# Hidden Hands: Safety and Health of Latino Immigrant Forestry Services Workers in the Pacific Northwest

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## TERMS AND ABBREVIATIONS

Brushing - clearing understory plants/brush usually cutting with chainsaws, piling, and then burning brush piles. Commonly conducted to reduce wildfire fuels/risk.

Bucking - the process of cutting the downed tree into appropriate lengths

EWG – Expert Working Group, for this project comprised of workers and promotoras actively engaged in the project and the local forestry services worker community in Medford, Oregon.

Hoedad – hand tool used in tree planting with a short handle and a long, flat blade.

LOHP - University of California Berkeley's Labor Occupational Health Program

NFWC - Northwest Forest Worker Center

PNASH - University of Washington's Pacific Northwest Agriculture Safety & Health Center

PPE - personal protective equipment

Promotoras de salud - Promotores de salud, also known as promotoras, is the Spanish term for "community health workers". The Latino community recognizes promotores de salud as lay health workers who work in Spanish-speaking communities.

Slash - coarse and fine woody debris generated during logging operations or through wind, snow or other natural forest disturbances

Thinning – cutting down trees in thick forest stands, to 'thin' the forest. A common forest management practice to foster growth of remaining trees and reduce wildfire fuel/risks.

## ABSTRACT

***Background:*** A large number of forestry services workers are immigrants from Latin America, placing them at disproportionately high risk for work-related injury and illness. While performing work essential for U.S. forest management, workers in this industry encounter injury and illness rates 2-3 times higher and fatality rates 9 times higher compared to the general U.S. workforce. To address this occupational health disparity, a partnership between academic research centers (University of Washington's Pacific Northwest Agriculture Safety & Health Center and University of California Berkeley's Labor Occupational Health Program) and a community-based organization (Northwest Forest Worker Center) was formed to create training resources on workplace safety and health and workers' rights awareness.

***Study design:*** Using a participatory approach and mixed-methods design, cross-sectional surveys and qualitative interviews were conducted with a convenience sample of employers and supervisors in the forestry services industry, as well as workers recruited from among community connections using chain-referral and census-type sampling. All participants operated or worked in the Medford, OR, area.

***Methods:*** Data collection with employers and supervisors (n=8) included interviews and worksite observations of job tasks being performed by workers. A total of 99 forestry services workers who were immigrants and of Latino descent were interviewed. Of these, 25 participants were re-contacted and completed more in-depth worker case studies about their injury/illness experience and how it was handled. These case studies served as the basis for the development of training resources, including first-person digital story narratives. The formative development of these materials included 247 trainees/audience evaluators. This project was guided throughout the three years by the Technical Advisory Group (forestry and safety professionals) and the Expert Working Group (workers and promotoras).

***Results:*** Employers/supervisors identified the following occupational risk factors: worker behaviors, cutting methods, and transportation and external factors such as the institutional environment and structure of the industry. To reduce risks, employers/supervisors emphasized worker training, creating a culture of safety, slower work pace and learning from accidents and near misses. Workers' reported injury/illness experiences were consistent with employer/supervisor perceptions of hazards and injury statistics. Principle injury causes were being struck by an object; slips, trips and falls; chainsaw kickback; and, over exertion/repetitive stress. Most injury/illness incidents occurred while workers were thinning, planting and brushing, and piling. Data also indicate that injury risk is exacerbated by fast-paced work, working too close together, reaching too high with the chainsaw, dull chains, worker inattention, antagonistic and bullying treatment of workers, fatigue, low visibility, poor communication, lack of safety training, and lack of personal protective equipment (PPE). Despite a prevailing fear of retaliation, some workers did request changes to improve safety, most often better maintained work tools or PPE, and, notably in circumstances where they could not perform job tasks or had clear concerns for their own safety. An underlining theme in the worker injury cases were of oppressive supervisory behaviors, which affected worker experiences with being injured, treatment for their injuries, and attempting to improve safety and health at work. Findings were used to develop educational materials, including first-person digital stories and bilingual "Safety Talk" training materials for supervisor to use at work sites.

***Discussion:*** Results from employer and supervisor interviews showed an awareness of the hazardous tasks in forestry services. These hazards were consistent with worker reports, as well as with federal and state injury statistics. This valuable workforce has a significant need for training and support at many levels, from local medical care to land management contracts. One area of need and common ground between employers and workers is to develop training solutions for supervisors and employers with a goal to improve workplace safety climate.

## FINAL PROGRESS REPORT

Forestry services work occurs nationwide, yet is often hidden from the public eye and is difficult to access by safety and health agencies. Injury and illness rates among workers in the forestry services industry are 2 to 3 times the rates of the average US worker, and fatality rates are 10 times as high. The largely immigrant, Latino workforce in this industry is essential to US forest management, yet vulnerable because of documentation status, lack of English proficiency, low literacy, occupational immobility, working in remote locations under contracted employment, and deficiencies in skills training. This industry manages forests for future harvest, reforestation, ecosystem management, and fuel management to prevent catastrophic wildfires.

To address this occupational health disparity, over 2014-2017, we launched an academic-community partnership with workers and a *promotoras de salud* program based southwestern Oregon, a geographic hub for contracted forestry services companies. Collaborating organizations included University of Washington's Pacific Northwest Agriculture Safety & Health Center (PNASH), University of California Berkeley's Labor Occupational Health Program (LOHP), and the Northwest Forest Worker Center (NFWC).

Our research characterized how hazardous working conditions, workplace practices/systems and worker fears of retaliation affect occupational injuries and illnesses, post-injury health outcomes, and worker attempts to improve workplace safety and health. We developed case studies based on in-depth, interviews with forest workers about serious on-the-job injuries/illnesses experienced in the previous 2-years and their proactive attempts to improve working conditions. These case studies were then transformed into print and video educational resources for workers and employers.

The project was conducted in three phases:

1) Employer and supervisor interviews and field visits (4 firms and 8 interviews),
2) Worker interviews (99 worker pre-selection interviews, and 25 in-depth case study interviews), and
3) Educational/training material development (247 trainees and evaluation participants)

In addition, two advisory groups guided our work throughout the project: 1) a Technical Advisory Group (TAG) made up of professionals with expertise in forestry and occupational safety and health, and 2) an Expert Working Group (EWG) consisting of forest workers and promotora de salud.

**Key Findings**

Results from employer and supervisor interviews showed an awareness of the hazardous tasks in forestry services. These hazards were consistent with worker reports, as well as with federal and state injury statistics. Notably, employers and supervisors characterized how internal organizational factors beyond workers' job tasks, such as pressures for fast, timely job completion based on the conditions of contracts, contributed to expectations of worker performance. To reduce risks, employers emphasized training, creating a culture of safety, a slower work pace and learning from accidents and near misses.

The leading cause of injury in our sample was being struck-by an object, and slips, trips and falls, chainsaw kickback and strain/repetitive stress were other major causes. While each type of accident had its own unique proximate causes, there were several factors that may have contributed generally to a number of accident types. These included the fast-paced work, working too close together, reaching too high with the chainsaw, dull chains, worker inattention, antagonistic and bullying treatment of workers, fatigue, low visibility, poor communication, lack of safety training, and lack of personal protective equipment (PPE).

Worker interviews and case studies showed work took place in a fast-paced and hazardous environments in which insufficient attention is paid to safety and health. 55% of the workers in our sample described the pace of work as "very fast," "too fast," "pressured," and "as fast as you can" indicates the absence of a safety climate.

Although more than a third of the workers in our sample had their injuries treated by medical professionals, the other two-thirds either were left to their own devices, or had experiences with the medical and/or workers'

compensation systems that can be described as failures of the system stemming from employer non-compliance with labor laws.

Finally, this research identified a need to address pervasive reports by workers of supervisory attitudes and behaviors detrimental to workplace safety, including oppressive behaviors. “Getting yelled at by supervisors” was participants’ top choice when asked what they struggle with most in their jobs and was reflected in accounts of on-the-job injury. This adverse climate had an apparent impact on worker experiences with being injured, being treated for their injuries, and attempting to improve safety and health at work. There was a strong fear of retaliation, often from threats to terminate workers made by supervisors as well as a sense of vulnerability related to insecure immigration status. Considering this fear, it is remarkable that workers in our sample reported their injuries to their supervisors and some 80% asked for tools and/or PPE in better working condition or for improvements in working conditions (e.g., rest breaks). Workers overcame their fear of retaliation, reported their injuries to their supervisors and proactively sought changes for the same reasons: they could no longer perform their work, and/or they were concerned for their safety and the safety of their coworkers.

**Translation of Findings**

- Top hazards identified by employers and also workers in our 99 worker injury experience results included: ***struck-by an object***, ***slips, trips and falls***, ***chainsaw kickback*****,** and ***strain/repetitive stress***. Most injury/illness incidents occurred while workers were thinning, planting and brushing, and piling. Injury risk was exacerbated by fast-paced work, working too close together, reaching too high with the chainsaw, dull chains, worker inattention, antagonistic and bullying treatment of workers, fatigue, low visibility, poor communication, lack of safety training, and lack of personal protective equipment (PPE).
- There is a **need for improved access to medical treatment** and support for returning to work.
- **Employers and supervisor recommendations for safety included,** training, creating a culture of safety, a slower work pace, and learning from accidents and near misses.
- **Worker safety climate concerns included,** lack of safety training, insufficient communication between crew members as well as between workers and supervisors, pace of work, fatigue, and bullying.

**Research Outcomes/Impact**

- NWFC Promotoras trained **247 workers** in Southern Oregon using Reality Tales Video trainings.
- Training of seven supervisors who pilot tested the materials with approximately **90 workers**.
- An area of common ground and opportunity is to develop training solutions for supervisors and employers with a goal to improve workplace safety climate. Supervisors we trained expressed an interest in professional development and our project advisories agree there is a need to establish and sustain a cadre of supervisory leaders who can ensure worker productivity while reducing worker injuries.

**Educational Products**

Coming to PNASH website January 2018 at: http://deohs.washington.edu/pnash/forest_safety

**Forest Worker Safety Talks / Platicas sobre seguridad para los trabajadores forestales**
Train your crew with these short but important “Safety Talks.” Real worker stories are used to start conversations and give essential safety tips. Injury prevention Safety Talks include: Struck by tree felling / Árbol derribado cae sobre un trabajador; Chainsaw kickback / Rebote de la motosierra; Herbicide application / Aplicación de herbicida, and; Speaking-up for safety / Por seguridad, diga lo que piensa.

**Reality Tales Videos: Injuries in the Woods / Videos historia Reales: Lesiones en los bosque**
Real worker injury stories, told in their own voice, from immigrant workers conducting contract services in our U.S. forests. These stories are for workers and trainers with the goal to increase awareness on forestry workforce needs and the importance of safe practices, personal protection, and rights – for themselves and their co-workers. Worker injury prevention stories and training materials available for *promotoras de salud:* Searching for a better future / Buscando un mejor future; American dreams / Sueños Americanos; Broken dreams / Sueños truncados, and Sadness, loneliness and hope / Tristeza, soledad, y esperanza.

## SCIENTIFIC REPORT

### INTRODUCTION

Forestry services work occurs nationwide, yet is often hidden from the public eye and is difficult to access by safety and health agencies. It is highly dangerous work, with job tasks involving the use of chainsaws, falling and burning trees and branches, carrying and lifting heavy loads, and frequent awkward and repetitive motions. Working conditions involve navigating rough terrain; extreme temperatures and inclement weather; exposure to poison oak, water-borne pathogens, and pesticides; inadequate maintenance of equipment and transportation vehicles; and constant pressure to work harder and faster (Campe 2011; Wilmsen et al 2015). Prior study indicated that these working conditions, combined with insufficient safety and skills training, put workers in this industry at very high risk for work-related injury, illness, and fatality. Additionally, low-level job status, job insecurity, and chaotic work environments also contribute to organizational practices and employment conditions that threaten worker health and well-being (Roscigno et al 2009). Workers in the forestry services industry in the Pacific Northwest are largely young, Spanish-speaking immigrants with limited English ability and low educational attainment (Sarathy 2012; Wilmsen et al 2015). The workforce is likely underestimated at 14,000 nationwide (US Bureau of Labor Statistics 2014).

The stakeholders engaged in this project were based in a geographic hub for contracted forestry services companies, with 45-registered contract firms in southwestern Oregon. This industry manages forests for future harvest, reforestation, ecosystem management, and fuel management to prevent catastrophic wildfires. While performing work essential for U.S. forests, fatality rates in Oregon state of forestry service workers is 40.4 per 100,000 workers, higher than the statewide rate of 4.2 and nonfatal injury rates as high as 9.79 per 100 workers, much higher than the U.S. rate of 5.02 (Oregon FACE 2017). Injury and illness rates are likely to be underreported, hence actually much higher than official estimates by as much as several hundred percent (Azaroff et al 2002).

### SPECIFIC AIMS

To address the occupational health disparity experienced by forestry services workers, we launched an academic-community partnership between PNASH, LOHP, and NFWC. Through a participatory approach and mixed-methods design, we characterized working conditions, injury and illness experiences, safety mitigation efforts, employer retaliation, and injury/illness treatment, recover, and return-to-work experiences among this workforce.

The specific aims of this project were to:

1. Characterize job-related injury and illness experiences among immigrant Latino forest workers in relation to workplace risk factors and outcomes in medical treatment, recovery/return-to-work, and safety mitigation.
2. Investigate the circumstances under which immigrant Latino forest workers report injuries to supervisors, seek medical care, and make attempts to improve safety and health at work.
3. Develop narrative storytelling educational resources that are culturally, linguistically, and educationally appropriate for immigrant Latino forest workers and their employers. Resources are organized around priority hazards/tasks, based on worker case studies, present the complex ecology of work organization factors, and provide recommended employee and employer solutions.
4. Deliver educational trainings through a promotora program, and evaluated for effectiveness.

## METHODS AND RESULTS

The project, overall, utilized a community participatory approach and was conducted in three phases:
1) Employer and supervisor interviews and field visit (4 firms and 8 interviews),
2) Worker interviews (99 worker pre-selection interviews, and 25 in-depth case study interviews), and
3) Educational/training material development (247 trainees and evaluation participants)

We convened two advisory groups to offer guidance and technical assistance throughout the project. One was a Technical Advisory Group (TAG) made up of professionals with expertise in forestry and occupational safety and health. The other was an Expert Working Group (EWG) consisting of forest workers.

### AIM 1 - Characterize job-related injury and illness experiences among immigrant Latino forest workers in relation to workplace risk factors and outcomes in medical treatment, recovery/return-to-work, and safety mitigation.

### 1. A. Employer and Supervisor Interviews and Field Visits

#### *Methods*

A study team of interviewed four employers and four supervisors (one from each recruited employers' firms). A total of twelve contractors in SW Oregon were invited to participate through telephone and e-mail communications. Four were selected on the basis of interest and meeting the criteria for the variety of forestry services work tasks. Interviews with employers were conducted in their offices or in the field at work sites in conjunction with field visit observations. The field visits included a brush thinning site, a brushing and piling site, and a site combining tree planting, thinning and tree processing.

A TAG made up of professionals with expertise in forestry and occupational safety and health was convened to offer guidance and technical assistance as the project progressed. Together with the TAG, the project team developed interview guides for employers and supervisors. Interview guides consisted of questions about experience in the forestry services industry, the company's type of work, workplace hazards, hazard mitigation actions, barriers to those actions, organizational environment and personnel-related practices, operations, occupational safety and health, and safety training. Employers were also asked to share their records of work-related injuries and illnesses and the minutes from their safety committee meetings. One employer complied with these requests. A worksite observation tool was developed to serve as a checklist of worksite hazards, job tasks, and other safety concerns.

Data from these interview guides and observational tools were qualitatively analyzed. Analysis consisted of recording emerging patterns and themes, along with points of agreement and disagreement between interviews.

#### *Results*

Interviewees had been working in forestry for an average of 33.25 years, employed a range of 13 to 250 full-time employees (one firm hired through the H-2B visa program). They conducted a variety of services on private, federal and state lands and together worked in five western states, although primarily in Oregon, Washington and California. Employers and supervisors in our sample see forest work as inherently dangerous. It is viewed as hard work with dangerous tools in challenging environments characterized by steep slopes, presence of slash, dense brush, holes, rocks, extreme temperatures, rain and snow, poison oak, bees and ticks. Overall, reported safety and health risks conformed with those highlighted and observed during worksite field visits, with major causes of injury reported through worker interviews, as well as statistics on injuries in the forestry services industry. Table 1. Displays employer and supervisor ranked hazards.

**Table 1: Ranking of Hazards and Presence of Hazards at Worksites**

| | Top 3 hazards for forest workers (number of employers who mentioned) | Hazard Ranking Sheet (average of ranks assigned by 4 employers. Scale: 0-5) | Hazards supervisors pointed out at worksites |
|---|---|---|---|
| **Chainsaw injuries (one included trees falling in this, and one considered it part of density management)** | **4 mentions** | **3.5 operating a chainsaw when cutting trees<br>3.25 operating a chainsaw when cutting brush & other vegetation** | ✓ **(Widow makers; snags)** |
| **Slips, trips and falls** | **3** | **3.25** | ✓ **(steep slopes; especially when carrying heavy loads)** |
| **Transportation** | **3** | **3** | |
| **Back strain/injuries (one associates these with slips)** | **3** | **3.25 long-term pain in joints backs and muscles** | ✓ **(carrying heavy loads)** |
| **Beestings and poison oak** | **1** | **4 (poison oak)** | ✓ |
| **Herbicide exposure** | **1** | | |
| **Rocks and logs dislodged and rolling down a slope** | | **3** | ✓ |
| **Exposure to heat** | | **3** | |
| **Twigs on branches being piled (eye hazard)** | | | ✓ |
| **Holes** | | | ✓ |
| **Brushy** | | | ✓ |

As Table 1 shows, all four employers mentioned chainsaw injuries, which included lacerations and being struck by a falling tree or branch, when asked to list the top three hazards for forest workers. However, on the hazard ranking worksheet, they ranked poison oak as the hazard with the highest risk (average ranking of 4). This could be explained in terms of assigning different weights to the components of risk. The other hazards the employers ranked as having at least a moderate risk (average scores of from 3.0 to 3.25 in Table 1) were slips, trips and falls, transportation, back strain, heat exposure and dislodged rocks and logs rolling down a slope. Overall, employers had a strong sense that the work is dangerous.

Employers remarked on several practices by workers, including attempts by younger workers to impress supervisors by working rapidly and inadequate hydration practices in an effort to present as tough. Two dangerous practices in particular were cutting toward oneself with the chainsaw and transportation. One supervisor noted that one could cut their feet when trimming piles because of the location and direction of the saw motion. One employer remarked extensively about transportation: “driving on forest roads in dangerous settings—steep terrain, curvy roads. Hauling equipment on top of the van makes it top heavy. The vans are full of people, adding more weight. Racing to get to the job; ice; tired drivers. The crummies are full of fumes from gas and oil.”

Also raised were structural and institutional factors that increase the risk of injury in the forestry services industry. Although all four of the employers thought that their crews receive adequate training, they mentioned the lack of training in safety and health, as well as pressure to meet production goals, as industry problems.

**Mitigations of Risk and Barriers to Mitigation**

When asked what could be done to reduce the risks they ranked very high, the employers stressed training and creating a culture of safety. Two also mentioned a slower work pace, and one suggested that the agencies need to accept higher costs that would result from a slower work pace and higher pay. All the employers incorporate training, a culture of safety and a slower work pace into their work routines, albeit in different ways, such as on-the-job training or formal outside training programs. All of the employers interviewed train their crews in first aid and CPR.

Employers described creating a culture of safety as making safety a part of work expectations, and then ensuring that the expectations are met. One said, “Make it known that it is not okay to get hurt and that safety is not related to pay.” Employers and supervisors stressed the need for supervision to assure that a safety culture exists. They said that regular checking is needed to make sure workers are following safety procedures. All four employers have their crews convene safety meetings on a regular basis. Some do hold monthly safety meetings, and one also mentioned that they hold a safety meeting before starting work at a new worksite. One supervisor said that he goes over a few things every day.

Communication was also mentioned as important to creating a culture of safety. Interviewees suggested that communication serves multiple functions, including identification of worksite hazards, ensuring safe practices, and maintaining good working relationships. One employer said it is important to “Have continuous communication up and down the hierarchy of managers through daily emails; reporting.” Employers also stressed communication as the way they have their supervisors deal with unsafe behavior. They give their supervisors wide latitude in this regard, including the authority to fire someone if necessary. In addition, all four employers said that they evaluate the safety performance of their employees. Two of them said this is part of each employee’s annual evaluation. One supervisor we interviewed mentioned another function of communication that is important: maintaining good working relationships between the crew members. He said: “If guys get uncomfortable with what people are saying, I make them stop. There are cultural differences. I tell them that we are doing forestry. We are in this together. Be respectful of each other.” There are Latino, Native American, and white crew members on his crew, and, he said sometimes workers may say insensitive things to one another.

Production goals set the pace of work, and the employers we interviewed suggested that a slower work pace is important to reducing the risk of job-related injury. One supervisor alluded to the lack of control over pace of work when he said, “Working long days is a problem. Pushing the limits is a problem. We’re trying not to do that.” However, all four said that they provide rest breaks. Three said they are “very diligent” about having the workers take rest breaks. These employers see rest breaks as an important part of reducing the risk of injury.

When asked about what they learned from accidents and near misses their crews have had, the employers we interviewed described learning as a central part of their approach to safety and health. For example, one employer described incidents as opportunities for learning. Several examples of this attitude were given, including a training program on safe driving and a method of avoiding dislodged rock and log fall hazards by working from the bottom up. Another summed it up this way: “Investigate, learn, train. We had an incident where the workers were working too close and a tree fell and injured a worker’s hand. We changed the way we work so that now we have a few workers working ahead dropping trees, and a crew working behind them bucking.”

**Barriers**

When asked what barriers inhibit mitigating risks, employers mentioned structural and institutional barriers, time and finances, and difficulty in establishing a culture of safety. They explained that competitive bidding "drags down safety." Other contractors circumvent the law, reducing costs, and bid lower. At such low bids, it is difficult to do training. As one employer put it, "The government tries to get best value to the government, not to the contractors." Another contractor explained: "When we have a lack of work, we bid against other companies and can't do consistent training. Partly it's monetary; we can't spend 6 months training and 1 month working. There is underreporting in the industry so competitors can bid cheaper. They circumvent the laws. We do as much training as we can afford in the classroom and the field. Our profits are less because we train."

Another barrier to safety employers mentioned was difficulty in establishing a culture of safety, particularly among supervisors who do not necessarily ascribe to workplace safety. One employer felt frustrated with his employees because he felt like they do not always speak up about safety and health issues.

Language barriers were also mentioned. In general, forest workers have limited English ability, and many are illiterate in Spanish. One employer explained, "Latino fire fighters sit through the safety training that is all done in English. Then the instructors pass them." A supervisor noted that Spanish translations of fire safety materials are problematic. "They don't use the language the workers use." With communication being central to creating a culture of safety, this could inhibit development of a safety culture. One employer worked with the local community college many years ago to provide in-house English classes to all of his Latino employees. Now they all speak English.

Other barriers to safety mitigations were shared with less detail. Workers may be reluctant to purchase good boots and rain gear, but they generally wear the safety equipment provided. Fatigue was raised, especially in circumstances such as when fighting fires, where there is long-term, or cumulative, fatigue. Lastly, three employers mentioned drug and alcohol abuse as a behavioral problem among workers that contribute to work-related injuries.

**Structural and Institutional Environment**

A series of questions were asked about the institutional environment in which the contractors currently work. All four we interviewed see the relationship between their own companies and the enforcement agencies in a more or less positive light. They described the workers' compensation system as performing an important role. They see Oregon's State Accident Insurance Fund (SAIF) as an ally that helps keep their claims low. The employers we interviewed generally felt that the state agencies could be doing more to monitor the industry as well. One suggested that OSHA should do more inspections. He said, "Migrating companies are not inspected. They can't find the workers. They don't go out to the field. Companies play the odds."

When asked about federal, state and private landowner policies they would like to see changed, three employers mentioned costs and the bidding process as one federal policy they would change. One contractor explained that he avoids problems with the federal agencies by doing 99.5% of his work on private lands. This allows him to negotiate contracts rather than submit bids. One employer expressed wanting the government to stop awarding contracts to companies "that chronically do not play by the rules." He would also like to see closer collaboration between the Department of Labor and the land management agencies. Another contractor wants higher SCA (Service Contract Act) wages. He said we need higher acre prices to increase wages. One supervisors we interviewed suggested that federal policy affects safety and health because on federal jobs the agencies set the production goals and that can increase the pace of work.

There was general agreement among the employers that hiring undocumented workers leads to the problem of contractors disregarding the law. The employers we interviewed estimated that 60 to 80% of the workforce in

the forestry services industry in southern Oregon is undocumented. This, they said, leads to contractors taking advantage of the workers, instilling fear, and even using blackmail against the workers.

Although three of the employers we interviewed feel that the role of federal agencies is monitoring and inspecting, there was general agreement among them that enforcement could be improved. For example, at the end of the interview, one employer made the following general comment: "I'm very concerned about wild fires. Not just for our own crews. [There is a problem of] not knowing when to say no or to get out of dangerous situations. For example, there was a crew boss who was on his first fire. It was a bad fire with back burns. The feds allow it. The feds are completely inept. There are no inspections. They say it's not our job. The Blue Mountain Report came out in 2003, and exposed all this."

**Internal Organization and Workplace Practices**

All the employers we interviewed provide safety and health training to their employees, implement various strategies for fostering a safety culture among their crews, and strive to learn from accidents and near misses. Additionally, all employers provide rest breaks, and three of them described their companies as being diligent about it.

We also asked the employers and supervisors specific questions about their workplace practices, and they responded that their crews use the required PPE, assure that safety mechanisms, such as chain breaks on chainsaws, are in place and functional, and provide water to their crews. Not all provided sanitation to their crews in the field, however, and one employer specifically stated that providing porta-potties is not feasible.

Key workplace safety practices included:

Emergency procedures. All four companies had an emergency plan, first aid kits and radios for communications. They also stated that they review their safety policies and procedures on a regular basis. If there is a severe injury, the worker is evacuated and taken to the nearest hospital. One supervisor described their emergency response procedures in this way: "If the guy can't walk out, we do first aid. Check the severity of the injury. We have the medi-pack and the radio. If it's life threatening, we call channel 1and let the Forest Service know what's going on. We would take him down to the heli spot; call the other nearby crews; call the safety officer at the office; all work would shut down and the crew would focus on the emergency."

Ensuring safe transportation of the crews. All the employers in our sample utilize a number of strategies to assure safe transportation of their crews, including regularly inspect the vehicles they use for transporting their crews, providing driver training, and three employers do drug testing on the drivers. Safety measures are taken on the way to the worksite including following safety laws, driving the speed limit and driving defensively, and making sure the workers in the seats equipped with seatbelts actually wear them. One pointed out that it is difficult for drivers who do not speak English to follow the CB radio communication to avoid logging trucks. When asked what could be done to improve transportation safety, the employers said things like drive more slowly and emphasize safety more. One employer suggested that different kinds of vehicles should be used to transport crews. He said, "Get away from fifteen passenger vans with the equipment on top and pull trailer. Don't overload the vans."

Working with subcontractors. The two contractors in our sample that hire subcontractors, reported they select on the basis of their reputations and also write clauses in their contracts that require compliance with safety and health regulations. Sometimes the employers inspect the work of the subcontractors, and monitor their payroll for federal reporting. One of the employers said they issue RFPs (requests for proposals) and RFQs (requests for quotes) that have past performance requirements.

Recruitment of supervisors and crew. The employers in our sample select their supervisors on the basis of leadership qualities, length of experience, and character. One emphasized character as being especially important. He also provides leadership training to his supervisors. The employers and supervisors applied

these same criteria to selecting a substitute in case the regular supervisor was absent from the jobsite. Three of the contractors said they recruit new employees through word of mouth, and one said he recruits family members of his current employees. The employers mentioned Craigslist, newspaper, radio and the employment office as recruitment services they use.

Wages and benefits. The pay offered by the employers we interviewed ranged from a low of $10.10 (the federal minimum) plus $4.12 in lieu of fringe benefits to the current wage required under the Service Contract Act (about $20 per hour). Some employers also provided paid holidays and vacations, and annual bonuses. One employer also provides dental and medical insurance to his crews.

**Field observations**

Our field observations showed that overall there was good compliance with safety requirements at the three sites visited. Three areas of concern came up, however:

- Drop starting chainsaws
- Drinking untreated water from mountain streams
- Washing hands with dirt after defecating in the woods.

**Training needs and desires**

The employers and supervisors we interviewed said they currently get their training materials from Associated Oregon Loggers, the Northwest Forest Worker Center, other disparate sources, or they create their own. They listed the following as the types of training materials they would like to see produced: brochures/handouts; demonstrations in the field; mock situations/role play; combination of classroom and hands-on in the field; realistic – correlated to what is actually happening on the ground; made personal to each contractor; explain why things are done a certain way, and; specific topics such as walking on hillsides, bees, poison oak recognition, look up/look down; heat stroke, and hydration.

***Discussion***

The sample of employers and supervisors was small. It included individuals who presumably represent some of the best practices in the industry and knowledge based on many years of successful business. Our interviewees see forest work as inherently dangerous that requires using dangerous tools in challenging environments. They point out that workers have high exposure to many hazards, and, this elevates the risk of job-related injury and illness. This awareness of risk, though, does not prevent them from realizing there is more they can do to reduce risks and prevent injury/illness.

The ranking of risks by the employers conform fairly well to the hazards the supervisors pointed out at the field sites we visited. They also conform fairly closely with major causes of injury we found in our interviews with injured workers as well as in official statistics on injuries in the forestry services industry. The fact that poison oak was ranked as highest risk could be due to the high likelihood of exposure to poison oak and one employer ranking chainsaw injuries lower for his crews because they are well trained.

In addition to high exposure, the employers and supervisors we interviewed mentioned internal and external factors that affect the risk to forest workers. Internal factors included worker behaviors, particular cutting methods, and transportation (which could include internal and external factors). External factors included the institutional environment and structure of industry. All four employers and some of the supervisors mentioned various practices of the federal land management agencies as contributing to risk of injury/illness throughout the industry. This included accepting low bids, the low level of SCA wages, and awarding contracts to contractors who do not comply with all the rules and regulations. It also included agencies setting the pace of work.

To reduce risks, employers emphasized training, creating a culture of safety, a slower work pace and learning from accidents and near misses. Key components of their approaches to mitigating hazards was open communication throughout the organization and being prepared to change practices in response to incidents that occur. These employers demonstrated an impressive commitment to safety, including developing innovative solutions, providing training and PPE, and building safety in to personal evaluations and subcontracts.

### 1.B. Worker Interviews

In addition to employer and supervisor perspectives, information about workplace hazards and injury/illness risk was also collected by directly interviewing frontline forestry services workers in the Medford, OR, community. This was phase 2 of the project.

#### *Methods*

Forest workers who had been injured on the job in the previous 2 years or had taken some kind of action to improve working conditions were recruited and enrolled in the project. Through chain-referral (snowball) and census-type sampling, a total of 99 forestry services workers were interviewed with the goal was to develop richly informed case studies of on-the-job injury/illness incidents and worker attempts to make workplace safety improvements. Recruitment consisted of contacting workers within the social networks of the Medford community, particularly those connected to the forestry workers and contacts of the NFWC. These 99 interviews served as pre-selection interviews from which a subset of 25 interviewees were identified for a second interview to obtain more in-depth interviews to serve as case studies.

#### *Results*

All 99 worker interviewees were men with an average age of 31.6 years. All were Spanish speakers, but 22 also spoke English. At least 29 different forestry services companies were represented in our sample. Twenty workers did not state their employer's name. On average, the workers had been with their current employer for 3.3 years, and had been working in forestry for 9 years. Thirty-seven of the workers were in the United States on H-2B visas.

#### Injuries and risk factors

Fifty-one workers in our sample had been injured on the job in the previous 2 years. While it is uncertain whether one of them reported his injury to his supervisor, 50 of them did. Most received medical treatment. Table 2 shows most accidents (50%) occurred while the workers were thinning. Planting had the second highest occurrence of accidents and this was followed by brushing and piling.

**Table 2: Tasks and Injury Types**

| Task | Cut | Back Strain | Broken Bone | Sprain | Bruise | Puncture Wound | Head Injury | Heat Illness | Pesticide | Musculo-skeletal | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thinning** | 11 | 2 | 7 | 3 | 2 | | 1 | | | | 26 |
| **Planting** | | 5 | 1 | | 1 | | | | | 1 | 8 |
| **Brushing** | 4 | | 1 | | | 1 | | | | | 6 |
| **Piling** | | 2 | | 2 | | | | 1 | | | 5 |
| **Axe work** | 1 | 1 | | | | | | | | | 2 |
| **Sawing** | | 1 | | | | | | | | | 1 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Applying Pesticides** | | | | | | | | | 1 | | 1 |
| **Other** | 1 | | | | | | | | | | 1 |
| **Total** | **17** | **11** | **9** | **6** | **3** | **1** | | **1** | **1** | **1** | **51** |

See Table 3 below for results of injuries in relation to risk factors. The leading cause of injury in our sample was being struck by an object, and slips, trips and falls, chainsaw kickback and over exertion/repetitive stress were other major causes.

***Slips, trips and falls*** - Proximate causes of slips, trips and falls were low visibility and wet, steep slopes. In 6 of those cases, the workers described the terrain as steep. Workers also described conditions with low visibility with fog, rain or pre-dawn work. In addition to saw cuts, the workers in our sample who slipped, tripped and/or fell, suffered broken bones (one broke his thumb), back strain and sprains.

***Chainsaw kickback*** - Cutting oneself with the chainsaw was the leading cause of lacerations in our sample of injured workers. Proximate causes were the saw tip hitting an object, and reaching too high. As one worker reached high and cut with the top of the bar to free a tree that had become entangled in another, the saw kicked back and cut his hand. When asked what he thought caused the injury, he said, “Because when you lift up the saw, you don’t have the same strength to hold it like you do when you have it at a good height.” In only two cases workers cut themselves with their saws, one on the leg and the other on the thigh, without a kickback event. One worker said he was working on a steep slope in high heat and was very tired. He attributes the injury incident to the stress of being pressured to work faster.

***Back strain*** - there were multiple factors, including the task of piling heavy brush, fatigue, jumping and hard ground. Three workers in our sample said they experienced back pain from lifting heavy logs while piling brush. They described the terrain as steep with a lot of slash. All three mentioned feeling fatigued, and two of them mentioned feeling stress due to a demand for high productivity. Three other workers said that they hurt their backs planting trees. They said they felt sudden back pain when they slammed their hoedads into the ground to create the hole for planting the tree. Two of them mentioned fatigue, one saying he felt “stressed, desperate with the feeling that he couldn’t take it anymore.”

While each type of incident had its own unique proximate causes, there were some factors that may have contributed generally to a number of incident types. These included pressure/bullying (29% of interviewees), organization of work in an unsafe manner, lack of safety training, failure to conduct on-site hazard inspections (19%), failure to maintain or provide effective tools and PPE, insufficient communication, and fatigue.

**Table 3. Injuries in Relation to Risk Factors**

| Accident type | Cut | Back Strain | Broken Bone | Sprain | Bruise | Puncture Wound | Head Injury | Heat Illness | Pesti-cide | Musculo-skeletal | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Struck by object** | 2 | 1 | 7 | 2 | 3 | 1 | 1 | | | | 17 |
| **Slip, trip, fall** | 3 | 2 | 1 | 3 | | | | | | | 9 |
| **Chainsaw kickback** | 9 | | | | | | | | | | 9 |
| **Strain /repe-** | | 8 | | | | | | | | 1 | 9 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **titive stress** | | | | | | | | | | | |
| **Saw cut** | 2 | | | | | | | | | | 2 |
| **Auger injury** | | | 1 | | | | | | | | 1 |
| **Axe injury** | 1 | | | | | | | | | | 1 |
| **Heat illness** | | | | | | | | 1 | | | 1 |
| **Pesticides** | | | | | | | | | 1 | | 1 |
| **Blank** | | | | 1 | | | | | | | 1 |
| **Total** | **17** | **11** | **9** | **6** | **3** | **1** | **1** | **1** | **1** | **1** | **51** |

**How accidents happen**

Our results suggest that working too close together, reaching too high with the chainsaw, dull chains, worker inattention, bullying, fatigue, low visibility, poor communication, lack of safety training, and lack of PPE may have all contributed to the accidents in our sample. An important theme among case study interviews, however, was intense and constant production and cost pressures characterizing the work. These pressures created or exacerbated other risks on the job, from workers rushing to complete their tasks to leadership decisions to continue working in hazardous conditions (e.g., fog, dark), to organize work in an unsafe manner (maintaining required distances, placing slower workers in front of faster workers), to fail to provide needed safety and other training, and to fail to provide or appropriately maintain effective tools or PPE.

**Lack of Safety Training**

There was a distinct need for safety training among workers interviewed. In the entire sample of 99 workers, 28 said that they got no training of any kind. A total of 25 interviewees said they received some type of training in preventing injuries and illnesses. Sixteen of these said they received training in how to work safely, five said they received training in how to use PPE, and 4 said they had received training in working safely with chemicals. Twenty-nine interviewees said they received training in first aid and CPR, which is not the same as safety training. While safety training focuses on how to prevent injuries, first aid and CPR training focuses on what to do after someone is injured. The 25 case study interviews give some indication of what safety training is like. The two case-study interviewees who said that they had had any kind of safety training described very minimal training. One of them said he was shown some videos that had a little safety information, and the other said he had received one safety class.

**Hazard Identification and Communications**

There was very little communication about hazards in the workplace between crews and their supervisors. This lack of communication reflected broader issues in the safety climate and culture that seemed to dominate many of these cases. When communication did happen, it may have been in a language the workers do not understand. One worker explained: “I think that’s why accidents happen also because the foreman didn’t inform us properly. Because he is supposed to tell us what the dangers are and all, and sometimes they say it in English, and we just stare because we don’t know.”

Inspecting worksites for hazards and holding safety meetings prior to commencing work are related to communication because the purpose of conducting inspections is to identify hazards and the purpose of safety meetings is to communicate the presence of hazards and other safety information to the crew. One measure of communication about hazards among the 99 workers we interviewed is thus whether their worksites are regularly inspected and whether their crews regularly hold safety meetings. Only 19 of the interviewees said that someone in their company inspects the worksite before they begin work. Thirty-six interviewees said that they regularly or sometimes have safety meetings. However, many of these workers described the safety meetings as consisting solely of the foreman telling them to be careful.

**Production Pressure**

A recurring theme in our case studies and 56% of all 99 pre-selection interviews was that workers feel under pressure at all times to work fast and keep production high. While interviewees described being pressured by their foremen most often, some of them also spoke of pressure coming from their co-workers as well as from feeling that they had to compete with their fellow crew members. Ten of the 23 case-study interviewees (43%) said they felt they were being pressured at the time they got injured. Among those who had been injured on the job in the previous 2 years (n=51), 15 mentioned pressure to finish the job, feeling rushed and/or stress as a factor contributing to their injury.

One of the case-study interviewees said, “the trees were very heavy and they demanded too much work from us. For the pressure we’re under and then we’re going, well, very fast.” They may have said that they were working normally when their accident happened, but elsewhere in the interview stated that feeling pressured is normal. Other workers said, for example, “Well, everything was normal, but very pressured like always.” Another said, “I think it was a normal day. So, well, people were working, well—how do you say it?—like we say here, hustling.”

Some interviewees attributed the pressure they felt coming from the foreman to monetary incentives. One worker suggested that his injury could have been prevented if the foremen were not so interested in making money. He said, “They just want to be making money, making money, and making money. And I feel they really don’t care so much what happens to people, what their concerns are, how they’re doing, if they feel good, if they feel bad, if they feel—they just want—‘okay, you work faster for me and I will pay you this.’ And that is their ambition, just money here and money, money there.”

At times the pressure came from the worker himself, coworkers and the foreman all at the same time. One interviewee, for example, described complex sources of pressure on the day he was injured. He said on that day, “I even felt happy because I was doing a good job.” He said the crew was working faster than usual that day because there was competition between the crew members. He described it as follows: “Uh, like, pressuring each other. And so, obviously, like one says, ‘Well no, he is really pressuring me. I’m not going to give in.’ … Because there were people that maybe were better than me. And I felt that they were, well they were behind me. Because in that work, when they’re behind you and pressuring you—let’s say right next to you—you say, ‘Well, if he’s right behind me, I have to work harder.’ I felt pressured that, well, he was more better [sic], and I said, ‘No.’”

**Safety Culture**

Relations between workers and job foremen were often described as negative and antagonistic, although some workers reported having a good relationships with their supervisors. Interviewees were ever cognizant of the possibility of reprisals for getting injured on the job or proactively seeking improvements in working conditions, although many stated that they did not fear retaliation. These adverse working conditions had a profound impact on worker experiences with being injured, being treated for their injuries, and attempting to improve safety and health at work. Bullying was present in 43% of the case-study interviews, and several workers thought that it was a direct cause of their accidents. While job foremen were responsible for most of

the bullying described, workers also observed that coworkers bully one another and that competition between crew members can lead to unsafe behavior as well. Workers described how supervisor attitudes and treatment of workers greatly influenced risk for injury, illness, and fatality. Bullying was perceived to directly cause on-the-job injury, and, "getting yelled at" was the top concern workers reported as struggling with the most. Workers also described how requests for PPE and operable, well-maintained tools and equipment were often met with an angry, aggressive responses.

A poor safety climate was also reflected by the high numbers of workers who reported that supervisors do not hold legally-required safety meetings before the workday begins, do not inspect new worksites for safety hazards, nor provide rest breaks or drinking water.

**Fatigue**

Fatigue was another common theme in the data. Fifteen of the injured workers in our sample mentioned that they thought fatigue was a contributing factor in their injury. One worker who was involved in a firefighting effort described the fatigue that he believed contributed to his injury: "So we'd been working the fires for 25 days and so, working 14, 15 hours a day and so we were tired already. And so a friend, being tired already, I think, well, he made a mistake and that mistake cost me my arm…. Yes, I think it was tiredness because well, I think doing the same thing for so many days, you get stressed from the same thing and all and also since the work is heavy."

Among the 25 case study interviews we asked interviewees the day of the week and time of day at which their injuries occurred. There was no discernible pattern in the data suggesting that the day of the week played a role in the accidents. However, time of day could have been a pattern, with the median number of hours the workers had been working when they were injured was 4. The average was 3.7 hours. Injury incidents tended to cluster around 9:00 am and 12:00 noon.

**AIM 2 - Investigate the circumstances under which immigrant Latino forest workers report injuries to supervisors, seek medical care, and make attempts to improve safety and health at work.**

Data for this aim come from the interviews conducted with frontline forestry service workers.

***Results and Discussion***

**Reporting Injuries to Supervisors**

The question, "under what circumstances do workers report their injuries to their supervisors," is compelling because in previous research we found that although forest workers often feared being fired if they reported their injuries to their supervisors, many of them did report their injuries. Our findings in the present project are similar. Although a few workers in our sample said that they were not afraid to report their injuries to their supervisors, most expressed a fear of being fired for doing so. One worker summed it up like this: "They find a way to fire you. Like when you tell the foreman all of this, they always try to find the way…even talking bad about you…. And right away, the first thing the foreman does, instead of, 'Oh no, well, I'll take care of him. I'll take him to the doctor because he's a good worker.' No, they say, 'This guy doesn't want to work anymore.' And that's what they always know to say."

Despite harboring such fears, however, all but one of the 51 injured workers in our sample said that they informed their supervisors of their injuries. The only worker who did not say he reported his injury to his supervisor was not asked this question. This nearly unanimous reporting of injuries is surprising because in our previous research we found that the reporting of injuries was linked to the severity of the injury. We therefore had hypothesized that workers will not report less severe injuries to their supervisors, but will report more severe ones. If the number of days away from work can serve as a rough estimate of the severity of the injury, one would expect that workers who missed only a few days of work would not report their injuries. The

number of work days missed by the injured workers in our sample ranged from 0 to 487, and the median number of days missed was 8. Yet, nearly all (and it could very well have been all if the one worker had been asked) the interviewees said that they reported their injuries.

The reasons interviewees gave for reporting their injuries suggest that they could not have done otherwise. The injuries prevented the workers from working, and there was no way they could hide the fact that they could not work from the foreman. For example: "You are afraid that you won't be able to get a job later and that they'll fire you, but when you can't do it anymore—what do you do if you can't keep on working? So I stopped and, well, I told him that I couldn't and that's all he did." Other workers cited similar reasons for reporting their injuries, for example, *"Well, because I couldn't keep on working."*

**Treatment of Injuries and Medical Outcomes**

The 23 injured workers with whom we conducted case-study interviews had a range of experiences with getting medical treatment for their injuries as well as a range of outcomes. These experiences can be grouped into 3 broad categories: 1) system functional, 2) no or alternative treatment, and 3) system failures.

**System Functional**

Nine (39%) of the 23 case-study interviewees described medical treatment and outcomes that may be categorized as more or less positive. In general, these cases unfolded as follows: The worker, or a coworker, reported the injury as soon as was possible to the foreman (in some cases the foreman was some distance from where the incident occurred, so it took time to reach him). The injured worker was evacuated from the site, taken to a nearby hospital or clinic, and treated for the injury. The attending physician was informed that the injury was work related, and the worker received workers' compensation benefits. What accounts for the system functioning more or less as it should in these cases? Length of experience in forestry services may have played a role. All but 3 of the workers in this "system functional" category had been working in forestry services in the U.S. for more than 10 years. The other 3 had 5, 7 and 9 years of experience in this industry. This experience could have provided these workers with greater knowledge of their rights as well as the workers' compensation system. One of the workers specifically stated that he feels he has a good understanding of his rights as a worker. On the other hand, one of these workers said that he did not know what form 801 (workers' compensation claim form) was and did not fill it out, although he did tell the doctor that his injury was work related.

Another possible factor that may have contributed to workers having positive outcomes is who interpreted for the worker during the medical exam. In two cases the workers spoke English well enough to need no interpretation. In another case, the doctor and nurses spoke Spanish. In four cases a family member or a hospital employee interpreted. In only two of the cases in this category did the worker's foreman interpret.

Finally, the approach of the company and foreman could have contributed to these outcomes. Although, in one case the worker said the foreman got angry because he was injured, while in other cases the interviewees described the foremen as simply taking the necessary actions to help an injured worker. In one case, the interviewee said the foreman dropped him at his house at the end of the day and told him, "Well, if you feel bad or something, you want them to clean you, go to the clinic and just give them the name of the company. And say you had an accident and that's it."

Although the experiences of these workers may be described as positive because the medical and workers' compensation systems functioned as intended, only 3 of them had fully recovered from their injuries at the time of the interviews and still suffered long-term effects with real impact on their lives. One worker described that he feels "like my arms fall asleep on me, I think I damaged my nerves... [S]ometimes I couldn't help my wife carry our girls."

**No or Alternative Treatment**

In 6 (26%) of the case studies, the workers were not taken to a hospital or clinic to receive medical treatment. In these cases the workers either received no treatment, treated their injuries with home remedies or sought the care of traditional healers or chiropractors. In the one case of heat illness in our sample the worker was not treated, although a coworker gave him some water to drink. The worker who developed symptoms related to pesticide exposure treated himself at home with herbal teas. A worker who sprained his ankle said that his injury had healed, and "after my coworkers massaged it, I don't feel anything anymore." Two workers went to a traditional healer a few days after being injured, and one worker went to a chiropractor to treat his back pain. None of these workers filled out form 801 (workers' compensation claim form) or new what it was. They all paid for treatment they sought with their own money, and none received workers' compensation benefits.

***System Failures***

The experiences of the workers in the final 8 case studies may be characterized as "system failures" because, although the workers were taken to a hospital or clinic to receive medical care, their employers did not comply with laws and regulations covering injured workers (and some actually engaged in fraud) and the system did not operate fully as intended. In 4 cases, the workers did not receive benefits through the workers' compensation system despite missing from 14 to 45 days of work due to their injuries, although two of them received compensation from their employers for time away from work. In 3 of those cases, the workers were specifically instructed to lie to healthcare providers at the hospital about their injuries being work related. Two were told to say they were cutting firewood at home. Several workers described having to wait hours and days for treatment during which time they endured much pain and suffering, others felt they received poor or inadequate medical treatment, and some were ultimately fired.

**Under what circumstances do workers proactively seek improvements in working conditions?**

Workers expressed concern about being reprimanded or fired if they speak up about workplace safety concerns. One interviewee noted that he and other workers will try to help each other out before going to the foreman: "Oh, yes, when my saw would break down, I never wanted to tell the foreman because he always, when it breaks down on you, for sure he's always going to get on you for it….. It's better to ask a friend. Almost everybody asks their friends instead of the foreman. Imagine relying more on your friends than the foreman when that's what the foreman's there for."

Out of the 99 workers interviewed, 79 said that they had sought improvements in working conditions, and most of these workers listed several things they had asked for in the past. Within the high pressure, antagonistic environment described earlier, workers often ask for tools and equipment in better condition. It was far less common for them to ask for more substantial changes like rest breaks. Table 4 below displays the types of things workers requested. Chaps were the item most frequently mentioned, and together with hard hats and other items of protective equipment, PPE was the most common thing requested. Tools were second most frequently requested. Altogether, PPE and tools accounted for 71% of all requests.

**Table 4: Requests for Improvements in Working Conditions by Success**

| Asked for | Successful | Unsuccessful | Total |
|---|---|---|---|
| **PPE** | | | |
| **Chaps** | 8 | 16 | 24 |
| **Hard hat** | 5 | | 5 |
| **Gloves** | 1 | | 1 |
| **Goggles** | 1 | | 1 |

| | | | |
|---|---|---|---|
| **PPE** | 4 | 1 | 5 |
| **Subtotal PPE** | 19 | 17 | 36 |
| **Tools** | | | |
| **Chainsaw in good condition** | 5 | 2 | 7 |
| **Chemical pump for sprayer** | 3 | | 3 |
| **Files** | 2 | 2 | 4 |
| **Hoedad** | 1 | 1 | 2 |
| **Carry bags for trees** | 1 | | 1 |
| **Tools** | 2 | | 2 |
| **Subtotal Tools** | 14 | 5 | 19 |
| **Subtotal PPE and Tools** | 33 | 22 | 55 |
| **Improvements in Working Conditions** | | | |
| **Breaks** | 2 | 7 | 9 |
| **Water** | | 4 | 4 |
| **Slower pace of work/no pressure** | 1 | 1 | 2 |
| **That they don't work us all piled on top of each Other** | 1 | | 1 |
| **Use a different van** | | 1 | 1 |
| **To be picked up on time** | 1 | | 1 |
| **To be taken to a place with cell phone service** | | 1 | 1 |
| **Not to put us in dangerous places** | n/a | | |
| **Subtotal Improvements** | 5 | 14 | 19 |
| **Mutual Assistance** | | | |
| **That they would help me move the branch** | | 1 | 1 |
| **Take a sick worker to the doctor** | | 1 | 1 |
| **Subtotal Mutual Assistance** | 0 | 2 | 2 |
| **Wages** | | | |
| **Lost hours on my pay check** | | 1 | 1 |
| **Grand Total** | **38** | **39** | **77** |

It was less common for workers to request improvements in working conditions such as rest breaks, drinking water, and a slower work pace. These types of requests accounted for just 25% of all requests. Requests for mutual assistance and unpaid wages accounted for 3% and 1%, respectively.

***Under what circumstances do workers ask for things?***

The two main reasons given were: (1) out of concern for their and their co-workers safety (37 workers), and, (2) out of necessity because their tools or PPE were not functioning well (23 mentioned) and their work was impeded. A worker who had tried asking for improvements explained why he felt he could ask for the change: "Because I was fed up that the foremen don't give a [*expletive*] what happens to us." And, "They were very careless with the safety of the workers." He reported that in response to his injury and the doctor's office saying, "oh my god, another hurt person!" his boss said, "No, no more, no more. It can't be, it can't be, it can't be, it can't be like this anymore. I'm fed up with so many hurt people." Others reported: "Well, that I could have another accident again, and that I was working too much with the chainsaw in bad condition." "If I didn't

ask, I wasn't going to be able to continue working." [because the chainsaw was dull] "I struggle with the sprayer and I get chemicals all over me." [requested a new sprayer pump] Seventeen workers said they asked for things out of a sense that they had a right to what they were asking for, saying things like, "because it is my right as a worker."

**Responses to Requests**

As Table 5 shows that workers were successful in having their requests granted about half the time. Denials were often accompanied by an angry or sarcastic response from the foreman. In one case, the foreman told the worker, "You came here to work, not to look at the pine trees," and in another case where the worker asked for a rest break the foreman "laughed and asked if there was anything else I'd like."

On the other hand, in about 40% of the cases, the request was granted in a more or less positive manner. In such cases, the foreman granted the request without expressing any anger or giving negative feedback. In many cases this was because it was obvious that the equipment was not working. For example, one worker said, "he checked the chain and saw that it wasn't working and just brought me another one."

The foremen were much more likely to grant requests for PPE or tools in good condition than they were requests for improvements in working conditions. Indeed, they granted 60% of the requests for PPE and tools compared to only 26% of requests to improve working conditions. The foreman almost always denied requests for rest breaks.

**Table 5. Supervisor Response to Requests**

| Type of Response | Successful Request | Unsuccessful Request |
|---|---|---|
| **Angry response** | 6 | 22 |
| **Ignored/refused** | | 9 |
| **Led on** | | 7 |
| **Granted request** | 31 | |
| **Total** | **37** | **38** |

***What Factors Led to Successful Outcomes to Requests?***

One hypothesis we had at the outset of this study was that workers who requested improvements in working conditions together with their co-workers would be successful more often than workers who made such requests alone. Yet, in this sample workers who asked the foreman for changes in working conditions together with their co-workers were no more likely to have their requests granted than workers who asked alone. Five things seemed to contribute to, though not guarantee, successful outcomes: (1) acting instead of asking and/or assertiveness, (2) knowing one's rights, (3) demonstrating a true need or reasonable expectation, (4) the nature of the relationship with the supervisor, and (5) the foreman's relationship with his boss. In combination with these factors, acting together as a group may contribute to success in certain circumstances.

Knowing one's rights, and having it known that one knows one's rights, may provide leverage and contribute to a successful outcome to a request. For example, one worker said he successfully asked his foreman to stop pressuring him. He explained, "He didn't say anything because they know that I know a little about my rights—but they make you out to be lazy".

At times, the foreman saw the same need and the request was granted. For example, the worker who asked to be picked up on time said that he once waited in the cold and rain for the driver to pick him up to take him to the work site and the driver was several hours late. The worker complained to the foreman saying that the company expects the workers to be punctual, so the company's driver should also be punctual. The foreman said he would talk to the driver, and the issue was resolved.

The requests for chaps are puzzling, however. Of the 24 requests for chaps, 8 were granted and 16 were not. A common reason for asking for new chaps was that the ties or buckles were broken, and the chaps would not stay up. In all but 5 of the cases, the worker asked the foreman for new chaps on his own. In only one of the successful cases did the worker make the request together with a co-worker. In the unsuccessful cases the foremen gave responses like the following: "There aren't any more. Keep using those.' and he left." "He told me that nothing would happen, that the van was far away, that I had to continue working." "He told me that I was crazy. 'What did you smoke?'" "That he was going to order new chaps. The chaps never came."

It is possible that in these cases the foremen made reasonable assessments that the chaps were not in need of replacement. Another possibility, however, is that the worker's relationship with the foreman may influence the outcome. Several workers expressed the feeling that their requests were not granted because they were not part of the foreman's inner circle of kin, friends, and close associates. For example, one worker observed, "Yes, discrimination. You see, there's always for the relatives. He does it for his relatives or friends, the best friends, he always gives them the best things. And if they want you to make progress in the job."

**Retaliation**

Fear of being fired or retaliated against in some way is common among this workforce. Because forest workers speak of this fear so often, we sought to understand where these fears came from and how retaliation played out, if at all, in the workplace. We found that fear of retaliation is widespread and that it stems from actual experiences with being fired (7 workers in our sample were fired for being injured on the job), supervisors threatening retaliation and anecdotes circulating among workers about dismissals. In addition, we found that workers overcome fear of retaliation through necessity, through knowledge of their rights, length of experience, and through supporting one another. We found further that retaliation does occur. This imparts strength to the rumors and threats, and provides justification for workers' fears. While the vast majority of workers in our sample did not let fears of retaliation stop them from reporting their injuries or making proactive attempts to improve working conditions, many of them actually experienced retaliation. Seven workers interviewed as case studies were fired as a result of their injuries. Four of them were actually told they were fired and the other 3 said that the foreman never came to pick them up anymore. This suggests that workers' fears of retaliation for being injured are justified. Some workers do get fired for being injured on the job. On the other hand, none of the workers in our sample reported being fired for asking for tools or PPE in better condition or improvements in working conditions.

**AIM 3 - Develop narrative storytelling educational resources that are culturally, linguistically, and educationally appropriate for immigrant Latino forest workers and their employers. Resources will be organized around priority hazards/tasks, based on worker case studies, present the complex ecology of work organization factors, and provide recommended employee and employer solutions.**

**and**

**AIM 4 - Deliver educational trainings through a promotora program, which will be evaluated for effectiveness.**

**Reality Tales: Injuries in the Woods (Digital Story Narratives (Videos historia Reales: Lesiones en los bosque)**

Digital storytelling and other forms of narrative are increasingly being used as participatory action research tools as well as to share information and promote change at individual and community. In January 2016, we convened the EWG to present the idea of creating worker-told digital stories and get feedback/reaction as to whether this would be a good approach to promote awareness about injury risk and convey messaging about worker rights advocacy. EWG members felt that digital stories would be an effective way to raise awareness among workers, and were enthusiastic about the approach.

***Methods***

From among the 25 participants who completed case study interviews, 5 were invited to create a first-person digital story. An additional 2 digital stories were created by promotoras de salud (lay health workers) from the NFWC. The goal in producing these digital stories was to capture and characterize personal experiences of injury/illness incidents from working in the forestry services industry. These digital stories also delivered advocacy messages for viewers to understand the hardships and consequences related to suffering a work-related injury/illness and what rights workers are entitled to. These digital stories were created to be used as training/educational resources as part of the NFWC worker safety and advocacy training program.

Using a process and methodology developed by the UC Berkeley StoryCenter, a non-profit organization that facilitates digital story production, our participants produced 3-5 minute visual narratives that combine images, video, audio recording of voice and music, and text to create compelling accounts of experiences of work-related injury/illness. Participants attended a two-day weekend workshop led by StoryCenter staff to develop and craft their personal digital story. During the workshop, conducted in Spanish by two bilingual StoryCenter staff, participants developed their own scripts, with support from bilingual research team members. Participants also selected photos, video clips, and music to be used in their digital story. And, they decided whether or not to capture their own voice or have someone else narrate the story. Once the final version of the digital story was created, participants could decide whether to give permission for public use of their digital story, or to use only as part of NFWC training and advocacy.

The range of digital stories focused on the following hazards or topics: (1) fast pace of work/need for breaks (“Water, Breaks, and New Generations”); (2) hazards from felling trees (“American Dreams”); (3) preventing driving accidents (“Sadness, Loneliness and Hope”); (4) hazards from falling trees and branches (“Broken Dreams”); (5) hazards from falling trees and branches (“Searching for a Better Future”); (6) fast pace of work/hazards from felling trees (“The Accident that Changed my Life”); and, (7) chainsaw kickback (“The Life of a Forest Worker”).

To integrate the digital stories into NFWC training, project staff worked with the NFWC promotoras to develop short lesson plans with questions and talking points to guide conversations about the themes in the digital stories, with a focus on basic worker rights for forest workers, what should happen if a worker is injured, and specific prevention messages regarding the hazards faced by the worker in the story.

Evaluation of the digital stories was conducted in two stages. First, after including the digital stories in the NFWC training, attendees were asked two questions about their immediate reactions to the digital stories (see below) and a guided conversation was conducted at the conclusion of the training/educational session. Second, a subset of 30 attendees of these training/educational training sessions were to be contacted by telephone 60-90 days later to find out whether they used any of the information they discussed in the educational session.

***Results and Discussion***

Slightly over 200 workers responded to immediate reaction assessments of the digital stories, per the following:

1. "How useful was it to share this video with you?"
    - Very useful: 87%
    - Somewhat useful: 12%
    - Not useful: 0
    - No response: 1%
2. Do you think we should keep using these videos when we talk to other workers?
    - Yes!!: 92%
    - Maybe: 6%
    - No: 0
    - No response: 2%

In the evaluation discussion at the end of each session, attendees were asked what they liked and did not like about the digital stories, and whether they learned anything new. The most frequent themes regarding what they liked about the video included that it was well done, short, and a true story told by a forest worker. Some commented that the digital stories were too short, that they wanted more specifics, and that they wanted a larger screen. When asked what they didn't like, most workers focused on the content of the video – they didn't like what happened to the worker, but not as a critique of the video—"No, keep showing it so that supervisors can see they can't keep treating people badly." There was some concern expressed that the individual in the story might be recognized, but the promotoras explained that each worker who made a video decided whether they wanted to be known or not. In terms of what attendees reported learning, themes focused on the following: (1) learning about workers' compensation, and specifically the 801 form (to report the injury as work-related and get into the workers' comp system); (2) learning about their rights generally, with some specific regarding breaks, and the employer's obligation to provide protective gear when needed (e.g., chaps, gloves, hard hats), and, (3) learning about OSHA, and specifically that they could request to speak to an OSHA representative themselves, and do it privately or anonymously. The 60-90 day follow-up phone calls were attempted over a two-month period. However, several challenges were encountered in establishing contact. Despite efforts to make multiple phone calls (even during evenings and weekends), phone numbers were either disconnected, not real numbers, just rang, or voicemail messages were not returned.

**Forest Worker "Safety Talks" (Platicas sobre seguridad para los trabajadores forestales)**

Four fotonovela-style "safety talk" guides were developed for employers and supervisors to use with work crews at the beginning of work shifts. These safety talks were based on four case study interviews, and included a short introductory fact sheet on how to conduct effective safety talks ("Safety Talks for Forest Workers: Introduction"). These guides were designed to help supervisors conduct a 10-15 minute safety talk using a real worker story to start a conversation about a workplace hazard and safety tips that could prevent the injury in the story. The four injuries/topics addressed are: (1) slips, trips and falls ("Worker Injured on a Steep Slope"); (2) stuck by felled tree ("Felled Tree Drops on Co-worker"); (3) chainsaw kickback ("Worker Injured from Chainsaw Kickback"); and, (4) herbicide application ("Worker Inhales Herbicide")

### *Methods*

To develop these safety talks, we reviewed information from the employer site visits and interviews described above. In addition, we interviewed the owner and safety trainers from two high-road forestry services contractors to get more details about their safety and health training activities – how the training is typically conducted, what training materials they use, what issues they felt would be most important to address, what barriers they face in conducting training, and what kinds of training materials would be most useful/most likely to be used by their supervisors. Based on the information gathered, we decided to develop short, visual materials that could be used by supervisors to conduct short safety talks. Safety talks are mandated under Oregon law: Oregon OSHA (Division 7 Rules: 437-007-0200) requires that employers hold pre-work safety meetings with employees before starting any work in the forest at each new site where they will work more than one day.

We selected the case studies to develop into these story-based safety talk materials based on injury illness statistics regarding the most common injuries, and feedback from the employer site visits, and our conversations with employers and safety trainers regarding training topics that were most important.

After reviewing other tailgate talk and safety talk models, we developed three different prototypes (fotonovela style, illustrated story style, and no graphics), which we shared with the project's TAG, with the two safety trainers previously interviewed, and with the NFWC promotoras. Based on their feedback, the fotonovela style was selected as the format for these safety talks.

After developing draft versions of the safety talks, a 2-hour workshop was held in March 2017 with 14 crew supervisors from four different forestry services contractors. These supervisors were introduced to the safety talk materials, instructed on their use and on the value of having them pilot tested in the field, practiced using the materials, and provided initial feedback. They were then asked to commit to conducting a short safety talk with their workers on one or both safety talks, using the provided materials, within 30 days of the workshop. We would then follow-up with a 15-minute phone interview to get their feedback. Twelve participants signed up to help pilot test the materials. Participants were particularly appreciative of the opportunity to hear what other contractors are doing, and advocated for more opportunities like this.

### *Results*

Seven supervisors pilot tested the materials with a total of approximately 90 workers (5-12 workers per crew). Four safety talks were conducted in English with English-speaking crews, two in Spanish, and one in both English and Spanish. Five supervisors used both safety talks; two used only the "Steep Slope" talk. All were conducted in the morning before heading out to the worksite, and at the worksite before working.

Supervisors reported that the inclusion of photos worked well and inspired workers to share their own experiences, which initiated dialogue between workers. Supervisors liked having a fotonovela style resource as something different to work with to conduct their safety talk, which helped workers pay more attention. Two supervisors also liked having the "talking points" to work from. Some supervisor quotes reflected this: "The workers thought they were better than the usual safety meetings and would like more like that." "The story did provoke prevention discussions. Opened it up to experiences and it was wet that day and it pertained to what we were doing. So, we talked about what we need to be aware of and went on with our stories from there."

One supervisor noted that the materials were geared for Latino crews, and suggested having mixed crews in some of the photos. One supervisor did not feel the story was necessary. Three supervisors used the "Questions to ask" section to help start the conversation, and focused on the prevention tips. But, one noted "Maybe if I had read the questions beforehand it may have gone better and helped them to engage more in the questions."

All of the supervisors said they would use the materials again, but wanted many more of them to select from—a binder of safety talks. Based on the results of the pilot test, we developed two additional safety talks. These are now available on the PNASH and NFWC websites. Planned dissemination activities include direct mail of the materials to 80 registered contractors throughout Oregon and Washington, through PNASH and NFWC networks, and through associations, such the Society of American Foresters. Educational materials and study major findings will be hosted on the PNASH Center website as of January 2018 at http://deohs.washington.edu/pnash/forest_safety.

## CONCLUSION

Results from employer and supervisor interviews revealed an awareness of the many dangerous, hazardous tasks that forestry services workers carry out. These were consistent with worker reports, as well as with federal and state injury statistics. Notably, employers and supervisors characterized how internal organizational factors beyond workers' job tasks, such as pressures for fast, timely job completion based on the conditions of contracts, contributed to expectations of worker performance. To reduce risks, employers emphasized training, creating a culture of safety, a slower work pace and learning from accidents and near misses. Key components of their approaches to mitigating hazards was open communication throughout the organization and being prepared to change practices in response to incidents that occur. The training needs the employers and supervisors emphasized were field-based trainings that are realistic, and that the more training materials can be tailored to the actual experiences of the workers, the better.

Worker experiences were the heart of this project. The workers we interviewed often work in a fast-paced, hazardous environments in which insufficient attention is paid to safety and health. Relations between workers and supervisors (foremen) were often described as negative and antagonistic, although some workers said they had good relationships with their supervisors. Workers were ever cognizant of the possibility of reprisals for getting injured on the job or proactively seeking improvements in working conditions, although many stated that they did not fear retaliation. These adverse working conditions had a profound impact on worker experiences with being injured, being treated for their injuries, and attempting to improve safety and health at work.

The leading cause of injury in our sample was being struck by an object, and slips, trips and falls, chainsaw kickback and strain/repetitive stress were other major causes. While each type of accident had its own unique proximate causes, there were some factors that may have contributed generally to a number of accident types. These included lack of safety training, insufficient communication between crew members as well as between workers and supervisors, pace of work, fatigue, and bullying.

Although more than a third of the workers in our sample experienced more or less positive outcomes in having their injuries treated by medical professionals, the other two-thirds either were left to their own devices, or had experiences with the medical and/or workers' compensation systems that can be described as failures of the system stemming from employer non-compliance with labor laws.

Fear of retaliation seemed to stem from threats to terminate workers made by supervisors as well as a sense of vulnerability related to insecure immigration status. These fears were buttressed by the fact that workers actually do get fired. Seven workers in our sample were fired for being injured on the job, although none were fired for proactively attempting to improve working conditions. There is an imbalance of power between undocumented workers and their employers greater than the imbalance of power that pertains between citizens and their employers. In addition, the design of the H-2B visa system exacerbates these power relations.

Finally, this research identified a need to address pervasive reports by workers of supervisory attitudes and behaviors detrimental to workplace safety, including abusive and oppressive behaviors, such as bullying, against frontline forestry services workers. Altogether, negative supervisory practices are thought to be a

primary contributor to a weak safety climate and, therefore, a root cause of work-related injury, illness, and fatality.

An area of common ground and opportunity for future work is a translational, research-to-practice approach to develop training solutions targeting supervisors and employers with a goal to improve workplace safety climate. The fact that 55% of the workers in our sample described the pace of work as “very fast,” “too fast,” “pressured,” and “as fast as you can” indicates the absence of a safety climate. Additionally, “getting yelled at by supervisors” was participants’ top choice when asked what they struggle with most in their jobs and was reflected in accounts of on-the-job injury. Twenty-nine percent of injured workers in our sample also mentioned pressure to finish the job, feeling rushed and/or stress as contributing to their injury. Our network of workers, educators, employers, and industry leaders have recognized that safety leadership training for forestry services supervisors and owner/contractors would be a key response to this problem. There is a need to establish and sustain a cadre of supervisory leaders whose actions enhance worker productivity while reducing worker injuries.

View Burden Statement

**PHS Inclusion Enrollment Report**

**This report format should NOT be used for collecting data from study participants.**

OMB Number: 0925-0001 and 0925-0002
Expiration Date: 10/31/2018

***Study Title (must be unique):** Safety and Health of Latino Immigrant Forestry Services Workers in the Pacific Northwest

* Delayed Onset Study? ☐ Yes ☒ No

***If study is not delayed onset, the following selections are required:***

| | | | | |
|---|---|---|---|---|
| **Enrollment Type** | ☐ Planned | ☒ Cumulative (Actual) | | |
| **Using an Existing Dataset or Resource** | ☒ Yes | ☐ No | | |
| **Enrollment Location** | ☒ Domestic | ☐ Foreign | | |
| **Clinical Trial** | ☐ Yes | ☒ No | **NIH-Defined Phase III Clinical Trial** | ☐ Yes ☒ No |

**Comments:** The forestry services industry in southern Oregon is a male dominated industry. Immigrant, Latino workers (the target population of this study) are almost all men. In fact, we did not encounter any women forest workers in the study area. Although some contractors, who hire the workers, are women, none of the women we approached agreed to participate in the employer interviews.

| **Racial Categories** | **Ethnic Categories** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Not Hispanic or Latino | | | Hispanic or Latino | | | Unknown/Not Reported Ethnicity | | | **Total** |
| | **Female** | **Male** | **Unknown/ Not Reported** | **Female** | **Male** | **Unknown/ Not Reported** | **Female** | **Male** | **Unknown/ Not Reported** | |
| American Indian/ Alaska Native | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Asian | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Native Hawaiian or Other Pacific Islander | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black or African American | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| White | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| More than One Race | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Unknown or Not Reported | 0 | 0 | 0 | 0 | 349 | 0 | 0 | 0 | 0 | 349 |
| **Total** | 0 | 4 | 0 | 0 | 350 | 0 | 0 | 0 | 0 | 354 |

**Report 1 of 1**

**< Previous Report** **Delete Report** **Next Report >**

**To ensure proper performance, please save frequently.**

**PUBLICATIONS**

*Manuscripts are currently in preparation.*

Doughty K: [2017] Peligros en el Bosque: Health and Safety Fotonovelas for Forestry Workers. MPH Capstone Project, University of Washington.

Educational products on the PNASH website January 2018: http://deohs.washington.edu/pnash/forest_safety

- Forest Worker Safety Talks / Platicas sobre seguridad para los trabajadores forestales
- Reality Tales Videos: Injuries in the Woods / Videos historia Reales: Lesiones en los bosque