

# Occupational Health Outcomes Among Self-Identified Immigrant Workers Living and Working in Somerville, Massachusetts 2006–2009

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**Abstract** This study examines the burden of occupational health risks among a convenience sample of three immigrant worker populations (Brazilian, Haitian, and El Salvadoran) in Somerville, Massachusetts. In this community based research initiative (n = 346), logistic regression is used to analyze immigrant occupational health survey data collected from 2006 to 2009. In this study, injuries at work were significantly associated with lower English proficiency (OR = 1.8, 95 % CI 1.1–3.0), workers between the ages of 46 and 65 (OR = 2.7, 95 % CI 1.0–7.0), service workers (OR = 13.8, 95 % CI 1.8–105.2), production workers (OR = 10.8, 95 % CI 1.3–90.1), construction workers (OR: 21.7, 95 % CI 2.8–170.9) and immigrants with no health insurance (OR = 1.8, 95 % CI 1.0–3.1).

Injuries were negatively associated with years in the US with more established immigrants in the US >15 years reporting more injuries at work. Older immigrants who have been in the US longer but are less proficient in English, and are still employed in low-wage occupations with no health insurance suffered more injuries than recent immigrants. Further validation of this result is required.

**Keywords** Occupational health · Immigrant health · Construction · Health access · Community based participatory research

## Introduction

It is well recognized that working conditions affect human health. Multiple risk factors are associated with the increased incidence of work related fatality and illness. Socio-demographic characteristics including race, ethnicity and gender have been shown to strongly influence health disparities [1]. The more hazardous working conditions that many minorities and immigrant workers are exposed to also increase the risk of work-related injuries, illnesses, and fatalities [2–12]. In job settings common among immigrant and minority workers, hazards are generally not controlled, the enforcement of safety regulations is often lax and workers often do not receive proper job or health and safety training [13, 14]. These workers are offered minimal, if any, health care benefits [15, 16]. Immigrants are further disadvantaged by their deficient language skills, non-transferability of their education and training from their country of origin, their immigrant status, discrimination and economic need [17–19]. Due to these issues, immigrant workers are more tolerant of working in substandard conditions compared to non-immigrants [20].

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Interventions designed to address these conditions have been unsuccessful partly due to the difficulty in obtaining access to these vulnerable populations [21]. Studies are needed that simultaneously assess, document and address immigrant occupational health deficits at the community level in order to design better interventions.

In this community based study, we explore the concurrent occupational health burden among self-identified Brazilian, Haitian, and El Salvadoran immigrant workers living or working in Somerville, Massachusetts.

## Methods

### Study Design and Data Collection

In this cross-sectional community based research, surveys were designed and primarily administered by trained bilingual Teen Educators who administered them in-person to immigrant workers living or working in Somerville, Massachusetts. Two research assistants from Tufts University were also involved in data collection. Twenty-two teens were employed in collecting surveys over the course of the study. The Teen Educators were assisted in the preparation of the survey with regards to technical aspects of occupational safety and health by staff from the Massachusetts Coalition for Occupational Safety and Health (MassCOSH) and the Massachusetts Department of Public Health. The Teen Educators received input and instruction from Tufts University faculty and were supervised by professional staff from the Haitian Coalition, Community Action Agency of Somerville (CAAS) and the Immigrant Services Providers Group/Health (ISPG/H). Our data collection strategies were designed to reduce respondent burden, and to benefit from the solid standing enjoyed by our community partners within the social milieu of Somerville, MA. A convenience sample was implemented at public events sponsored by our community partner organizations. These events included: annual influenza clinics, occupational health fairs and other community events organized to appeal to the major immigrant populations in Somerville. Two occupational health fairs were conducted; one at the Cambridge Health Alliance Occupational Health Clinic and one at the Clarendon Hill public housing development, where one of our community partners, the Haitian Coalition, was based. The influenza clinics offered free vaccinations in addition to other health services and were co-sponsored by the ISPG/H, a community partner and the Somerville Health Department.

Administration of the surveys started in 2006 and ended in 2009. The involvement of Teen Educators in designing the survey allowed them to apply principles learned from occupational safety and health training received from both

academic researchers and community-based practitioners as well as to ensure that the survey content could be administered with relative consistency and reliability. The surveys were performed in an informal conversational style with time of completion averaging 30 min. The surveys were administered in a face-to-face manner by Teen Educators and researchers in either Spanish, Portuguese, Haitian Creole or English. Approaches to potential study subjects featured an explanation of the survey's purpose and a reading of a scripted oral consent narrative. The approach also qualified each respondent as being 18 years of age or older and responding positively to the question, "Do you live or work in Somerville, Massachusetts?" The bilingual Teen Educators translated the questions into the appropriate target language in real time and were allowed to discuss the questions with the respondent rather than simply reading them verbatim. Our sample consisted of 405 respondents who self-identified as immigrants either living or working in Somerville.

All occupational data were coded by the author according to the US Bureau of Labor Statistics, standard occupational classification (SOC). No names were ascertained nor were potential subjects asked about documentation status. Oral consent was obtained from each participant. The study protocol was reviewed and approved by the Tufts University Social, Behavioral and Educational Research Institutional Review Board (IRB).

### Data Analysis

Statistical analysis was performed using SPSS 17.0. Data were analyzed for each of the three health outcomes—hazards at work, health problems due to work, and injuries at work. The basic analytic plan included univariate descriptive analysis and bivariate analysis. Univariate descriptive analysis estimated both the percentage and proportion of binary and categorical variables and the bivariate analysis consisted of cross tabulations and Chi square statistics. The variables that were significant were examined further with binary logistic regression to determine odds ratios (ORs) and 95 % confidence intervals (95 % CIs). For the bivariate regression analysis, the reference group for ethnicity or country of birth was Haiti; for number of years in the US the reference group was >15 years, for age it was 18–20 years, for occupation it was professional and management jobs or sales jobs, and for type of job or number of employers it was working for a single employer.

The main country or origin categories were Haiti, El Salvador, Brazil, "Other Hispanics" and "Others". The "Other Hispanics" category includes respondents born in Puerto Rico, Mexico, Belize, Honduras, Guatemala, Colombia, Peru, Venezuela, Ecuador and Dominican

Republic. The “Others” category includes respondents born in Asia and Africa.

## Results

The data set is comprised of 405 respondents who either live or work in Somerville. For this analysis on health outcomes among immigrants, all the non immigrants (i.e., subjects who reported a US birth) in the study were removed. In addition five potential duplicate or incomplete responses were deleted. The remaining immigrant population ( $n = 346$ ) reflect a diverse population from 33 different countries. Table 1 describes the study population.

The health outcomes recorded in this study included self-reported hazards at work, health problems at work and injuries suffered at work. Hazards at work were reported by 44 % of the study participants. Chemical hazards (43 %) accounted for the largest share of the hazards followed by physical hazards (38 %), material handling, repetitive hazards (14 %) and hazards due to psychological stressors such as work pressure or long hours (6 %). Health problems due to work were reported by 21 % of the participants. Predominant health problems due to work included musculoskeletal problems (31 %), psychological stress (23 %), or recurring injuries (22 %). Being injured at work was reported by 28 % of the respondents, and 6 % reported being injured multiple times.

Table 2 shows that ethnicity or country of birth, years in the US, English proficiency, age, occupation and access to health insurance were predictive of hazards or injuries at work. None of the demographic or occupational variables were significantly correlated to health problems due to work despite some relatively large ORs.

Hazards at work were significantly correlated with Brazilian ethnicity, English proficiency, age and with years in the US. Brazilians were three times more likely to report hazards at work compared to Haitians (OR = 3.3, 95 % CI 1.1–10.1). Immigrants who were not proficient in English were twice as likely to report hazards at work (OR = 2.2, 95 % CI 1.0–4.8). Workers between the ages of 46 and 65 years were three times more likely to report more hazards at work (OR = 3.3, 95 % CI 0.99–10.9) compared to 18–20 year olds. Immigrants in the US for 10–15 years were less likely to report hazards at work (OR = 0.28, 95 % CI 0.10–0.76) than those who have been in the US for over 15 years and those in the US for less than 9 years.

Injuries at work were significantly associated with English proficiency, age, occupation and health insurance and negatively associated with years in the US. Immigrants in the US for less than 3 years (OR = 0.42, 95 % CI 0.18–0.94), between 4 and 9 years (OR = 0.47, 95 % CI

**Table 1** Frequencies of the demographic, occupational and health variables among self-identified immigrant workers

	N	%
Country of birth		
Haiti	83	24
El Salvador	74	21
Brazil	98	28
Other Hispanic	40	12
Other	51	15
Years in the US		
0–3 years	66	19
4–9 years	135	40
10–15 years	77	23
>15 years	63	18
English skill		
Yes	200	58
No	146	42
Gender		
Male	159	48
Female	175	52
Age categories		
18–20	53	15
21–45	207	61
46–65	69	20
>66	13	4
# of Jobs		
One job	204	78
More than one job	59	22
Work classification		
Management and professional	20	6
Sales and office	34	10
Service	133	40
Production and transportation	40	12
Construction, extraction and maintenance	57	17
Unemployed	52	15
Work training		
Yes	182	62
No	113	38
Health and safety training		
Yes	150	48
No	159	52
Health insurance		
Yes	174	56
No	108	35
MA workers comp		
Yes	143	45
No	172	55
Access to doctor		
Yes	163	78
No	46	22

**Table 1** continued

	N	%
<b>Hazards at work</b>		
Yes	130	44
No	126	43
<b>Health problems at work</b>		
Yes	43	21
No	161	79
<b>Injuries at work</b>		
Yes	84	28
No	217	72

0.24–0.92) and 10–15 years (OR = 0.20, 95 % CI 0.20–0.95) reported less injuries at work compared to immigrants in the US over 15 years. Immigrants who were not proficient in English were twice as likely to report injuries at work (OR = 1.8, 95 % CI 1.1–3.0). Workers between the ages of 46 and 65 years were twice as likely to report injuries at work (OR = 2.7, 95 % CI 1.0–6.9) compared to younger (18–20 years) respondents.

**Table 2** Odds ratios of health outcomes by ethnicity, years in the US, language, age, occupation and health insurance among self-identified immigrant workers: Somerville, Massachusetts: 2006–2009

	Hazards at work	Health problems due to work	Injured at work
<b>Ethnicity</b>			
Haitian	Ref	Ref	Ref
El Salvador	1.6 (0.55–4.79)	2.1 (0.75–6.2)	1.8 (0.85–3.9)
Brazil	<b>3.3 (1.0–10.1)</b>	2.2 (0.72–6.9)	1.4 (0.67–2.8)
Other Hispanic	4.1 (0.80–21.2)	2.0 (0.62–6.5)	1.56 (0.64–3.8)
Other	0.40 (0.14–1.16)	0.86 (0.24–3.1)	0.56 (0.20–1.6)
<b>Years in the US</b>			
1–3 years	1.1 (0.28–4.1)	0.64 (0.19–2.1)	<b>0.42 (0.18–0.94)</b>
4–9 years	1.0 (0.35–2.9)	0.89 (0.36–2.2)	<b>0.47 (0.24–0.92)</b>
10–15 years	<b>0.27 (0.09–0.76)</b>	0.52 (0.18–1.48)	<b>0.44 (0.20–0.95)</b>
>15 years	Ref	Ref	Ref
<b>English proficiency</b>			
No	<b>2.19 (1.0–4.8)</b>	1.6 (0.83–3.2)	<b>1.8 (1.1–3.0)</b>
<b>Age</b>			
18–20	Ref	Ref	Ref
21–45	2.1 (0.82–5.5)	0.74 (0.31–1.79)	1.6 (0.68–3.97)
46–65	<b>3.3 (0.99–10.9)</b>	1.7 (0.63–4.9)	<b>2.7 (1.0–6.9)</b>
>66	0.90 (0.12–6.4)	0.73 (0.08–7.1)	2.7 (0.53–14.3)
<b>Occupation</b>			
Professional	0	Ref	0
sales	Ref	0.55 (0.07–4.5)	<b>Ref</b>
service	1.9 (0.53–7.4)	1.8 (0.36–8.9)	<b>13.8 (1.8–105.2)</b>
Production	1.2 (0.28–5.6)	1.9 (0.35–10.6)	<b>10.8 (1.3–90.1)</b>
Construction	3.5 (0.74–17.1)	3.7 (0.67–20.2)	<b>21.7 (2.7–170.9)</b>
<b>Health insurance</b>			
No	1.8 (0.74–4.5)	0.89 (0.40–2.0)	<b>1.8 (1.0–3.1)</b>

Bold signifies statistical significance at the 0.05 level

Report of injury varied by occupation. Construction workers (OR = 21.7, 95 % CI 2.7–170.9), service workers (OR = 13.8, 95 % CI 1.8–105.2) and production workers (OR = 10.8, 95 % CI 1.3–90.1) were significantly more likely to report injuries at work compared to sales workers. Immigrants who had no access to health insurance were also twice as likely to report injuries at work (OR = 1.8, 95 % CI 1.0–3.1).

**Discussion**

Ethnicity, years in the US, English proficiency, age, occupational classification and health insurance were significant predictors of self-reported occupational health risks.

Brazilians reported significantly more hazards at work or are working in jobs with more hazards at work compared to the other immigrant groups. Despite the high hazards among this group, they received less health and safety training as in the COBWEB report [27].

Increased report of occupational health and safety problems among immigrants who have been in the US over 15 years may seem counterintuitive. Recent immigrants have been shown to incur more occupational injuries in some studies [22, 23], however, our study did not show such associations suggesting the possibility that some risks increased with the duration of tenure at the job or that a lack of upward mobility among this group places them at added risk. An alternate explanation is that the longer term immigrants are more likely to report injuries or associate them with their jobs. Our research did not ascertain injuries occurring within the past work year. This suggests that these injuries reported by our respondents may reflect greater years of service in a particular industry sector. Lack of English proficiency and increased occupational health risks have also been identified in other studies [4, 8, 22].

Our finding of more hazards and injuries at work among older workers (45–65) is consistent with other studies. Bureau of Labor Statistics (BLS) data show that workers aged 45–54 had the highest occupational injury and illness rates [24]. A study done in New Mexico found higher fatality in workers over 65 [5] and a study conducted with immigrant workers in Spain showed increased fatalities and non fatal injuries in workers 45–54 years of age and over 55 years of age [7].

Occupation and self reported injuries at work were correlated. The highest proportion of health problems was reported by workers in the construction industry followed by the service and production industry. Prior studies have shown that employment in certain industry sectors highly influences the risk of occupational injuries and many studies have identified construction and service industries as particularly high risk industries [5, 9, 25, 26]. This pattern is also consistent with studies conducted in Massachusetts [27].

#### Limitations and Strengths

Limitations of our study include those that are inherent in any cross-sectional study design, such as recall bias, sampling bias (as the work reported here constituted a series of convenience samples and the lack of consistency in the interview format as the survey was verbally translated to the respondents by the Teen Educators while interacting with study participants. An additional limitation that would result in underestimates of work-related hazards, injuries, and illnesses is the relative lack of awareness among respondents as to which health outcomes are likely to be caused by work. For example, a person with a bad back might blame it on many things and not think about the relationship to standing all day at work. The magnitude of the effects in this study is uncertain due to the wide

confidence intervals. While precision is low, a larger sample size might better substantiate these results.

A critical issue to any discussion of limitations of the work reported here is the representativeness of our sample relative to the source population from which it was drawn. Given that the majority of the respondents were obtained at events either sponsored or endorsed by our community partner organizations, it is likely that these respondents were more acculturated than the general immigrant population. Accordingly, we believe that our findings should be considered a conservative estimate of work and health hazards seen among immigrants in Somerville, Massachusetts. These issues limit the generalizability of our results.

Serial convenience sampling among a given population runs the risk of enrolling study participants more than once. Our study is not exempt from this drawback. To our knowledge no study participant reported that they had previously participated in the survey. As an added quality control measure we looked for duplicate responses to selected survey responses; country of origin, age, and gender. This analysis revealed no exact duplicate responses thus increasing our belief that our final sample is composed of non-duplicate responses.

The strengths of this study include successfully interacting concurrently with the three principal immigrant populations in Somerville. This was accomplished in a time period in which U.S. Immigration and Customs Enforcement (ICE) was aggressively deporting undocumented immigrants resulting in the immigrant population being somewhat reluctant to interact with any research-oriented activity. These widely publicized events increased anxiety and complicated recruitment. Due to our collaborative partnership with community partners we were able to establish trust and succeeded in recruiting an adequate sample of a hard to reach population.

This is the first cross-sectional, community based study to concurrently measure the relative occupational health burden in three distinct immigrant populations within the same social milieu. This work suggests that older immigrants, those with low English proficiency, those working in low skilled jobs, and those with no health insurance may experience more occupational health risks. Lack of upward mobility is one possible explanation of this finding. Further studies with larger samples are required to further explore these hypotheses.

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Appendix

**Somerville Immigrant Occupational Health & Safety Survey**

These questions will help us better understand the safety and employment needs of our community members. You will not be asked to sign your name or identify yourself. You can stop the survey anytime you want.

**Thank you for taking the time to answer these questions.**

**BACKGROUND**

1. In what country were you born? (write in) \_\_\_\_\_
2. How long have you lived in the United States? (check one):  
 Less than 1 year    1-3 years    4-6 years    7-9 years    10-12 years    13-15 years    More than 15 years
3. In what country or countries were your parents born? (write in): \_\_\_\_\_
4. What language do you use at home most of the time? (write in, one language only): \_\_\_\_\_
5. What other languages do you speak?:  
 Spanish    Portuguese    Haitian Creole    English    Other (write in) \_\_\_\_\_
6. Are you... (check one)    Male    Female
7. How old are you? (check one)    18-20    21-30    31-45    46-54    55-65    66-79    Over 79
8. In what city or town do you live now?(write in): \_\_\_\_\_

**OCCUPATION**

9. Who do you work for? (check one):  
 One Regular employer (boss)    Many different employers    Self employed    Currently unemployed
10. Do you work at one job or more than one job? (check one):    One job    More than one
11. What kind of work do you do at your primary job? (write in) \_\_\_\_\_
12. If you work more than one job, what other kind of work do you do? (write in): \_\_\_\_\_
13. Did you receive any type of training for your job or jobs? (check one):    Yes    No
14. If you have a profession that you cannot currently practice, what is it?: \_\_\_\_\_

**HEALTH AND SAFETY**

15. Did you receive job training that was specifically about health and safety? (check one):    Yes    No
16. A hazard is anything that can harm you, injure you or affect your health. Are there hazards in the work you do? .  
 Yes (write in type of hazard, use back of sheet if necessary): \_\_\_\_\_    No    Don't Know
17. Are you covered by any form of health insurance or health plan? Plan name: \_\_\_\_\_    No    Don't know
18. Do you know your rights under Massachusetts Workers' Compensation laws? (check one):    Yes    No
19. Have you ever been injured at work?    Yes, once    Yes, more than once    No (if no, proceed to Question 24))
20. Was the most recent injury officially reported? (check one):    Yes    No
21. For the most recent injury, did you receive treatment?    Yes    No
22. For the most recent injury where do you go for treatment? be specific, if possible): \_\_\_\_\_
23. If yes, how did you pay for treatment?    Workman's Compensation    Self    Employer

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## Somerville Immigrant Occupational Health & Safety Survey

24. Do you have any health problems that you think are work related? Yes  No

If yes, please describe:

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25. Do you have a doctor? Yes  No

If no, why not?

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26. If we held a free worker's health clinic what health conditions would you like help with?

	Very Interested	Interested	Not Interested
Preventing and treating lower back pain or strain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing and treating shoulder, elbow, wrist pain or strain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing and treating knee, foot, ankle pain or strain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing chemical exposures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing and treating lead paint exposure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrition and weight control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blood pressure check	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blood sugar check	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workshop on workers compensation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workshop on health access and free health care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other: \_\_\_\_\_

**APPROVED**

**MAR 29 2008**

**Tufts SBER IRB**

**EXPIRES**

**MAR 28 2009**

**Tufts SBER IRB**

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