Published in final edited form as:

J Immigr Minor Health. 2014 October ; 16(5): 846–855. doi:10.1007/s10903-013-9806-8.

Urban occupational health in the Mexican and Latino/Latina immigrant population: A literature review

Francesca Gany¹, Patricia Novo², Rebecca Dobslaw³, and Jennifer Leng¹

¹Memorial Sloan-Kettering Cancer Center, Center for Immigrant Health and Cancer Disparities, Department of Psychiatry and Behavioral Sciences, Department of Medicine, New York, NY

²New York University School of Medicine, Department of Psychiatry, New York, NY

³New York University School of Medicine, New York, NY

Abstract

Mexican and Latino/Latina immigrants represent a rapidly growing population within the United States. The majority settle in urban areas. As a group, Mexican immigrants typically have low educational attainment and socioeconomic status, and limited English proficiency. These immigrants often find work in hazardous jobs, with high injury and fatality rates. They often have inadequate or no safety training, no personal protective equipment, limited understanding of workers' rights, job insecurity, fear of report of undocumented status and lack health care benefits. This review includes what has been published on the urban occupational health of this population. The findings suggest that Mexican and Latino/Latina immigrants experience higher rates of workrelated fatalities and injuries compared to other populations, and may be less likely to report such incidents to employers or to apply for workers' compensation. There is a strong need to develop effective programs to address the health and safety of this vulnerable population.

Keywords

Mexican immigrant; Latino; Latina; urban; Occupational health

Background

The foreign-born population in the United States increased almost 35% between 2000 and 2007, from approximately 28.3 million to 38.1 million (1,2). Mexican immigrants are the largest immigrant group in the U.S., approximately 33% of the foreign-born (3). Data from the 2000 National Health Interview Survey (NHIS) show that the majority (87%) of newly immigrated Mexicans (living in the U.S. less than 10 years) settle in urban areas, defined as areas with a metropolitan statistical area of 250,000 persons or more (4). Both immigration status and sociodemographic characteristics have implications for occupational health. Passel estimates that approximately 56% (6.2 million) of the total U.S. undocumented immigrant population comes from Mexico (5). Data from the 2000 NHIS show that 47% of

Mexican immigrants living in the United States for less than 10 years, and 27% of those residing in the U.S. for 10 or more years, are Spanish-speaking only (4). Twenty-five percent of recent Mexican immigrants (<10 years in the U.S.) reported income levels below the federal poverty line, 51% had an education of eighth grade or less, 73% were uninsured, and 55% had no usual source of health care (2000 NHIS data) (4).

While the population is continuing to grow, little is known about the urban occupational health hazards facing Mexican immigrants. Many find work in low-paying, potentially hazardous occupations such as construction, manufacturing, agriculture, restaurants, moving and cleaning (6–12). These jobs often involve exposure to hazardous chemicals, heavy lifting, long hours, and use of repetitive motions (13). Legal status, education level, socioeconomic status, ethnicity, labor skills and language barriers are some of the factors that contribute to the over-representation of immigrants in these potentially dangerous lines of work (6,11,14–17). Mexican immigrants employed in these occupations may not receive adequate safety training and may lack access to protective equipment as well as occupational health and safety services and information, including workers' compensation (16,18). They may lack knowledge of the right to form unions and demand better working conditions (16). Language barriers may worsen these issues (16).

While there has been substantial examination of Mexican immigrant agricultural workers, there is a paucity of research on the rapidly growing urban population and their occupational health and safety. This review will examine the immigrant Mexican urban occupational health literature according to occupation and risk, as well as barriers to health and safety.

Methods

This review addresses the health of Mexican immigrants in their most common urban occupations: manufacturing, construction, day labor, restaurants and housekeeping. A PubMed search was conducted in December 2011–January 2012. The following key words were used: 'Mexican immigrant occupational health', 'immigrant occupational health', 'Mexican immigrant health', 'immigrant health', 'migrants and health', 'Mexican immigrants', 'immigrants'. Literature searches were also conducted in ISI Web of Knowledge, Embase, Global Health and Google Scholar. In addition, the grey literature was searched via the New York Academy of Medicine online catalog. Finally, bibliographies were searched for relevant citations. Over 200 papers were identified through these searches. 17 papers of 15 studies on the subject of immigrant occupational health were identified and reviewed; 5 of those either focused on Mexican immigrants or contained information on an identifiable Mexican immigrant cohort (see Table 1). In many cases, no information specific to Mexican immigrant occupational health could be gleaned, so data were extracted on Latino immigrant occupational health or immigrant occupational health in general. Additional articles, providing context on health care utilization, barriers to care, and the health consequences of the urban occupations where most immigrants find themselves employed in the U.S., are included in the discussion.

Results

Occupational Fatalities, Injuries, and Illnesses

Evidence suggests a higher rate of on-the-job fatalities and injuries in workers of Latino descent within the United States than in workers of any other ethnicity (19). Of the Hispanic immigrant occupational fatalities recorded between 1996 and 2001, 67% occurred in employees born in Mexico (19). Data from the Census of Fatal Occupational Injuries (1996–2001) indicate that Mexicans have 27.3% of the share of employment, but have 42.1% of the share of fatalities (19). In 2007, 44% of recorded immigrant occupational fatalities involved Mexican workers (20).

In 2007, Latino workers (both foreign- and native-born) had a fatality rate of 4.6 per 100,000 employed workers compared with 3.9 for Black, non-Hispanic workers and 3.8 for White workers (21). Of the total occupational fatalities for Latino workers in the U.S. in 2007, 31.4% were caused by transportation accidents, 21.3% from contact with equipment/objects, 20.2% from falls, 12.3% from assaults and violent acts, 12% from exposure to harmful substances/environments, and 2.3% from fires and explosions (22). In 2007, non-fatal occupational injuries and illnesses for the same group were 38.3% of total injuries in the mining and natural resources sector, 18.8% in construction, and 16% in manufacturing. In the service sector, Latino workers accounted for 19.6% of the injuries in leisure and hospitality, 17.7% in professional and business services, 10.6% in financial activities, 9.5% in trade transportation and utilities, 8% in education, 6% in information, and 11.7% in other services (23).

Urban Occupations and Risks

Studies have shown that minority status is a predictor of trade and trade is a predictor of risk of injury (24). Many urban Mexican immigrant workers are employed in low-paying, potentially hazardous occupations including manufacturing, construction, restaurants, moving and cleaning (5–11).

Manufacturing—Many female Hispanic workers (from Mexico, Central America, or South America) are employed in light manufacturing (garment, furniture and food processing factories) (25). Latina immigrant participation rates in the manufacturing industry increased from 3.1% to 11% from 1970 to 1990 (26). Common factory jobs for these immigrant workers include garment sewers and cutters, food processing packagers, and assembly workers (25).

The garment industry in California and New York is a common entry point for Latina immigrant workers. 71% of the garment industry workers in California and 34% of those in New York City are Latina (27). These women work in tight quarters and perform repetitive, high-speed, complex tasks, often with antiquated machinery. Repetitive motion injuries are common (28). In a study of 100 Cantonese garment workers in Oakland, CA, Burgel et al. similarly reported that 99% of women interviewed at a free clinic for garment factory workers complained of musculoskeletal pain (28). Other frequent complaints included headaches (39%), problems with eyesight (38%), and allergies (26%) (28).

Many of the locations in which these women work have already been cited in violation of labor laws and health and safety codes. For example, The California Target Industries Partnership Program of 1994 found that 98% of garment firms inspected were in violation of Occupational Safety and Health Administration (OSHA) and/or safety standards (29). A follow up study in 1996 found 96% of firms still in violation (29). Typical hazards found in garment factories include poor lighting, inadequate ventilation, risk of fire due to haphazard electrical wiring, and lack of ergonomic working stations (28,30). Health insurance, time off and other benefits are rarely included for these workers (28). 61% of garment industry workers studied in California had no form of health insurance (28). Moreover, some California garment factories did not maintain their workers' compensation insurance, a clear violation of the law (28).

Other manufacturing industries also employ large numbers of Mexican immigrants. Mexican immigrants make up 9.1% of the nondurable goods, and 4.7% of the durable goods manufacturing industry workforce (31). A large number of Mexican immigrants work in non-durable goods manufacturing such as fruit and vegetable manufacturing (22.3%), animal slaughter (26.8%), bakeries (15.2%), and textile mills (9.7%), as well as durable goods manufacturing including plastics (10.4%) and furniture (12.2%) (31). These workers face the same working hazards as in the garment industry, including repetitive motion injuries, poor working conditions and insufficient provision of personal protective equipment (PPE) and safety training (13). In a study by de Castro et al. that analyzed case record data from workers seeking assistance at the Chicago Interfaith Workers' Rights Center, a Mexican machine operator at a manufacturing facility reported hazardous working conditions including oil and dangerous materials on the floors, large amounts of dust, and poor ventilation (13). Another Latino worker at a plastic manufacturing facility described that there were no guards or sensors on machines, no PPE such as gloves or masks, and no safety training, with several workers losing fingers as a result (13). This study relies on data that was not originally collected for research purposes and a future study with a more structured interview targeted to this population would be useful. Nonetheless, the qualitative examination seems thorough and the researchers propose an integrated model to better understand immigrant workers' experience at work and its impact on health and well-being.

Construction—Construction is considered the most dangerous trade in the United States, with 1 in 5 workers suffering a work-related injury or illness each year (32). A large percentage of Mexican immigrants (15.2%) work in the construction industry (33). Results from a recent study show that 27.7% of on-the-job fatalities among Latino workers occur in construction, the highest number represented by any one industry (34). In 2000, Hispanics comprised less than 16% of the construction workforce, but accounted for 23.5% of fatal injuries (35).

There are many possible reasons for the high risk of fatal and non-fatal injuries among Mexican immigrant construction workers. Many Latino construction workers may receive limited or no safety training. In a 2005 study conducted by O'Connor et al. among 50 Latino youth, aged 21 years in the construction industry, 68–72% received some type of safety training, although training was typically brief, median training time was 1 hour (10). In semi-structured interviews conducted in Spanish, 90% of the construction workers reported

Spanish as their primary language, with only 20% reporting they spoke “good” or “fluent” English (10). However, of those studied who received on-the-job safety training, 76% received the training in Spanish (10). Moreover, Mexican immigrant construction workers may not be given the proper personal protective equipment (PPE) or proper training on how to use it. In the O’Conner et al. study, only 62% of Latino construction workers reported receiving information on the use of personal protective equipment and appropriate dress for the job (10). While this was a small study, intended to provide descriptive information, it provides a glimpse into the challenges immigrants face in the construction industry. In a paper by Malievskaia et al. from information gathered during free medical screenings for building cleanup workers at the World Trade Center Ground Zero operations, immigrant construction workers reported that they often were not provided with respirators or any PPE to protect them from the large amounts of dust and debris in their area of work (36). Some of the workers questioned were actually told by supervisors not to wear respirators that they brought from home so as not to alarm co-workers (36).

Day Laborers—A large number of Mexican immigrant construction workers are day laborers with undocumented immigration status (8,37). In a national, randomized survey study conducted by Valenzuela et al. of 2,660 day laborers in various communities throughout the United States, 75% of respondents were found to be undocumented immigrants (59% of Mexican origin) (37). In a study conducted by Seixas et al., 44% of day laborers from three common sites of congregation in Seattle, Washington, worked in construction and 47% were Mexican-born (8). Day laborers also work in manufacturing, yard work, landscaping, and home improvement projects at private residences (8). Because they are starting a new job each day, there is often little or no on-the-job safety training provided. In the study by Seixas et al., only 40% of day laborers reported receiving health or safety-related training at their job (8). Occupational injury rates for day laborers have been found to be high. In the study by Valenzuela et al., 20% of day laborers reported a work-related injury for which they had to receive medical attention (37). In addition, day laborers who are undocumented have limited rights and low socio-economic standing (8,37). Employment abuses are also common. In the national survey of day laborers conducted by Valenzuela et al., almost half reported at least one occurrence of wage theft in the 2 months before the survey, and 44% reported being denied food, water, or breaks while working (37). The Valenzuela et al. study is the only study reviewed here that collected primary data (not secondary analysis of existing data sets) on a national scope. It also had a rigorous sampling strategy that paid particular attention to the transient nature of its target population. The Seixas et al. study is smaller in scope, but also succeeds in highlighting key issues of concern for this particularly vulnerable population.

Restaurant Workers—Many immigrants have moved into the restaurant industry, where they often work as cooks, dishwashers and bus boys (12). Throughout the United States, 14% of Mexican immigrants work in the food and hospitality industry which includes workers in the arts, entertainment, recreation, accommodation, and food services industries (33). In 2000, the New York City restaurant industry reported that 64.4% of its workers were foreign-born, with 12.2% from Mexico and Central America (38). There are many potential hazards and opportunities for injury in the restaurant industry. Commonly reported injuries

include skin and respiratory symptoms, sprains, strains, cuts, lacerations, punctures, heat burns and musculoskeletal disorders (39–43).

In the restaurant industry, too, there is little safety-related training provided (44). Workers are reluctant to report injuries to their supervisors and will often resort to self-applied first aid should an injury, such as a burn or minor laceration, occur (12). Reluctance to report injury may be for the same reasons as in other industries, where immigrant workers fear repercussions, such as termination of employment or deportation.

Housekeeping—Many Mexican immigrant women work in the housekeeping industry, in hotels or private residences. Because housekeeping is often performed in private residences, little or no safety training is provided. Data from the 2000 Census suggest that 13.4% of the housekeeping industry is supplied by Mexican immigrant workers (31). Although there has been limited research done in the United States on this sector of the immigrant workforce, a recent European study has demonstrated some of the work-related hardships these women face (45). While this was a small (n=46) exploratory study, interestingly, it analyzed data by documentation status, and while risk presented by the working conditions (environmental, ergonomic, psychosocial) was seen as similar between the two groups, power (to negotiate or affect a change) was perceived as greater in the documented group, a nuance that had not previously been presented. Harsh chemicals such as bleach and ammonia are commonplace and are usually required on the job. Skin and respiratory conditions can develop from increased exposure to these chemicals (46–47). Repetitive motion injuries are also commonplace in the housekeeping industry, where workers are expected to scrub, iron, mop, sweep and dust. Additional muscle strain may result from lifting heavy objects or moving furniture to clean around it. Awkward postures may be necessary when cleaning in hard to reach areas (45).

Chemical & Physical Hazards—Immigrant workers face chemical and physical hazards in the workplace. In a study conducted by Pransky et al. with a population of 427 Latino workers in the Washington D.C. area, workers reported encountering an average of 6.79 chemical or physical job-related hazards, including pesticides, bleach, formaldehyde, asbestos, blood, slippery floors, risk of falls, cuts or burns, and heavy lifting (18). Workers who reported more hazards at work were more likely to suffer from an injury (18). Eighteen percent believed their working conditions negatively impacted their health (18). The Pransky et al., study used a rigorously developed and tested questionnaire administered by trained community health workers and describes the work and occupational health experiences of a relatively stable urban Latino immigrant population. However, surveys were conducted in the evenings and on weekends, which might exclude those working at more than one job or with less traditional schedules. In the study conducted by de Castro et al. (previously described) at the Chicago Interfaith Workers' Rights Center, case record data showed that workers faced chemical and physical hazards while on the job (13). For example, a Mexican painter reported that he was never provided with safety training or equipment including gloves and masks (13). As a result, he complained about being exposed to toxic fumes and paint and lead chips while remodeling old buildings (13). A Mexican steel worker reported that while eye protection was provided for spot welding, there was no 'protection for

breathing', fans do not reliably work and a coworker had recently fainted on the job as a result (13).

Barriers to Occupational Health and Safety

Lack of Safety Training and Personal Protective Equipment (PPE)—Despite the hazards faced by many Mexican immigrants at work, there is inadequate safety training and insufficient PPE provided to them at the jobs in which they are most often employed (8,10). In the community study conducted by Pransky et al., only 31% of Latino immigrant workers interviewed were provided with job safety training (18). Language may be a barrier to adequate training (see below).

An added hazard Mexican immigrant workers face is lack of adequate safety equipment. The U.S. Occupational Safety and Health Administration (OSHA) regulations make employers responsible to assess, identify and control workplace hazards and identify, provide and maintain appropriate PPE for workers (48). However, many day laborers report that these regulations are ignored (32). Unfortunately, these workers are reluctant to complain to their employers because they are afraid of losing their jobs or being deported (49).

Language—Inability to read, speak, and/or understand English puts Mexican immigrant workers at a disadvantage. According to the study conducted by de Castro et al., workers (the majority of whom were immigrants from Latin American countries) said that inability to understand English was used as a reason to harass them and threaten them with dismissal (13). Furthermore, some workers reported occasions when they were forced to sign documents in English without knowing what they were signing (13).

As discussed above, safety training may only be provided in English. Data from Pransky et al. suggests that when training is provided, 25% of training provided to Latino immigrant workers in the industries of construction, maintenance, restaurants, hotels, landscaping and laundry is only provided in English, rendering it useless to workers with little knowledge of the English language (18). Even when training and other material may be available in Spanish, it may not be sufficient. Studies of agricultural migrant workers have shown an increase in the numbers of indigenous individuals from southern Mexico and Guatemala (16,50). Most of these workers are Mixtec, Zapotec, or Maya and do not fluently speak or understand English or Spanish (16). In a study assessing pesticide knowledge among Hispanic migrant farmworkers in Oregon, participants who spoke indigenous languages scored significantly lower than those who did not (51). As those immigrants make their way to urban settings, additional language and cultural challenges to occupational health and safety will likely materialize.

Health Care Access—Often the employers of immigrant workers do not provide benefits, including health insurance. In a recent study of Latino immigrant workers in Northern Virginia, only 20% were shown to have personal health insurance (18). According to the National Center for Health Statistics, in 2000, 58% of Mexican immigrants aged 18–64 had no health insurance and 45% had no usual source of health care (52). Moreover, undocumented immigrants are ineligible for many publicly funded services, including health

care and disability benefits from Social Security, even though the majority of these immigrants have social security contributions and taxes withheld from their income (53–54).

In addition to lack of health insurance, many immigrant workers are reluctant to seek health care as a result of numerous barriers including culture, language, hours of operation of medical facilities, and lack of transportation and child care (55–59).

Knowledge of Rights—Workers' compensation is state-required insurance employers must provide for workers who are injured on the job or have a work-related illness (60). States design and administer workers' compensation programs, and the programs vary in who provides the insurance, the injuries and illnesses that are compensable, and the type of benefits provided (60). The Federal Employees' Compensation Act (FECA) outlines the provision of workers' compensation for all federally-employed workers (61). Documented and undocumented immigrants can receive workers' compensation if injured on the job (62). Once a worker has agreed to utilize resources from workers' compensation s/he loses his/her right to sue the employer for injury costs and damages (60). Some of the benefits that can be received via workers' compensation include partial recovery of lost wages, medical care for work-related conditions, temporary total disability benefits while the worker is away from the job, permanent disability benefits if the condition has long-term consequences, and dependent survivor benefits in the case of fatalities (60).

Immigrants may choose not to file workers' compensation claims for fear of deportation or job loss (18). When occupational injuries arise, workers may be hesitant to notify an employer for fear of losing their job and its economic implications (32). Since most jobs undertaken by Mexican immigrants require physical strength, injury, illness or physical ailments can result in termination from employment (13). In the Pransky et al. study, 58% of Latino workers who suffered from an occupational injury did not file workers' compensation claims (18).

Lack of knowledge that such a program exists may also be a reason for not filing claims (18,53). In the study by O'Connor et al. among Latino construction workers that showed 68–72% had received some form of safety training, only 8% were told how to file a claim for workers' compensation (10). Furthermore, an occupational health survey conducted among 1,428 workers at five Massachusetts community health centers found that 52% of foreign-born workers (excluding Puerto Rico) had never heard of workers' compensation (63). This survey, conducted as part of the Occupational Health Surveillance Program of the Massachusetts Department of Public Health, provided descriptive information about the types of employment and related injuries across a range of immigrant groups. While not necessarily representative of all immigrants in Massachusetts, it provides an important starting place to address unmet needs in occupational health information, resources and interventions.

In a second paper of the study conducted with workers at the World Trade Center (previously described), of whom 44.5% were immigrants (and nearly all of whom were from Latin America), the most common barriers to filing a New York State workers' compensation claim included lack of employment documentation, fear of retaliation by

employers or job loss, financial need, inability to provide adequate documentation since they could not or did not seek medical attention at the time of injury, and difficulty communicating with legal or medical advisors (usually due to language barriers) (53). In addition, many day laborers do not have the ability to file a workers' compensation claim because they work for a period of one day and most employment agreements are made informally.

The increased presence of immigrant workers and their reluctance to file workers' compensation claims and injury reports may explain the decreased frequency of workers' compensation claims and reported occupational injuries and illnesses to the Bureau of Labor Statistics for the years 1992–2000 (decrease of 25%) (6,64–66). In fact, industries reporting the greatest drops in workers' compensation claims filed are also the industries that have been recently staffed by the growing immigrant population (6).

Discussion

As a result of low socio-economic status, little or no formal education, undocumented legal status, and poor knowledge of the English language, Mexican immigrants often work with little or no protection in high-risk industries such as construction, day labor, manufacturing, restaurants and housekeeping. Consequently, Mexican immigrants suffer from higher rates of work-related fatalities and injuries and may be more reluctant to report such problems to employers or to apply for workers' compensation (19,31).

Community-based programs implemented to educate immigrant populations on occupational health and safety may provide a method to improve conditions for some urban workers (11,13,67). One such example is the Chicago Interfaith Workers' Rights Center and its programs aimed at supporting immigrant workers of all backgrounds (13). Workers can visit the center to receive information and training on their labor rights. Additionally the center delivers outreach programs to immigrant communities to provide training on workers' rights, occupational safety and health, and workers' compensation. As a result of its reputation in the Chicago community, the Chicago Interfaith Workers' Rights Center is also able to conduct studies on immigrant occupational health focused on improving our understanding of these workers' occupational needs (11,13). Another example is described by Williams et al., where a participatory, peer-led health and safety awareness training for Latino day laborers was effective in improving work practices and rates of self-reported injury (68).

More culturally and linguistically responsive community outreach programs need to be created to inform the large and growing numbers of Mexican immigrants about health and safety in the workplace and the need to use proper protective equipment on the job. Additionally, community members need to be educated about health insurance and workers' compensation, and eligibility requirements for each (16). Workers should also be made aware of their rights for better working conditions (16).

The formation of unions can be encouraged to protect the rights of immigrant workers. One such example is the New York Domestic Workers United (DWU), an organization of immigrant domestic workers in the New York City area (69). DWU provides occupational

safety training workshops and English as a Second Language classes to immigrant household service workers, who may not receive training on the job. Additionally, DWU provides members with legal services and promotes the passing of legislation aimed at improving working conditions for workers in the housekeeping industry. Finally, DWU provides guidelines and standards which can be accessed through the group's website by potential employers of household service workers (69).

Alternatives to hazardous environments should be explored and changes made where possible. Preliminary study results outlined by Chan et al. suggest low-cost changes to work station design could improve musculoskeletal symptoms in workers (67). OSHA has created web-based tutorials on improving ergonomic design of garment-industry workstations in both Spanish and English (70).

In addition to heightened awareness of occupational safety and workers' rights, there is great need for increased regulation of the hazardous industries in which Mexican immigrant workers are employed. More compliance inspections by OSHA and the National Institute for Occupational Safety and Health (NIOSH) need to take place at such sites of business. Review of safety training procedures and practices as well as the stocking, supplying and maintenance of personal protective equipment for all workers should take place during such compliance inspections. Moreover, immigrant workers' rights need to be protected including access to and support needed to file workers' compensation claims. Claim forms should be present at all places of business and available in the primary language of the employee.

Health care providers can also play an important role in improving detection of work-related illness and injury by raising the level of suspicion for occupational disease, building skills for taking an occupational health history, and developing access to resources for occupational medicine (71).

Finally, there is a need to conduct occupational health studies for the Mexican immigrant population in further detail, with a focus on their increasingly urban occupations. Many of the articles reviewed focused on Latinos, but did not specify participants' countries of origin and there can be much variability among the populations that fall under this classification. There are relatively few studies of immigrant occupational health and many of them are very small, using convenience samples. While they can provide rich data about the subjects studied, they are not generalizable to the larger population. Secondary analyses of large existing data sets suffer from missing data, possible misclassification and probable undercounting. Since much of this data is from federal sources, it is likely that information on undocumented immigrants is not included. Through community-based studies, a better estimate of occupational injury and fatality rates could be ascertained, as current rates only focus on reported injuries and fatalities and there is a strong trend by Mexican immigrants to underreport these occurrences (6,18,72–74). An expanded understanding of Mexican immigrants' occupations, working conditions, occupational safety, and access and utilization of healthcare could potentially lead to better programs and services to advance their health and safety in the workplace, as well as lead to safer work environments for all.

References

1. U.S. Census Bureau. Current population survey. Mar. 2000 January 3, 2001. Available at: <http://www.census.gov/population/socdemo/foreign/p20-534/tab0301.pdf>. Accessed December, 2011
2. U.S. Census Bureau. American Community Survey Reports: Race and Hispanic origin of the foreign-born population in the United States: 2007. Jan. 2010 Available at: <http://www.census.gov/prod/2010pubs/acs-11.pdf>. Accessed December, 2011
3. U.S. Census Bureau. Foreign-born Profiles; Profile of Selected Demographic and Social Characteristics: 2000, People born in Mexico. 2000a. Available at: <http://www.census.gov/population/cen2000/stp-159/STP-159-Mexico.pdf>. Accessed December, 2011
4. Wallace SP, Gutiérrez VF, Castañeda X. Access to preventive services for adults of Mexican origin. *J Immigr Minor Health*. 2008; 10:363–371. [PubMed: 17939052]
5. Passel, JS. The size and characteristics of the unauthorized migrant population in the U.S. estimates based on the March 2005 current population survey. Pew Hispanic Center. Mar 7. 2006 Available at: <http://pewhispanic.org/files/reports/61.pdf>. Accessed December, 2011
6. Azaroff LS, Lax MB, Levenstein C, Wegman DH. Wounding the messenger: the new economy makes occupational health indicators too good to be true. *Int J Health Serv*. 2004; 345:271–303.
7. Zarate-Abbott P, Etnyre A, Gilliland I, et al. Workplace health promotion - strategies for low-income Hispanic immigrant women. *AAOHN J*. 2008; 56(5):217–22. [PubMed: 18578188]
8. Seixas NS, Blecker H, Camp J, Neitzel R. Occupational health and safety experience of day laborers in Seattle, WA. *Am J Ind Med*. 2008; 51:399–406. [PubMed: 18330894]
9. Holmes SM. An ethnographic study of the social context of migrant health in the United States. *PLoS Med*. 2006; 3(10):e448. [PubMed: 17076567]
10. O'Connor T, Loomis D, Runyan C, Abboud dal Santo J, Schulman M. Adequacy of health and safety training among young Latino construction workers. *J Occup Environ Med*. 2005; 47(3): 272–7. [PubMed: 15761323]
11. Cho CC, Oliva J, Sweitzer E, et al. An interfaith workers' center approach to workplace rights: implications for workplace safety and health. *J Occup Environ Med*. 2007; 49(3):275–81. [PubMed: 17351513]
12. Tsai JH. Chinese immigrant restaurant workers' injury and illness experiences. *Arch Environ Occup Health*. 2009; 64(2):107–14. [PubMed: 19395341]
13. de Castro AB, Fujishiro K, Switzer E, Oliva J. How immigrant workers experience workplace problems: a qualitative study. *Arch Environ Occup Health*. 2006; 61(6):249–258. [PubMed: 17967746]
14. Dembe A. Social inequalities in occupational and health care for work-related injuries and illnesses. *Int J Law Psychiatry*. 1999; 22:567–579. [PubMed: 10637758]
15. American Federation of Labor – Congress of Industrial Organizations (AFL-CIO). Immigrant workers at risk: the urgent need for improved workplace safety and health policies and programs. Washington, DC: AFL-CIO; 2005. Available at: <http://www.ncfh.org/pdfs/6000.pdf>. Accessed December, 2011
16. McCauley LA. Immigrant workers in the United States: recent trends, vulnerable populations, and challenges for occupational health. *AAOHN J*. 2005; 53:313–319. [PubMed: 16097105]
17. Taylor, AK., Murray, LR. Occupational safety and health. In: Levy, BS., Sidel, VW., editors. *Social Injustice and Public Health*. Oxford, England: Oxford University Press; 2006. p. 337–356.
18. Pransky G, Moshenberg D, Benjamin K, et al. Occupational risks and injuries in non-agricultural immigrant Latino workers. *Am J Ind Med*. 2002; 42(2):117–123. [PubMed: 12125087]
19. Loh K, Richardson S. Foreign-born workers: trends in fatal occupational injuries, 1996–2001. *Monthly Labor Rev*. 2004; 127(6):42–53.
20. U.S. Department of Labor, Bureau of Labor Statistics. Fatal occupational injuries to foreign-born workers, by region of origin, 2007. 2009a. Available at: <http://www.bls.gov/iif/oshwc/cfoi/cfch0006.pdf>. Accessed December, 2011
21. U.S Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries. Fatal occupational injuries, employment, and rates of fatal occupational injuries by selected worker

- characteristics, occupations, and industries, 2007. 2007a. Available at: http://www.bls.gov/iif/oshwc/cfoi/cfoi_revised07.pdf. Accessed December, 2011
22. U.S Department of Labor, Bureau of Labor Statistics, in cooperation with State and Federal agencies. Census of fatal occupational injuries: Table A-7. Fatal occupational injuries by worker characteristics and event or exposure, all United States. 2007b. Available at: <http://www.bls.gov/iif/oshwc/cfoi/cftb0229.pdf>. Accessed December, 2011
 23. U.S Department of Labor, Bureau of Labor Statistics. Nonfatal occupational injuries and illnesses requiring days away from work. 2008. Available at: <http://www.bls.gov/iif/oshwc/osh/case/osnr0031.pdf>. Accessed December, 2011
 24. Anderson JT, Hunting KL, Welch LS. Injury and employment patterns among Hispanic construction workers. *J Occup Environ Med*. 2000 Feb; 42(2):176–86. [PubMed: 10693079]
 25. Myers D, Cranford CJ. Temporal differentiation in the occupational mobility of immigrant and native-born Latina workers. *American Sociological Review*. 1998; 63(1):68–93.
 26. Scott, A. The manufacturing economy: ethnic and gender divisions of labor. In: Waldinger, R., Bozorgmehr, M., editors. *Ethnic Los Angeles*. New York: Russell Sage Foundation; 1996. p. 215–246.
 27. U.S. Census Bureau. Census 2000 EEO data tool. U.S. Census Bureau; 2000b. Web site Available at: <http://www.census.gov/eo2000/index.html>. Accessed December, 2011
 28. Burgel BJ, Lashuay N, Isreal L, Harrison R. Garment workers in California: health outcomes of the Asian immigrant women workers clinic. *AAOHN J*. 2004; 52(11):465–475. [PubMed: 15587459]
 29. California Division of Labor Standards Enforcement. Targeted industries partnership program – a joint enforcement and educational effort in the agricultural and garment industries: fourth annual report. California Department of Industrial Relations; 1996. Web site Available at: <http://www.dir.ca.gov/dlse/tipp4.htm>. Accessed December, 2011
 30. Stephenson J. Good workers may get bad breaks on health. *JAMA*. 1995; 273(21):1643–1646. [PubMed: 7752397]
 31. American Immigrant Law Foundation. Mexican immigrant workers and the U.S. economy: an increasingly vital role. *Immigration Policy Focus*. 2002; 1(2):1–14. Available at: <http://www.immigrationpolicy.org/sites/default/files/docs/Mex%20Imm%20Workers%20&%20US%20Economy.pdf>. Accessed December, 2011.
 32. Walter N, Bourgois P, Margarita Loinaz H, Schillinger D. Social context of work injury among undocumented day laborers in San Francisco. *J Gen Intern Med*. 2002; 17(3):221–9. [PubMed: 11929509]
 33. U.S. Census Bureau. Foreign-born Profiles; Profile of Selected Economic Characteristics: 2000. People born in Mexico. 2000c. Available at: <http://www.census.gov/population/cen2000/stp-159/STP-159-Mexico.pdf>. Accessed December, 2011
 34. Department of Health and Human Services. Worker health chartbook. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health; 2004. Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. Publication No. 2004-146 Web site Available at: <http://www.cdc.gov/niosh/docs/2004-146/>. Accessed December, 2011
 35. Dong X, Platner JW. Occupational fatalities of Hispanic construction workers from 1992 to 2000. *Am J Ind Med*. 2004 Jan; 45(1):45–54. [PubMed: 14691968]
 36. Malievskaia E, Rosenberg N, Markowitz S. Assessing the health of immigrant workers near Ground Zero: preliminary results of the World Trade Center day laborer medical monitoring project. *Am J Ind Med*. 2002; 42:548–549. [PubMed: 12439882]
 37. Valenzuela, A., Theodore, N., Meléndez, E., Gonzalez, AL. On the corner: day labor in the United States. Los Angeles: UCLA Center for the Study of Urban Poverty; Jan. 2006
 38. Restaurant Opportunities Center of New York (ROC-NY) and the New York City Restaurant Industry Coalition. Behind the Kitchen Door: pervasive inequality in New York City's thriving restaurant industry. Jan 25. 2005 Available at: <http://www.urbanjustice.org/pdf/publications/BKDFinalReport.pdf>. Accessed December, 2011
 39. Seigel M. Involuntary smoking in restaurant workplace: a review of employee exposure and health effects. *JAMA*. 1993; 270:490–493. [PubMed: 8320789]

40. Svendsen K, Sjaastad AK, Siversten J. Respiratory symptoms in kitchen workers. *Am J Ind Med.* 2003; 43:436–439. [PubMed: 12645099]
41. Webster T. Occupational hazards in eating and drinking places. *Compens Work Cond.* 2001:27–33.
42. Dempsey PG, Filiaggi AJ. Cross-sectional investigation of task demands and musculoskeletal discomfort among restaurant wait staff. *Ergonomics.* 2006; 49:93–106. [PubMed: 16393806]
43. Dickel H, Kuss O, Schmidt A, Kretz J, Diepgen TL. Importance of irritant contact dermatitis in occupational skin disease. *Amer J Clin Dermatol.* 2002; 3:283–289. [PubMed: 12010073]
44. Tsai J, Bruck A. Sociocultural contexts and worker safety and health: findings of a study with Chinese immigrant restaurant workers. *AAOHN J.* 2009; 57(2):51–8. [PubMed: 19283933]
45. Ahonen, EQ., López-Jacob, MJ., Vázquez, ML., et al. Invisible work, unseen hazards: the health of women immigrant household service workers in Spain [published online ahead of print May 28 2009]. *Am J Ind Med.* 2009. Available at: <http://www3.interscience.wiley.com/journal/122408537/abstract?CRETRY=1&SRETRY=0>. Accessed December, 2011
46. Agency for Toxic Substances and Disease Registry (ATSDR). ToxFAQs for calcium hypochlorite/sodium hypochlorite. Agency for Toxic Substances and Disease Registry; 2002. Web site Available at: <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=928&tid=192>. Accessed December, 2011
47. Agency for Toxic Substances and Disease Registry (ATSDR). ToxFAQs for ammonia. Agency for Toxic Substances and Disease Registry; 2004. Web site Available at: <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=10&tid=2>. Accessed December, 2011
48. U.S. Department of Labor, Occupational Safety and Health Administration. Personal Protective Equipment. Available at: <http://www.osha.gov/Publications/OSHA3151.html>. Accessed September, 2012
49. Marín AJ, Grzywacz JG, Arcury TA, et al. Evidence of organizational injustice in poultry processing plants: possible effects on occupational health and safety among Latino workers in North Carolina. *Am J Ind Med.* 2009; 52(1):37–48. [PubMed: 18942666]
50. Farquhar S, Shadbeh N, Samples J, Ventura S, Goff N. Occupational conditions and well-being of indigenous farmworkers. *Am J Public Health.* 2008; 98(11):1956–9. Epub 2008 Sep 17. [PubMed: 18799774]
51. McCauley LA, Shapiro SE, Scherer JA, Lasarev MR. Assessing pesticide safety knowledge among Hispanic migrant farmworkers in Oregon. *J Agric Saf Health.* 2004; 10(3):177–86. [PubMed: 15461134]
52. Wallace, SP., Gutiérrez, VF., Castañeda, X. Health service disparities among Mexican immigrants. UCLA Center for Health Policy Research and California-Mexico Health. Initiative; 2005. Health policy fact sheet. Available at: http://www.healthpolicy.ucla.edu/pubs/files/2005cmhi_health_disp.pdf. Accessed December, 2011
53. de la Hoz RE, Hill S, Chasan R, et al. Health care and social issues of immigrant rescue and recovery workers at the World Trade Center site. *J Occup Environ Med.* 2008; 50(12):1329–1334. [PubMed: 19092486]
54. Porter, E. The New York Times. Apr 5. 2005 Illegal immigrants are bolstering Social Security with billions.
55. Berk ML, Schur CL, Chavez LR, Frankel M. Health care use among undocumented Latino immigrants. *Health Aff.* 2000; 19(4):51–64.
56. Larson CO, Stroebel CK, Perkey BN. Merging education with measurement: a focus on the Hispanic community. *J Ambul Care Manage.* 2001; 24(3):27–36. [PubMed: 11433553]
57. Karter AJ, Ferrara A, Darbinian JA, Ackerson LM, Selby JV. Self-monitoring of blood glucose: language and financial barriers in a managed care population with diabetes. *Diabetes Care.* 2000; 23(4):477–483. [PubMed: 10857938]
58. David RA, Rhee M. The impact of language as a barrier to effective health care in an underserved urban Hispanic community. *Mt Sinai J Med.* 1998; 65(5–6):393–397. [PubMed: 9844369]
59. Becker G. Effects of being uninsured on ethnic minorities' management of chronic illness. *West J Med.* 2001; 175(1):19–23. [PubMed: 11431394]
60. Reno V, Williams CT, Sengupta I. Worker's Compensation, Social Security Disability Insurance, and the Offset: A Fact Sheet. Social Security Bulletin 2003/2004. 65(4):3–6. Available at: <http://www.ssa.gov/policy/docs/ssb/v65n4/v65n4p3.pdf>. Accessed December, 2011.

61. Division of Federal Employees' Compensation (DFEC). About DFEC. United States Department of Labor Office of Workers' Compensation Programs (OWCP); 2009. Web site Available at: <http://www.dol.gov/owcp/dfec/>. Accessed December, 2011
62. Faist, T. Boundaries of welfare states: immigrants and social rights on the national and supranational level. In: Miles, R., Thränhardt, D., editors. Migration and European Integration: the dynamics of inclusion and exclusion. London, England: Pinter Publishers; 1995. p. 177-193.
63. Occupational Health Surveillance Program: Massachusetts Department of Public Health. Occupational health and community health center (CHC) patients. Apr. 2007 A report on a survey conducted at five Massachusetts CHCs Available at: <http://www.mass.gov/eohhs/docs/dph/occupational-health/ohsp-survey-report-summary.doc>. Accessed December, 2011
64. Fletcher M. Safety awareness cutting comp claims. Bus Insur. 2001; 35(18):6-7.
65. Martin M. Comp benefits, costs continue decline in '99. Occup Hazards. 2001; 63(8):23-24.
66. Krueger, AB. New York Times. Sep 14. 2000 Fewer workplace injuries and illnesses are adding to economic strength.
67. Chan J, Janowitz I, Lashuay N, et al. Preventing musculoskeletal disorders in garment workers: preliminary results regarding ergonomic risk factors and proposed interventions among sewing machine operators in the San Francisco bay area. Appl Occup Environ Hyg. 2002; 17(4):247-253. [PubMed: 11942668]
68. Williams Q, Ochsner M, Marshall E, Kimmel L, Martino C. The impact of a peer-led participatory health and safety training program for Latino day laborers in construction. J Safety Res. 2010; 41(3):253-261. [PubMed: 20630277]
69. Domestic Workers United. Domestic Workers United Web site. Helen Marie Creative Partners LLC; 2009. Standard employment contract for domestic workers. Available at: <http://www.domesticworkersunited.org/resources.php>. Accessed December, 2011
70. Besser, B., Curtis, B., Zimowski, E., Michael, R. Sewing station design. U.S. Department of Labor Occupational Health and Safety; Web site. Available at: <http://www.osha.gov/SLTC/etools/sewing/sewingstationdesign.html>. Accessed December, 2011
71. Lax MB, Manetti FA, Klein R. Recognizing occupational disease - taking an effective occupational history. Am Fam Physician. 1998; 58(4):935-44. [PubMed: 9767728]
72. Azaroff LS, Levenstein C, Wegman DH. Occupational injury and illness surveillance: conceptual filters explain underreporting. Am J Public Health. 2002; 92:1421-1429. [PubMed: 12197968]
73. Cenicerros R. Experts view shift in claims frequency. Bus Insur. 2001; 35(45):48-50.
74. Minter SG. Safety and the fear factor. Occup Hazards. 1999; 61(4):10.

Table 1

Author	Type/Method	Sample	Bias	Mexican cohort
Ahonen, et al.	qualitative, descriptive study; focus groups & semi structured interviews	criterion sampling	selection bias; recall bias	N
Anderson, et al.	quantitative, chart review qualitative: follow up interviews with a portion of the sample	convenience sample	selection bias (only those treated at a particular hospital ER); misclassification	Y
Burgel, et al.	cross sectional, descriptive	convenience sample	selection bias	N
Cho, et al.	qualitative; descriptive chart review	convenience sample	selection bias; missing data (secondary analysis)	N
de Castro, et al.	qualitative; case review	convenience sample	interviewer bias	N
de la Hoz, et al.	quantitative; descriptive	random sampling of a convenience population	selection bias	N
Dempsey, et al.	mixed-methods; cross sectional survey	convenience sample	selection bias	N
Dong, et al.	quantitative; analysis of data set - CFOI (census of fatal occupational injuries)	all work-related fatalities in US construction	missing data; undercounting; respondent bias	N
Loh, et al.	quantitative; analysis of Bureau of Labor Statistics 1996–2001	all work-related fatalities in US; classified as “foreign-born”	possible classification bias	Y
MA Dept of Public Health	mixed methods: survey	convenience sample	selection bias	N
Maliyevskaya, et al.	qualitative; descriptive	convenience sample	selection bias	N
Pransky, et al.	mixed-methods; survey	cluster sampling	selection bias; reporting bias	N
Seixas, et al.	mixed methods, cross-sectional	varied at the 3 locations; random sampling of a convenience population	selection bias; reporting bias	Y
Tsai, et al.	qualitative: ethnographic, descriptive	purposeful sampling	selection bias; very small sample	N
Tsai, JH	qualitative: ethnographic, descriptive	purposeful sampling	selection bias; very small sample	N
Valenzuela, et al.	mixed methods; surveys & interviews descriptive	random cluster sampling	possible reporting bias (transient nature of population)	Y
Walter, et al.	qualitative; ethnographic; observation	convenience sample	selection bias; very small sample	Y