room, visit to a doctor's office or other health clinic, phone call to a doctor, nurse, or other health care professional). Respondents were asked to report the total number of injury/poisoning episodes that occurred during the three-month reference period.

Respondents were asked the question, "What were you doing when the injury happened?" In this study, work-related injury episodes were defined by the response, "Working at a paid job" (variables "WHAT_1" and "WHAT_2" in the NHIS). There were separate questions about injuries and poisoning, and data were saved separately in two files (one for injuries and one for poisonings) from 1997 to 1999. After 1999, one question was asked about both injuries and poisonings, but injuries could be separated from poisonings by using a variable describing "the cause of the person's injury/poisoning" ("CAUSNEW"). We chose to focus on work-related injuries, and poisoning cases were excluded using this injury cause variable ("CAUSNEW"= 4 for poisoning).

MEPS uses five rounds of interviews over a 2.5-year period to collect detailed data on medical conditions, health care use, medical expenditures, sources of payment, and health insurance coverage. When a medical condition is first reported in the MEPS, a portion of the MEPS Household Component questionnaire asks the respondent to specifically report whether this medical condition is an injury or not (yes or no). When an individual (≥16 years of age) reports an injury in the MEPS, a number of questions are asked, including "Whether the injury occurred at work." In our study, injuries were defined as occupational injuries if the respondent answered, "Yes" to "Whether the injury occurred at work."

- ***Disabilities***

Disabilities were defined by a 'yes' response to one of six disability questions covered in the 2007 ACS Questions 15-17. Q15 - Does this person have any of the following long-lasting conditions: (1) Blindness, deafness, or a severe vision or hearing impairment? (2) A condition that substantially limits one or more basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying? Q16 - Because of a physical, mental, or emotional condition lasting six months or more, does this person have any difficulty in doing any of the following activities: (3) Learning, remembering, or concentrating? (4) Dressing, bathing, or getting around inside the home? Q17 - Because of a physical, mental, or emotional condition lasting six months or more, does this person have any difficulty in doing any of the following activities: (5) Going outside the home alone to shop or visit a doctor's office? (6) Working at a job or business? This disability definition is consistent with conceptual framework of the International Classification of Functioning, Disability, and Health (ICF).

NHIS also uses the ICF concept of disability classification to define disability status. We classified respondents into three categories: individuals with no disabilities, with moderate disabilities, and with severe disabilities. Respondents who responded "yes" to at least one of the following questions were classified as having a disability: 1) " Are you limited in any way in any activities because of physical, mental, or emotional problems?" 2) "Are you limited in any way because of difficulty remembering or because you experience periods of confusion?" 3)

"Are you limited in the kind OR amount of work you can do because of a physical, mental or emotional problem?" 4) "Because of a health problem, do you have difficulty walking without using any special equipment?" 5) "Because of a physical, mental, or emotional problem, do you need the help of other adults with PERSONAL CARE NEEDS, such as eating, bathing, dressing, or getting around inside the home?" and 6) "Because of a physical, mental, or emotional problem, do you need the help of other adults with ROUTINE NEEDS, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?" Individuals with disabilities who responded "yes" to question 5 or 6 were classified as having severe disabilities. Those who answered yes to at least one of the first 4 questions, but neither 5 nor 6 were defined as having moderate disabilities.

- ***Behavioral Risk Factors***

Detailed information was collected in the NESARC survey about a variety of risk-taking behaviors. We selected ten behavioral risk factors that are generally recognized as risk factors for injuries in published literature. These risk factors cover three main areas, including substance use (tobacco use, drug use, alcohol drinking), drinking and driving, and other risky motor vehicle driving behaviors. Because the focus of the original survey was on alcohol and substance abuse, nine of ten risk behaviors we examined were about alcohol, substance, and motor vehicle driving risk behaviors. Whenever possible, we used information about risk-taking behaviors of the respondent in the 12 months prior to the survey to ensure that risk-taking behaviors and nonfatal injuries occurred in the same study period. However, questions regarding reckless driving, driver's license suspension, and doing dangerous things that easily have hurt someone were asked about respondents' lifetime behaviors. All questions were self-reported using the standardized instruments in health surveys.

We counted the total number of risk-taking behaviors for each respondent, with the assumption that a higher number of total risk-taking behaviors would increase the prevalence of nonfatal injuries.

4. Statistical Analyses

- ***Work-related Injuries among Immigrant Workers***

SAS [2004] and SUDAAN [2004] statistical software were used for the statistical analyses. SUDAAN procedures were used to account for the complex sample design and weighting structure of the NHIS and MEPS.

The weighted rates of work-related injuries per 10,000 workers among the foreign-born and US-born were calculated by sociodemographic characteristics (the personal file was linked with the injury file). The work-related injury rates were calculated for each year and all years combined (1997-2005) for both foreign-born and US-born workers. Injury odds ratios (ORs) and 95% confidence intervals (95% CI) were also calculated in logistic regression models.

In univariate models, nativity, sex, age, race/ethnicity, level of education, poverty status, family size, insurance status, delayed medical care, alcohol use, and years in the US were all significant

($p < 0.05$) and used as covariates in the final logistic regression models. Out of the four final logistic regression models, two models were based only on the adult sample file of the NHIS. This allowed for inclusion of a variable describing alcohol use, which is often considered a significant injury risk factor. The adult sample files were approximately 1/3 the size of the person files of NHIS data, ranging from 34.9% in 1997 to 31.9% in 2005. Interactions between immigrant status and other covariates were examined. The interaction terms were not statistically significant and were not included in the final logistic regression models.

Using the adult sample file, injury rates by industry were calculated and ranked for both foreign-born and US-born workers. Injury patterns for all injuries (external cause, injury type, and body region injured) were examined using information from the injury datasets. The following measures of severity were included as well: overnight hospitalization, hospitalized nights, and days of work missed as the result of the work-related injury. Proportions of injuries and 95% CIs by external cause, injury type, injured body region, and injury severity were presented separately for foreign-born and US-born workers.

- ***Medical Expenditures Associated with Work-related Injuries among Immigrant Workers***

Data analyses were conducted using SAS [2004] and STATA [2009]. All medical expenditures were adjusted as 2005 equivalent dollars using the Consumer Price Index for Medical Services published by the US Bureau of Labor Statistics. Survey-weight adjusted percentages and 95% confidence intervals (CI) were derived using the SURVEYFREQ procedure in SAS to account for the complex survey design and weighting structure of the MEPS.

We first analyzed the sociodemographic characteristics of individuals who reported occupational injuries, separately for immigrant and US-born workers. Sociodemographic factors included age, sex, race/ethnicity, marital status, education, family poverty status based on federal poverty level, health insurance coverage, and the major industry in which the injured person worked.

Second, we calculated mean medical expenditures per injured worker related to occupational injuries by sex and age for both immigrants and US-born individuals. In our analyses steps, we examined the log transformation of medical expenditures. The log transformation is known to achieve normality for certain types of economic data, but it did not work in our study. Therefore we employed non-parametric bootstrap methods to provide a robust alternative for calculating the 95% confidence intervals (95% CIs) of the medical expenditures' means. The bootstrap approaches have been used by others to analyze medical costs or expenditure data.

Third, we estimated the total annual medical expenditures of occupational injuries in the US, calculated the mean expenditure per injured worker, and investigated the percentage distribution of medical expenditures by different types of services (office-based, outpatient, emergency room, inpatient, home health care, and prescribed medicine). We did these analyses separately for immigrant and US-born workers. We also calculated the percentage of total medical expenditures associated with occupational injuries that were paid out-of-pocket by immigrant and US-born workers.

Finally, to obtain estimates of medical expenditures resulting from occupational injuries adjusted for relevant covariates, we used the two-part regression models that have been used by others to analyze medical cost data.

- ***Behavioral Risk Factors and Overall Nonfatal Injuries among Immigrants***

Because the goals of our study were to compare unintentional nonfatal injuries among immigrant and US-born adults in the US and to investigate differences in selected behavioral risk factors between two groups, we did not use the weighting structure of the NESARC survey in our statistical analyses.

First, we calculated injury prevalence (%), injury prevalence ratio (PR) and 95% confidence intervals (CI) for the PR. Then, these injury measurements were compared between immigrant and US-born respondents according to gender, age, race/ethnicity, years of education, current FPL, income group based on immigrant's country of origin, residence in the US, and standard classifications of employment industry and occupation. Injury prevalence between the two groups was considered to be statistically significant if the P-value from the Chi-square (χ^2) test of difference was less than 0.05.

Second, we calculated the prevalence of injuries (%) by years of residence in the US and used the Chi-square test (χ^2) to investigate whether length of stay in the US had any impact on the prevalence of injuries among immigrant adults.

Third, we calculated the proportion (%) of respondents who were involved in risk-taking behaviors and used the Chi-square test (χ^2) to determine if immigrant adults were less likely than US-born adults to be involved in behavioral risk factors. In order to test the second of our hypotheses regarding the association between risk-taking behaviors and injury risk, we compared injury prevalence (%) between immigrants and US-born adults according to their total number of behavioral risk factors.

Finally, we utilized negative binominal Poisson regression models to control for the confounding effects of sociodemographic variables when determining the association between immigrant status and nonfatal injuries.

- ***Disability and Nonfatal Unintentional Injuries among US Adults***

We calculated weighted 3-month cumulative incidence of injuries per 100 individuals. We first analyzed the distribution of disabilities in the study sample of the NHIS. Proportion and 95% CI of individuals in each of the three disability groups, status by sex, age, race/ethnicity, education, marital status, and poverty status are presented.

We then compared 3-month cumulative incidence of injuries among individuals with no disability, moderate disability and severe disability by the above sociodemographic variables. We also examined differences in injury patterns by injury characteristics including type of injuries diagnosed using the ICD-9-CM N codes, mechanism of injury episode, activity at time of the injury event, and place the injury event occurred. We also compared hospital length of stay

for those injuries that required hospitalization. Finally, we used logistic regression models to calculate risk of injuries while controlling for sociodemographic variables. We assessed the impact of major sociodemographic variables on the association between disability status and injury risk. All variables that were statistically significant ($P<0.05$) in the univariate analysis were included in the multivariate model.

- ***Disability and Employments among Immigrants and US-born Adults***

Statistical Analysis Software [SAS, 2004], version 9.1, was used for the data analysis. We used the weights provided in PUMS to generate national estimates, including total numbers and proportions. The weighting factors considered non-response, selection ratio, and distributional disparities of age, sex, race, and Hispanic origin from the Intercensal Population Estimates (IPEs) program of the Census Bureau. Since our calculations were based on these weights, our statistics should be interpreted as national estimates of the civilian non-institutionalized population of the United States.

Like most large national surveys, the ACS employs a complex sampling design to select the housing units that will be included in the sample. The US Census Bureau currently employs a specific type of replication method called the successive difference replication (SDR) method to compute standard errors for publicly released ACS estimates. Replicate weights are used to calculate direct standard errors, which are often more accurate than generalized standard errors.

Each observation in the internal, person-level ACS data file contains the full-sample weight and 80 replicate weights. To calculate the standard error of an estimate, the full sample estimate was first calculated using the full-sample weight in our study. Next, 80 “replicate estimates” were calculated by estimating the statistic using each of the replicate weights. The standard error for the full-sample estimate was derived using a formula that incorporates the difference between the full-sample estimate and each replicate estimate.

All rates/proportions were calculated using the SAS FREQ procedure. With the standard errors calculated using the replicate method for each proportion, 95% confidence intervals (CI) around the estimated rates/proportions were constructed with the assumption of an asymptotically normal distribution.

Study Results

- ***Work-related Injuries among Immigrant Workers (Specific Aim 1)***

A total of 3,260 workers reported work-related injuries during the 3-months prior to the 1997-2005 NHIS interviews. The time trends of foreign-born and US-born work-related injury rates for the years 1997 to 2005 are similar (Figure 1). Foreign-born workers reported a lower rate of work-related injuries than US-born workers, 50/10,000 (95% CI=45-56) versus 89/10,000 (95% CI=86-93).

Across many of the sociodemographic categories, foreign-born workers had significantly lower rates of work-related injuries than their US-born counterparts. Only for workers 65 years and older was the foreign-born work-related injury rate higher than the US-born rate; however this difference was not statistically significant (Table 1).

For both foreign-born and US-born workers, males had a higher rate of work-related injury than females. Among US-born workers, work-related injury rates were highest among the youngest workers, and the rates trended down with increasing age groups. For the foreign-born worker, injury rates were highest among the youngest and oldest age groups.

Figure 1. Time trends of work-related injury rates among US-born and foreign-born workers (1997 to 2005)

In all industrial categories, foreign-born workers reported a significantly lower rate of work-related injuries than US-born workers (Table 2). Rankings by industry were similar for foreign-born and US-born workers. Those industries showing higher injury rates were construction (104/10,000 in foreign-born workers versus 214/10,000 in US-born workers), agriculture/forestry and fisheries (80/10,000 in foreign-born workers versus 170/10,000 in US-born workers), and manufacturing (80/10,000 in foreign-born workers versus 133/10,000 in US-born workers).

Table 1. Work-related injury rate per 10,000 with 95% CI for foreign-born and US-born workers, NHIS, 1997-2005

	Foreign-born			*US-born*			
	Observation (n)	**Injured (n)**	**Rate (95% CI)**	**Observation (n)**	**Injured (n)**	**Rate (95% CI)**	**Rate Ratio**
Total	77,844	405	50 (45-56)	324,823	2,855	89 (86-93)	0.56**
Sex							
Male	45,992	291	59 (52-68)	167,431	1,927	116 (110-122)	0.51**
Female	31,852	114	36 (30-44)	157,392	928	59 (55-64)	0.61**
Age (years)							
18-24	9,110	58	62 (46-83)	40,432	421	116 (103-129)	0.53**
25-44	44,622	221	48 (41-55)	159,944	1,503	95 (89-100)	0.51**
45-64	22,566	115	48 (39-61)	113,475	882	77 (71-82)	0.62**
65+	1,546	11	63 (33-120)	10,972	49	45 (34-60)	1.40
Race/Ethnicity							
Non-Hispanic White	11,548	67	60 (46-78)	244,239	2,214	92 (87-96)	0.65**
Black	5,605	22	39 (25-60)	44,232	329	76 (67-85)	0.51**
Hispanic	48,479	274	54 (48-62)	30,936	254	83 (72-97)	0.65**
Asian	11,536	37	32 (23-44)	2,473	11	40 (22-73)	0.80
Other ethnic group	390	4	113 (44-287)	2,684	43	145 (107-197)	0.78
Education							
Less than high school	28,077	171	58 (49-68)	30,555	416	144 (130-159)	0.40**
High school diploma	16,524	83	50 (39-64)	100,716	1,095	114 (107-122)	0.44**
Some college	14,277	88	66 (51-84)	102,243	972	97 (91-104)	0.68**
Bachelor's degree or	15,704	52	32 (24-44)	85,468	349	40 (36-45)	0.80
Not reported							
Poverty status							
Poor	8,505	48	52 (38-72)	15,057	183	123 (104-145)	0.42**
Near poor	14,886	82	52 (41-65)	32,456	424	138 (125-153)	0.38**
Not poor	31,184	182	55 (47-65)	195,835	1,763	92 (88-98)	0.60**
Family size							
1-3	36,803	208	56 (48-65)	216,245	1,997	93 (89-98)	0.60**
4-5	29,309	129	41 (33-51)	92,994	741	82 (76-88)	0.50**
6+	11,732	68	52 (39-70)	15,584	117	77 (63-94)	0.68*
Insurance status							
Uninsured	26,144	129	47 (38-56)	40,531	446	116 (104-128)	0.41**
Insured	43,148	221	49 (42-57)	243,343	1,910	80 (76-84)	0.61**
Not reported	654	2	36 (7-194)	2,186	11	52 (27-98)	0.69
Delayed getting needed medical care							
Yes	5,194	38	71 (50-101)	26,061	427	166 (151-183)	0.43**
No	72,445	366	48 (43-54)	298,151	2,425	83 (79-87)	0.58**
Alcohol use							
Life time abstainer	9,797	32	30 (20-44)	23,208	156	68 (58-81)	0.44**
Former drinker	2,668	22	72 (47-112)	18,212	200	114 (99-131)	0.63*
Current drinker	16,925	101	53 (43-65)	105,694	1,115	107 (100-114)	0.50**
Years in the US							
<5	9,573	54	59 (43-80)				
5-9	10,519	56	50 (38-66)				
10-14	10,596	55	50 (37-67)				
>15	33,278	174	48 (41-58)				

*P<0.05 and **P<0.01 based on chi-square test comparing foreign-born to US-born.

Table 2. Work-related injury rate per 10,000 workers with 95% CI by industry[a] and nativity, NHIS, 1997-2005

	Foreign-born			*US-born*			
	Rank Order	**Injured (n)**	**Rate (95% CI)**	**Rank Order**	**Injured (n)**	**Rate (95% CI)**	**PR [%]**
Industry [a]		142			1338		
Construction	1	23	104 (67-163)	1	174	214 (183-251)	0.49**
Agriculture, Forestry and Fisheries	2	10	80 (40-160)	2	40	170 (119-242)	0.47*
Manufacturing	3	36	80 (56-114)	3	248	133 (118-150)	0.60**
Transportation and Utilities	5	10	36 (18-69)	4	117	118 (98-143)	0.31**
Wholesale/retail trade	4	27	53 (34-84)	5	248	106 (92-122)	0.50**
Services	6	27	27 (18-41)	6	362	66 (59-73)	0.41**
Others		6	15 (6-35)		131	67 (55-81)	0.22**

[a] Industry information only available from the adult sample survey.

*P<0.05 and **P<0.01 based on chi-square test comparing foreign-born to US-born.

Overexertion/strenuous activities and falls were the two most common external causes of injury, followed by cut/pierced by object, struck by object or person, machinery, transportation and fire/burn/scald (Table 3). The patterns for these external causes were similar between foreign-born and US-born workers. Overexertion/strenuous activities ranked first among injuries of US-born workers. Falls ranked first among the injuries of foreign-born workers, but the proportion of injuries due to falls and overexertion/strenuous activity were similar between the two populations.

For both foreign-born and US-born injured workers, sprains and strains were the most common type of injury, followed by open wound (Table 3). Nature of injury was coded as "unspecified" for 18.4% of the injuries of foreign-born workers and 15.5% of injuries of US-born workers.

Injury patterns by affected body region were also similar for foreign-born and US-born workers. Injury to the extremities accounted for more than 84% of total work-related injuries, followed by injuries to the torso, head and neck (Table 3). Injured body region was coded as unclassified in 7% of the injuries for both injured foreign-born and US-born workers.

Table 3 also includes measures of injury severity, specifically hospitalization and missed work. Injuries suffered by foreign-born workers were more likely to result in hospitalization, and a larger proportion of those injuries to foreign-born workers resulted in more than 6 days or more of missed work.

Table 3. Weighted proportion (%) of work-related injuries by injury external causes, nature, body region, and measures of severity, NHIS, 1997-2005

	Foreign-born			*US-born*		
	Rank Order	**Injuries (n)**	**Proportion (95% CI)**	**Rank Order**	**Injuries (n)**	**Proportion (95% CI)**
Cause of injury based on E codes						
Overexertion/strenuous movements	2	93	23.3 (18.8-28.4)	1	821	28.2 (26.4-30.0)
Fall	1	102	23.6 (19.1-28.8)	2	637	21.4 (19.7-23.3)
Cut/pierce	3	57	15.9 (11.7-21.3)	3	365	12.8 (11.6-14.2)
Struck by object or person	4	50	10.3 (7.8-13.6)	4	372	12.5 (11.4-13.8)
Machinery	5	35	7.8 (5.5-10.9)	5	158	5.3 (4.5-6.3)
Transportation	6	23	6.0 (3.8-9.5)	6	114	3.6 (3.0-4.4)
Fire/burn/scald	7	10	2.5 (1.3-4.9)	7	73	2.5 (2.0-3.2)
Animal or insect bite	8	4	1.0 (0.3-3.3)	8	47	1.7 (1.2-2.3)
Other		40	9.8 (6.9-13.7)		350	12.0 (10.8-13.2)
Nature						
Sprain & strains	1	119	31.2 (26.6-36.3)	1	1021	35.1 (33.1-37.1)
Open wound	2	84	20.8 (16.3-26.1)	2	593	20.8 (19.3-22.4)
Contusion/superficial	4	44	10.2 (7.4-13.8)	3	296	9.9 (8.8-11.0)
Fracture	3	46	11.0 (8.1-14.9)	4	240	8.2 (7.2-9.3)
Others		37	8.3 (5.7-12.0)		319	10.7 (9.6-11.9)
Unspecified		81	18.4 (13.9-24.0)		463	15.5 (14.1-16.9)
Body region						
Extremities	1	339	84.0 (78.8-88.1)	1	2499	85.5 (84.1-86.8)
Torso	2	29	6.2 (3.7-10.1)	2	156	5.3 (4.5-6.3)
Head and neck	3	8	1.6 (0.8-3.3)	3	60	2.0 (1.5-2.6)
Spine and back	4	8	1.6 (0.8-3.1)	4	19	0.6 (0.4-1.0)
Unclassified		27	6.6 (4.3-10.0)		192	6.6 (5.7-7.6)
Hospitalized over night*						
Yes		24	5.4 (3.4-8.4)		90	2.8 (2.3-3.5)
No		385	94.6 (91.6-96.6)		2835	97.2 (96.5-97.7)
Hospitalized nights						
None		385	94.6 (91.6-96.6)		2835	97.2 (96.5-97.7)
1		10	2.2 (1.0-4.7)		33	1.0 (0.7-1.4)
2-3		6	1.5 (0.6-3.8)		30	1.0 (0.7-1.5)
4+		8	1.6 (0.7-3.7)		26	0.8 (0.6-1.2)
Work days missed**						
None		119	30.0 (25.2-35.3)		1063	36.6 (34.7-38.4)
< 1		47	12.1 (8.8-16.5)		347	12.4 (11.1-13.8)
1-5		100	25.9 (21.1-31.4)		766	26.8 (25.0-28.7)
6+		144	32.0 (27.4-36.9)		732	24.3 (22.8-25.9)

*P<0.05 and **P<0.01 based on chi-square test comparing foreign-born to US-born.

- ***Medical Expenditures Associated with Work-related Injuries among Immigrant Workers (Specific Aim 2-3)***

A total of 139,417 persons were sampled from NHIS (1998-2004) and MEPS (2000-2005), including 6,433 who reported one or more occupational injuries. Among the injured persons, 4,785 were US-born workers (74.4%), 1,066 were immigrant workers (16.6%), and 582 were workers (9.05%) whose birthplace was not reported in the NHIS.

The estimated mean medical expenditures and 95% CIs by sex and age are presented separately for US-born and immigrant workers in Table 4. Our results suggest that the mean medical expenditures associated with treatment of occupational injuries are comparable between the two groups of workers.

Table 4 Estimated Mean Medical Expenditures for Occupational Injuries, 2000-2005 MEPS

	U.S.-born			Immigrant		
	Injured n	Mean Expenditure† $	95 % CI¥	Injured n	Mean Expenditure† $	95 % CI¥
Male						
18-24 years	205	1324	874 – 1950	33	721	372 – 1306
25-44 years	995	1980	1659 – 2371	303	2829	1755 – 4335
45-54 years	553	2439	1993 – 2979	133	2020	1339 – 2956
55-64 years	318	2506	1925 – 3172	69	1932	1043 – 3087
Female						
18-24 years	117	826	553 – 1283	<10 ¶	403	140 – 719
25-44 years	641	1986	1563 – 2518	113	2202	1477 – 3085
45-54 years	428	2383	1933 – 2901	81	2343	1371 – 3669
55-64 years	250	2034	1601 – 2544	40	2323	1153 – 4078

† Medical expenditures were adjusted as 2005 equivalent dollars using the Consumer Price Index for Medical Services.

¥ Non-parametric bootstrap methods were used to calculate the confidence intervals.

¶ Cell suppressed when n< 10 to protect confidentiality.

Table 5 summarizes the total estimates of medical expenditures associated with occupational injuries in the US, mean medical expenditures per injured worker, and the percentage distribution of medical expenditures by different type of service. Based on the 2000-2005 MEPS data, our study results indicate that total annual medical expenditure stemming from occupational injuries in the US was approximately $15.7 billion (95% CI: $14.2-$17.3 billion in 2005 dollars). The total annual medical expenditures for occupational injuries were $13.9 billion (95% CI: $12.4-$15.5 billion) for US-born workers (88.5%) and $1.8 billion (95% CI: $1.5-$2.2 billion) for immigrant workers (11.5%). The mean medical expenditures per injured worker were comparable between the two groups ($2066 for the US-born vs. $1956 for immigrant workers). Although 52.3% of the medical expenditures of immigrant workers were office-based, only 38.1% of US-born workers expenditures were office-based. Higher percentages of the

expenditures were inpatient expenditures or outpatient expenditures for US-born workers (26.7% and 18.0%) than for immigrant workers (18.8% and 11.5%).

Table 5 Distribution of Medical Expenditures by Type of Medical Service Associated with Occupational Injuries, 2000-2005 MEPS

Type of Services	All (%)		U.S.-Born (%)		Immigrant (%)	
Office-based	39.7		38.1		52.3	
Outpatient	17.3		18.0		11.5	
Emergency room	8.3		8.1		9.9	
Inpatient	25.8		26.7		18.8	
Home health care	1.3		1.3		2.0	
Prescribed medicine	7.6		7.9		5.3	
Total medical expenditures[†]	**All ($)**	**95%CI**	**U.S.-Born ($)**	**95%CI**	**Immigrant ($)**	**95%CI**
Estimated Annual Expenditure per injured worker	2053	1886-2219	2066	1881-2252	1956	1626-2285
Total Annual expenditure (billions $)	15.7	14.2-17.3	13.9	12.4-15.5	1.8	1.5-2.2

[†] Medical expenditures were adjusted as 2005 equivalent dollars using the Consumer Price Index for Medical Services.

The percentage of medical expenditures paid out-of-pocket was compared between US-born and immigrant workers (see Table 6). Overall, immigrant workers paid higher percentages of medical expenditures related to occupational injuries out-of-pocket than US-born workers. However, the difference in the percentage of out-of-pocket payment between immigrant and US-born workers classified by sex, age group, race, poverty, and insurance type was not statistically significant because the 95% CIs for immigrant and US-born workers overlapped. Immigrant workers without medical insurance paid out-of-pocket 57.7% (95% CI: 52.0%-63.7%) of their medical expenditures related to occupational injuries while uninsured US-born workers paid out-of-pocket 60.9% (95% CI: 57.2%-64.6%). For both groups, the more impoverished the household, the higher percentage of medical expenditures paid out-of-pocket.

The two-part regression models provided insight into the medical utilization process after occupational injuries. In the models, we adjusted for age, sex, race, marital status, education, poverty status, and insurance. The first part of the model, the logistic regression, suggested that immigrant and US-born workers had similar likelihoods of accessing any medical care after experiencing occupational injury. The second part regression showed that the medical care expenditures of both groups were not statistically different because the 95% confidence of medical care expenditures for immigrant and US-born workers overlapped.

Table 6 Weighted % Paid Out-of-Pocket Medical Expenditures for Occupational Injuries, 2000-2005 MEPS

	U.S.-Born			Immigrant		
	Sample n	Weighted %	95% CI	Sample n	Weighted %	95% CI
Sex						
Male	1610	31.0	29.3 – 32.8	422	35.9	32.2 – 39.7
Female	1112	29.3	27.4 – 31.4	186	30.7	25.7 – 35.9
Age						
18-24	230	35.3	30.4 – 40.4	27	51.2	34.3 – 68.2
25-44	1256	29.7	27.8 – 31.6	324	33.7	29.7 – 37.9
45-54	776	30.0	27.6 – 32.3	172	33.2	27.8 – 39.0
55-64	460	30.1	27.0 – 33.2	85	33.2	25.9 – 41.1
Race						
White	2216	30.7	29.2 – 32.1	504	35.6	32.3 – 39.0
Black	398	28.0	24.9 – 31.4	43	36.6	25.3 – 48.7
Other	108	32.2	25.8 – 39.0	61	22.0	15.4 – 29.3
Poverty status as % of FPL[†]						
<100% FPL	315	40.7	36.5 – 45.0	86	39.9	31.9 – 48.3
100% to <125%FPL	126	32.3	26.2 – 38.5	44	38.2	26.9 – 50.0
125% to <200%FPL	389	34.0	30.5 – 37.9	150	34.0	28.1 – 40.3
200% to <400%FPL	983	29.0	26.9 – 31.2	208	34.9	29.9 – 40.2
>=400% FPL	909	26.3	24.4 – 28.4	120	28.1	22.2 – 34.4
Medical insurance						
Private	2031	24.1	22.8 – 25.4	359	22.1	19.5 – 25.3
Public	254	27.3	23.3 – 31.4	57	31.4	22.0 – 41.3
No insurance	437	60.9	57.2 – 64.6	192	57.7	52.0 – 63.7

[†]FPL refers to the Federal Poverty Level.

- ***Behavioral Risk Factors and Overall Nonfatal Injuries (Specific Aim 1)***

Of the 43,093 respondents in the NESARC survey, 7,320 were foreign-born immigrants to the US. Among immigrants, 13.3% (95% CI: 12.5%-14.1%) reported injuries in the past 12 months compared with 19.1% (95% CI: 18.7%-19.5%) of US-born respondents. Immigrants had a lower risk of unintentional injuries than US-born adults by almost all sociodemographic characteristics including gender, years of education, US family poverty level, World Bank country of origin income grouping, residence region in the US, employment and occupation. Injury prevalence ratios range from 1.06 (95% CI: 0.94-1.20) to 1.81 (95% CI: 1.59-2.07).

Comparisons of risk-taking behaviors between immigrant and US-born adults indicate that immigrants were less likely to be involved in all ten selected risk behaviors and the difference between the groups was statistically significant (Table 7). For example, while 15.9% of US-born adults reported driving a motor vehicle after 3 alcohol drinks, only 8.9% of immigrants reported such risk-taking behavior.

Table 7. Proportion (%) of respondents with behavioral risk factors for injuries among US-born and immigrant adults (age>17 years), 2001-2002

	Immigrant	US-born	
Selected Characteristics	Sample N (%)	Sample N(%)	P-value*
Tobacco use status			<0.01
Current smoker	1,123 (15.3%)	9,971(28.0%)	
Ex-smoker	885 (12.1%)	7,180 (20.2%)	
Lifetime nonsmoker	5,312 (72.6%)	18,471(51.9%)	
Drug use status			<0.01
Current user	210 (2.9%)	2,246 (6.3%)	
Ex-user (did not use in last 12 months)	473 (6.5%)	6,198 (17.4%)	
Lifetime nondrug user	6,637 (90.7%)	27,178 (76.3)	
Alcohol drinking status			<0.01
Current drinker	3,871 (52.9%)	23,042 (64.7%)	
Ex-drinker	991 (13.5%)	6,871 (19.3%)	
Lifetime abstainer	2,458 (33.6%)	5,709 (16.0%)	
Heavy drinking (drank 5+ drinks during heavy drinking period in last 12 months)			<0.01
Yes	1,478 (30.4%)	12,141(40.6%)	
No	3,330 (68.5%)	17,344 (58.0%)	
Unknown	54 (1.1%)	428 (1.4%)	
Drove motor vehicle while drinking in last 12 months			<0.01
Yes	121 (2.5%)	1,628(5.8%)	
No	4,622 (96.8%)	26,437 (93.4%)	
Unknown	34 (0.7%)	243 (0.9%)	
Rode in vehicle while driver was drinking in last 12 months			<0.01
Yes	219 (4.6%)	2,375 (8.6%)	
No	4,475 (94.3%)	25,049 (90.3%)	
Unknown	51 (1.1%)	319 (1.2%)	
Drove motor vehicle after 3+ drinks in last 12 months			<0.01
Yes	343 (8.9%)	3,672 (15.9%)	
No	3,514 (90.8%)	19,208 (83.4%)	
Unknown	14 (0.4%)	162 (0.7%)	
Ever get 3+ tickets for reckless driving			<0.01
Yes	314 (4.3%)	2,931 (8.2%)	
No	6,883 (93.4%)	31,797 (89.35)	
Unknown	173 (2.45)	894 (2.5%)	
Ever have driver's license suspended for moving violation			<0.01
Yes	323 (4.4%)	2,828 (8.0%)	
No	6,831 (93.3%)	31,906 (89.6%)	
Unknown	166 (2.3%)	878 (2.5%)	
Ever do things that could easily have hurt someone			<0.01
Yes	268 (3.7%)	4,864 (13.7%)	
No	6,875 (93.9%)	29,864 (83.8%)	
Unknown	177 (2.4%)	894 (2.5%)	

Note: * P-value from Chi-square ($\chi 2$) test of difference of proportions (%) of behavioral risk factor between immigrant and US-born adults.

Data Source: National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

When the total number of risk-taking behaviors was plotted against injury proportions among immigrants and US-born by gender and race/ethnicity, our results indicate that the prevalence of injury (%) increased linearly as involvement in risk behavior increased (Figure 2-A,B).

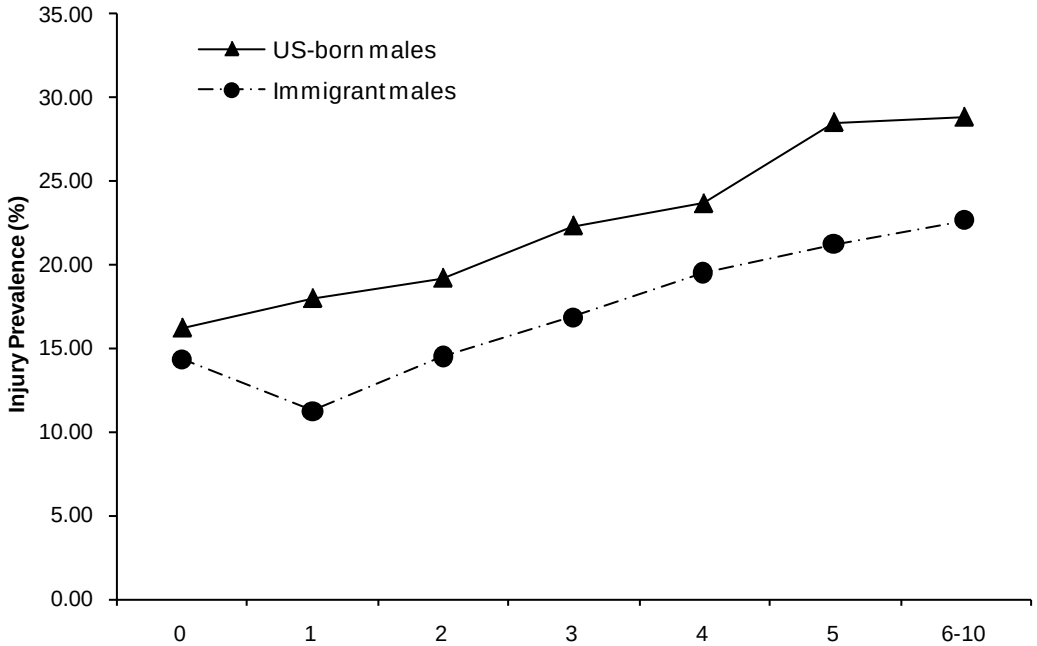

Figure 2-A: Number of Behavioral Risk Factors for Injury

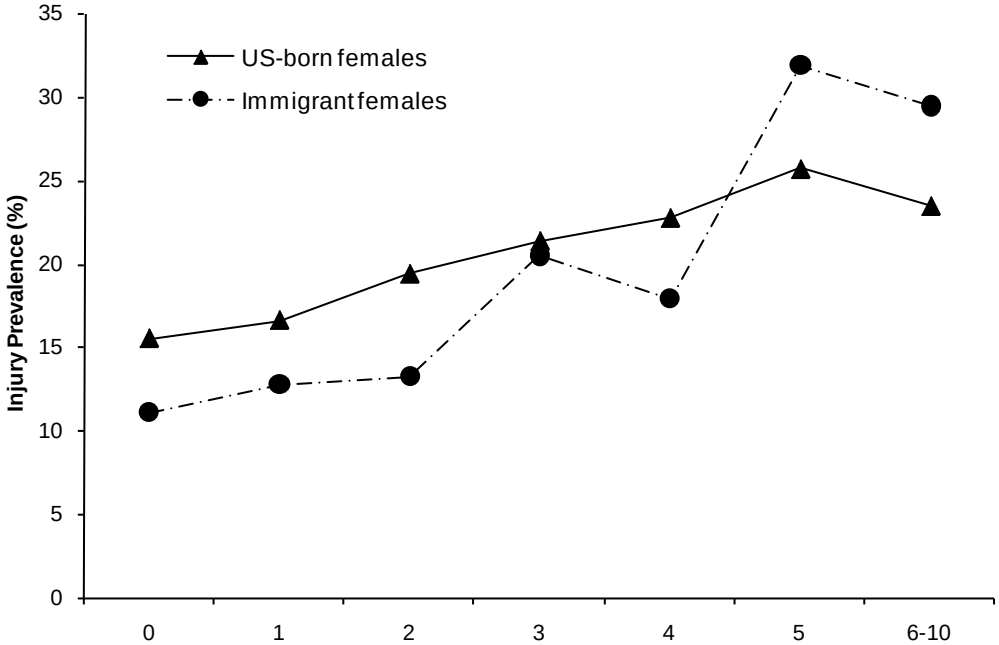

Figure 2-B: Number of Behavioral Risk Factors for Injury

More importantly, it appeared that a threshold existed in the relationship between total number of risk-taking behaviors and injury prevalence. When both immigrants and US-born adults engaged in 3 or less risk-taking behaviors, immigrants were less likely to suffer injuries (P-value <0.05). However, when immigrants engaged in more than four risk-taking behaviors, the difference in injury prevalence between immigrant and US-born adults disappeared (P-value >0.05).

Furthermore, this threshold association between total number of risk-taking behaviors and injury prevalence was more dramatic among females comparing with males. However, for both Asians and Non-Hispanic African-Americans, the difference in injury prevalence between immigrants and US-born adults was not statistically significant when the total number of risk-taking behaviors were considered.

- ***Nonfatal Victimization among Immigrants***

Of the 43,093 respondents in Wave 1 of NESARC, 1,147 records were excluded from the analysis because of missing information for the study variables. Foreign-born respondents were 17% of the sample. The overall reported incidence of victimization was 4.06% (95%CI: 3.74-4.40).

Table 8 presents the prevalence of victimization among US-born and foreign-born by selected sociodemographics. Victimization prevalence was 4.10% (95%CI: 3.77-4.44) and 3.84% (95%CI: 3.18-4.63) for the US-born and the foreign-born, respectively. The reported victimization prevalence was comparable for the US-born and the foreign-born across sex, race/ethnicity, education, family income. However, the prevalence of victimization for those not married was lower for the foreign-born than for the US-born (4.26% vs. 5.89%, p<0.05). Immigrant residents of central city areas had statistically lower rates of victimization than US-born residents of central city areas (4.08% vs. 5.36%, p<0.05).

Comparisons in the prevalence of victimization by employment status, industry, occupation, smoking, alcohol and drug use are shown in Table 9. Noteworthy in Table II are the differences (approaching statistical significance) for the occupations in the administrative/professional category and in the farming, forestry, and fishing category. US-born victimization incidence of those in the administrative/professional was greater than that for immigrants (3.88 vs. 2.75, p=0.052). Alternatively, immigrant victimization incidence for those employed in farming, forestry, and fishing was greater than that for the US-born (4.11% vs. 1.28%, p=0.098).

Table 8. Weighted Prevalence of Personal Victimization Experienced In the Past 12 Months By Nativity and Demographics

	Foreign-born			US-born		
	n	Weighted %	(95% CI)	n	Weighted %	(95% CI)
Total	7,174	3.84	(3.18, 4.63)	34,772	4.10	(3.77, 4.44)
Sex						
Male	3,201	4.11	(3.22, 5.22)	14,779	4.26	(3.81, 4.74)
Female	3,973	3.58	(2.81, 4.56)	19,993	3.95	(3.60, 4.34)
Age group						
18-29 years	1,643	5.16	(3.81, 6.95)	6,818	5.87	(5.28, 6.53)
30-44 years	2,717	2.95	(2.31, 3.75) *	10,283	4.83	(4.26, 5.48)
45-64 years	1,895	3.83	(2.73, 5.35)	10,576	3.08	(2.65, 3.58)
65 years+	919	3.75	(2.44, 5.71)	7,095	2.50	(2.10, 2.44)
Race/ethnicity						
White/Non-Hispanic	1,228	3.37	(2.45, 4.63)	22,652	3.89	(3.53, 4.27)
Black/Non-Hispanic	645	3.73	(2.21, 6.21)	7,326	4.83	(4.18, 5.57)
Hispanic	4,317	4.26	(3.49, 5.19)	3,798	5.26	(4.19, 6.58)
American Indian or Alaska Native	†			657	4.37	(2.69, 7.02)
Asian/Pacific Islander	960	3.49	(2.02, 5.97)	339	4.63	(2.98, 7.15)
Marital status						
Married/widowed	4,515	3.64	(2.87,4.61)	20,026	3.12	(2.76, 3.51)
Not married ¥	2,659	4.26	(3.27,5.55) *	14,746	5.89	(5.37, 6.46)
Education						
Less than high school	2,439	4.14	(3.19, 5.36)	5,173	4.36	(3.59, 5.30)
High school	1,641	3.92	(2.77,5.53)	10,558	3.76	(3.34, 4.23)
Some college	1,502	4.15	(3.03, 5.67)	10,836	4.84	(4.33, 5.41)
College graduate or higher	1,592	3.16	(2.08, 4.77)	8,205	3.42	(2.92, 3.99)
Family income						
<25,000	3,169	4.25	(3.34, 5.38)	12,322	5.11	(4.56, 5.72)
25,000-49,999	2,117	4.35	(3.15, 5.97)	10,431	4.07	(3.60, 4.58)
50,000-79,999	1,082	2.94	(1.93, 4.44)	6,824	3.75	(3.15, 4.44)
80,000+	806	2.81	(1.65, 4.74)	5,195	3.02	(2.51, 3.64)
Residence in metropolitan statistical area						
Yes, in central city	3,340	4.08	(3.04, 5.45) *	11,217	5.36	(4.74, 6.06)
Yes, not in central city	3,439	3.60	(2.91, 4.45)	16,313	3.73	(3.33, 4.17)
Not in MSA	395	4.11	(1.92, 8.59)	7,242	3.41	(2.88, 4.04)

95%CI, 95% confidence intervals

* p <0.05 from Chi-square test of difference in victimization prevalence between foreign-born and US-born.

† Sample size was insufficient, n=24.

¥ Unmarried includes those living with someone as if married, divorced, separated, and never married.

Table 9. Weighted Prevalence of Personal Victimization Experienced in Past 12 Months by Nativity and Employment and Substance Use

	Foreign-born			US-born		
	n	Weighted %	(95% CI)	n	Weighted %	(95% CI)
Employment status						
Out of labor force	2,262	3.43	(2.48, 4.71)	11,985	3.70	(3.27, 4.19)
Employed	4,623	3.97	(3.19, 4.94)	21,612	4.14	(3.77, 4.55)
Unemployed	289	4.79	(2.37, 9.41)	1,175	7.20	(5.52, 9.34)
Industry						
Agriculture, mining, construction	739	3.91	(2.42, 6.27)	2,558	4.62	(3.70, 5.75)
Manufacturing	738	3.44	(2.05, 5.73)	3,061	3.41	(2.53, 4.59)
Transportation/public utilities	343	5.12	(2.74, 9.37)	2,000	4.01	(2.97, 5.38)
Wholesale/retail trade	898	3.93	(2.34, 6.53)	4,398	4.87	(4.20, 5.65)
Service	2,751	3.75	(2.88, 4.88)	15,224	4.28	(3.84, 4.78)
Never worked for salary	1,674	3.85	(2.59, 5.68)	7,142	3.19	(2.69, 3.78)
Occupation						
Administrative/professional	1,403	2.75	(1.88, 4.00) *	9,176	3.88	(3.37, 4.46)
Service/sales	2,563	3.8	(2.97, 4.84)	12,868	4.49	(4.05, 4.98)
Farming, forestry and fishing	168	4.11	(1.93, 8.53) *	511	1.28	(0.60, 2.70)
Transportation/equipment laborers	881	4.42	(3.01, 6.46)	3,101	4.63	(3.64, 5.86)
Other laborers	462	6.37	(3.68, 10.81)	1,687	5.55	(4.09, 7.49)
Never worked for salary	1,674	3.85	(2.59, 5.68)	7,142	3.19	(2.69, 3.78)
Smoking						
Lifetime nonsmoker	5,198	3.65	(2.93, 4.54)	17,937	3.55	(3.20, 3.94)
Ex-smoker †	872	3.71	(2.59, 5.29)	7,071	3.05	(2.46, 3.76)
Current smoker	1,104	4.80	(3.19, 7.16)	9,764	5.72	(5.16, 6.35)
Alcohol use						
Lifetime abstainer	2,405	3.91	(3.01, 5.07) *	5,495	2.97	(2.43, 3.64)
Ex-drinker †	969	3.93	(2.36, 6.46)	6,717	3.72	(3.12, 4.44)
Current drinker	3,800	3.78	(2.97, 4.79)	22,560	4.43	(4.05, 4.84)
Drug use						
Lifetime nondrug user	6,502	3.79	(3.09, 4.64)	26,467	3.30	(3.00, 3.63)
Ex-user †	464	3.77	(2.07, 6.76)	6,105	5.32	(4.55, 6.20)
Current user	208	5.41	(2.60, 10.92)	2,200	9.52	(8.03, 11.25)

95%CI, 95% confidence intervals

* p <0.10 from Chi-square test of difference in victim prevalence between foreign-born and US-born.

† No use in the past 12 months.

- *Disability, Injuries, and Employment among Immigrants*

A total of 135,091 adults 18 years of age or older were included in the 2004-2005 NHIS. After excluding 512 persons with disabilities from injuries occurring less than one year prior to the interview, a total of 133,907 adults remained in our sample, including 119,020 adults with no disability, 9,757 adults with moderate disability, and 5,092 adults with severe disability. There were 3,137 adults who were medically treated for an injury within the 3 months prior to the interview, consisting of 2,504 adults with no disability, 366 adults with moderate disability, and 267 adults with severe disability. The total number of injury episodes within the 3 months prior to the interview among adults with no disabilities, moderate disabilities, and severe disabilities were 3,301, 557, and 458, respectively.

Comparison of the 3-month cumulative incidence of injuries for persons with no disability, moderate disability, and severe disability (stratified by sociodemographic characteristics) indicated that injury incidence was 2.3% (2.2%-2.4%) among adults with no disability, 3.8% (3.4%-4.2%) among adults with moderate disability, and 5.6% (4.9%-6.3%) among adults with severe disability. This trend was consistent throughout the various sociodemographic groups.

Based on data from the 2007 ACS, 8,545,852 working-age individuals with disabilities were employed in 2007. Of these, 940,223 were immigrants and 7,605,629 were US-born adults.

In general, working-age adults with disabilities were less likely to be employed than individuals without disabilities (Table 10). While 73.9% (95% CI: 73.7-74.1) of immigrants without disabilities and 77.5% (95% CI: 77.5-77.6) of US-born persons without disabilities were employed, just 40.8% (95% CI: 39.9-41.7) of immigrants with disabilities and 35.9% (95% CI: 34.6-35.2) of US-born with disabilities were employed. The rate of unemployment was not statistically different for the immigrant and US-born persons with disabilities (5.2% vs. 5.5%). Instead, a smaller proportion of immigrant persons with disabilities considered themselves "not in the labor force" when compared to US-born persons with disabilities. The unemployment rates were higher for those persons with disabilities compared to those without disabilities.

For each type of disability, including "difficulty working," immigrants with disabilities were more likely than their US-born counterparts to be employed. Over 22% of the immigrant population who reported "difficulty working" was employed, but this was true for just 15.9% of the US-born working age adults reporting this same disability. For both the foreign-born and the US-born, the highest employment percentages were among those reporting vision or hearing impairments. The lowest employment rates for the foreign-born were among those persons reporting self-care limitations. For the US-born, those who reported difficulty going outside the home had the lowest employment rate, but this percentage did not differ significantly from percentage employed among those reporting self-care limitations.

Table 10. Employment Status Percentages for U.S. born and Foreign-born Working-age Adults by Reported Disabilities, ACS 2007

	Not in labor force			Unemployed			Employed		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
U.S. born	37,577,311	23.6	(23.5 - 23.7)	7,490,606	4.7	(4.7 - 4.7)	114,207,051	71.7	(71.6 - 71.8)
No disability	24,598,792	17.9	(17.8 - 18.0)	6,290,494	4.6	(4.5 - 4.6)	106,601,422	77.5	(77.5 - 77.6)
Any disability	12,978,519	59.6	(59.3 - 59.9)	1,200,112	5.5	(5.4 - 5.6)	7,605,629	34.9	(34.6 - 35.2)
Impairment									
Vision / hearing	2,510,374	51.5	(50.9 - 52.1)	231,173	4.7	(4.5 - 5.0)	2,133,309	43.8	(43.2 - 44.3)
Physical	8,755,938	66.1	(65.7 - 66.4)	571,189	4.3	(4.2 - 4.4)	3,925,860	29.6	(29.3 - 29.9)
Mental	5,832,606	67.6	(67.2 - 68.0)	517,227	6.0	(5.8 - 6.2)	2,282,509	26.4	(26.1 - 26.8)
Activity limitation									
Self-care	3,329,050	82.1	(81.6 - 82.6)	106,889	2.6	(2.4 - 2.9)	620,512	15.3	(14.8 - 15.8)
Participation restriction									
Difficulty going outside home	4,827,171	82.1	(81.8 - 82.5)	172,878	2.9	(2.7 - 3.1)	878,598	14.9	(14.6 - 15.3)
Difficulty working	10,263,897	79.6	(79.3 - 79.8)	581,716	4.5	(4.4 - 4.6)	2,056,739	15.9	(15.7 - 16.2)
Foreign-born	7,513,461	24.5	(24.3 - 24.7)	1,245,731	4.1	(4.0 - 4.2)	21,875,637	71.4	(71.2 - 71.6)
No disability	6,271,366	22.1	(21.9 - 22.3)	1,124,973	4.0	(3.9 - 4.1)	20,935,414	73.9	(73.7 - 74.1)
Any disability	1,242,095	53.9	(53.0 - 54.9)	120,758	5.2	(4.8 - 5.7)	940,223	40.8	(39.9 - 41.7)
Impairment									
Vision / hearing	261,122	46.6	(44.9 - 48.3)	28,249	5.0	(4.2 - 5.9)	270,888	48.4	(46.7 - 50.0)
Physical	781,626	60.2	(59.1 - 61.3)	60,727	4.7	(4.2 - 5.1)	455,567	35.1	(34.0 - 36.2)
Mental	463,751	64.1	(62.7 - 65.5)	38,710	5.3	(4.7 - 6.0)	221,360	30.6	(29.3 - 31.9)
Activity limitation									
Self-care	285,937	78.2	(76.3 - 80.1)	11,070	3.0	(2.4 - 3.7)	68,470	18.7	(17.1 - 20.4)
Participation restriction									
Difficulty going outside home	459,843	74.3	(72.8 - 75.8)	21,139	3.4	(2.8 - 4.0)	138,056	22.3	(20.9 - 23.7)
Difficulty working	873,068	73.0	(71.9 - 74.1)	50,257	4.2	(3.7 - 4.7)	272,302	22.8	(21.7 - 23.8)

The percentages (%) were weighted.

95% CI, 95% confidence interval.

Major Findings and Discussions

Major findings from this NIOSH-funded research project are:

- Immigrants in the US generally have a lower prevalence of unintentional injuries compared with US-born individuals.
- Nonfatal work-related injury rates are significantly lower for foreign-born workers than US-born workers. However, injury severity measures suggested that foreign-born workers suffered more severe work-related injuries than US-born workers.
- Immigrant victimization prevalence is often lower than that seen among the US-born.
- Immigrants are less likely to have risk-taking behaviors than their US-born counterparts, which may partially explain why immigrant respondents have a lower prevalence of overall injuries and work-related injuries.
- Patterns of work-related injuries with regard to external cause of injury, nature of injury, and injured body region are similar between the two groups.
- Comparison of medical expenditures associated with occupational injuries suggested that US-born and immigrant workers had similar likelihoods of using any medical care after occupational injuries. In addition, the estimated mean medical expenditures per injured worker were comparable between the two groups.
- Immigrant workers were found to have fewer years of education, lower family income, and were more likely to have no medical insurance, and differed from US-born workers across other sociodemographics.
- A higher percentage of medical expenditures of immigrant workers were office-based while a higher proportion of medical expenditures of US-born workers were inpatient and outpatient expenditures.
- Working-age immigrants with disability were significantly more likely to be employed. Adults with disability had a substantially higher injury incidence than adults with no disability.

The lower work-related injury rates in foreign-born workers could not be explained by distribution of gender or age. Previous studies have found work-related injury rates to be higher among individuals less than 44 years of age and in males as compared to females [Jackson, 2001; Salminen, 2004; Smith et al., 2005]. With these assumptions in mind, it could be inferred that the injury rate should be higher in foreign-born workers because among the foreign born, males and 25- 44 year olds were larger proportions of the workers. However, this was not supported by the findings of our study. The work-related injury rate for 25-44 year olds and the injury rate for males in the foreign-born group were lower than those in US-born group.

A previous study has reported that Hispanics had higher fatal and non-fatal work-related injury rates than any other ethnic groups in the US [Richardson et al., 200]. This work by Richardson has suggested that Hispanic workers are more heavily represented in higher risk occupations than non-Hispanic Whites and other racial/ethnic groups, and this disproportionate representation explains their higher rates of fatality and non-fatal injury [Richardson et al., 200]. Our results also showed that Hispanic workers had higher overall work-related injury rates than Blacks and Asians but lower rates than Non-Hispanic Whites. An epidemiological study conducted in

Virginia compared nonfatal injuries among non-agricultural immigrant Latino workers with the 1997 US working population [Fransky et al., 2002]. Immigrant workers were found to have a higher work-related injury rate. In Singapore, the pattern and severity of injuries were similar when comparing foreign workers to local-born workers [Carangan et al., 2004].

Work-related injuries ranked by industry had the same patterns among these two groups; however, the injury rate for each industry was lower among foreign-born workers than US-born workers. The Bureau of Labor Statistics indicated that the highest nonfatal workplace injury and illness rates were in transportation and warehousing, followed by construction, then manufacturing, and then goods producing [Bureau of Labor Statistics, 2004a]. In 2003, private construction sector had the highest number of fatalities, but the highest fatality rates were in agriculture, forestry, fishing, and hunting, followed by mining, transportation and warehousing, and construction [Bureau of Labor Statistics, 2004b]. In our analysis, transportation and utilities ranked fifth. Transportation without utilities might have ranked higher.

Our results also indicated that immigrants in the US generally had a lower prevalence of unintentional injuries compared with US-born individuals. However, the difference in injury prevalence between the two groups was not statistically significant if the participants had more than four of the ten risk-taking behaviors examined in our study. Comparisons of risk-taking behaviors indicated that immigrants were less likely to have risk-taking behaviors than their US-born counterparts, which may partially explain why immigrant respondents had a lower injury prevalence overall.

Previous studies have reported contradictory findings regarding the risk of nonfatal injuries among immigrant populations. Our findings replicated results from a limited number of studies that reported lower injury rates among immigrants than among US-born individuals [Schwebel et al., 2005; Sinclair et al., 2006; Simon et al.; 2006]. Schewebel et al. (2005) and Sinclair et al. (2006) reported lower injury rates from unintentional injuries among immigrant children in the United States [Schwebel et al., 2005; Sinclair et al., 2006]. Data analysis of the National Health Ambulatory Medical Care Survey by Simon et al. [Simon et al., 2006] indicated that Latino children had lower rates of ED injury visits than non-Latino White children. However, in that study, immigrant status was not reported. The lower rates reported were not associated with differences in health insurance status or with barriers to accessing ED care [Simon et al., 2006]. Several studies reported a higher injury risk among immigrant populations [Carangan et al., 2004; Freccero et al., 2000]. In Sweden, a medical record review of 214 pediatric burn patients resulted in a report of increased scalding injuries among immigrant children [Freccero et al., 2000]. Both studies reporting a higher injury risk among immigrants used data from emergency room visits [Freccero et al., 2000; Simon et al., 2006]. Emergency room data often reflects more severe injuries than those reported in surveys of general populations, like those of Schewebel et al. [Schwebel et al., 2005], Sinclair et al.[Sinclair et al., 2006], and our study.

Because contradictory findings have been reported about the risk of nonfatal, unintentional injuries among immigrant populations [Freccero et al., 2000; Fransky et al., 2002; Sinclair et al., 2006], it is challenging to pinpoint underlying factors responsible for the lower injury risk among immigrants. The majority of previous studies examining injuries among immigrants have failed to conduct a comprehensive examination of risk-taking behaviors associated with injuries.

In our study, we compared the proportion (%) of immigrant and US-born adults who were involved in risk-taking behaviors generally considered to be important risk factors for unintentional injuries. Our statistical results provided strong evidence supporting our hypothesis that immigrant adults are less likely to have risk-taking behaviors than US-born adults. This may partially explain why immigrant adults in the US generally have a lower injury prevalence than their US-born counterparts. One previous study by Vaughan et al. [Vaughan et al., 2004] suggested that cultural differences act as a strong protective factor in maintaining a low injury risk among immigrant families. However, when respondents had more than four risk-taking behaviors, the difference in injury prevalence between immigrant and US-born adults disappeared in our analyses; therefore, immigrants were equally likely to suffer from injuries if they were involved in risk-taking behaviors like their US-born counterparts. To the best of our knowledge, this finding regarding the association between number of risk-taking behaviors and injury prevalence among the immigrant population has never been previously reported in the literature.

Comparison of medical expenditures associated with occupational injuries suggested that US-born and immigrant workers had similar likelihoods of using any medical care after occupational injuries. In addition, the estimated mean medical expenditures per injured worker were comparable between the two groups (based on results from models controlling for age, sex, race, marital status, education, poverty, and insurance). Immigrant workers were found to have fewer years of education, lower family income, and were more likely to have no medical insurance, and differed from US-born workers across other sociodemographics. A higher percentage of medical expenditures of immigrant workers were office-based while a higher proportion of medical expenditures of US-born workers were inpatient and outpatient expenditures.

Little is known about medical expenditures related to occupational injuries among immigrant workers in the US The results from a few studies have indicated that immigrants may have lower rates of unintentional injuries as well as occupational injuries than their US-born counterparts [Sinclair et al., 2006; Xiang et al., 2007; Zhang et al., 2009]. However, we are unaware of any studies that have directly investigated medical expenditures of occupational injuries among immigrant workers. Medical costs of occupational injuries and sources of payment were compared between Hispanic and non-Hispanic construction workers in the US, and it was found that Hispanic workers were more likely to report medical conditions caused by work-related injuries, but they were less likely to receive workers compensation payment [Dong et al., 2007.

Unlike previous research comparing costs of medical care between immigrants and the US-born that reported much lower medical expenditures among immigrants [Goldman et al., 2006; Ku 2009, Mohanty et al., 2005], results of our study suggest that the estimated medical expenditures per injured worker for occupational injuries were comparable between the two groups. Our research further indicated that US-born and immigrant workers had a similar likelihood of utilizing medical care after occupational injuries.

Nevertheless, our study found a few significant differences in the medical expenditures related to occupational injuries between immigrant and US-born workers. First, a higher percentage of medical expenditures of immigrant workers were office-based while a higher percentage of medical expenditures of U.S.-born workers were inpatient and outpatient expenditures. Second,

the percentage of medical expenditures paid out-of-pocket was slightly higher among immigrant workers compared to U.S.-born workers, but this difference was not statistically significant. This finding is consistent with previous studies that reported a slightly higher percentage of medical expenditures paid-out-of-pocket among immigrant adults in comparison with U.S.-born adults [Goldman et al., 2006; Ku 2009]. Another study of immigrant children's medical care also found that Spanish speakers had 1.5 times the odds of spending $500 or more out-of-pocket medical expenditures per year than English speakers [Yu et al., 2004]. Overall, the literature suggests that hospitalization rates are lower for both immigrant men and women compared with their U.S.-born counterparts [Goldman et al., 2006]. However, previous research has suggested that after an occupational injury, immigrant workers are hospitalized as often as U.S.-born workers, and possibly more often [Zhang et al., 2009]. Results from our study reported here indicate that the percentage of the total expenditures spent on inpatient care was lower for immigrant as compared to the U.S.-born.

Conclusions

Findings this NIOSH-funded research project provide answers to important occupation safety questions whether immigrant workers in the US face a significantly higher risk of occupational injuries than their US-born worker and whether patterns of injuries and medical expenditures differ between the two groups. This study concludes that immigrant workers have an overall lower risk of non-fatal work-related injuries compared with the US-born workers. Injury patterns and medical expenditures of work-related injuries are comparable between the two groups. However, the following two issues warrant future research: 1) future research needs to investigate why immigrant workers suffer more severe work-related injuries than US-born workers; and 2) given the findings from our research that adults with disabilities have a substantially higher risk of injury than adults with no disability, and immigrants with disabilities have greater rates of employment than US-born persons with disabilities, much remains to be learned regarding disabilities, general health, and occupational safety among US workers with disabilities.

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Inclusion of Gender and Minority Study Subjects

Our study used several national survey datasets. Women and minority subjects were included in our statistical analyses. However, we were unable to provide the gender and minority inclusion table due to the fact that sample size varied between our publications.

Inclusion of Children

Individuals aged 18 or above were included in our statistical analyses. Occupational status and work-related injuries were asked in the national survey datasets that were used for our study.

Materials Available for Other Investigators

None.