# Interlibrary Loans and Journal Article Requests

**Notice Warning Concerning Copyright Restrictions:**

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One specified condition is that the photocopy or reproduction is not to be *"used for any purpose other than private study, scholarship, or research."* If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

Upon receipt of this reproduction of the publication you have requested, you understand that the publication may be protected by copyright law. You also understand that you are expected to comply with copyright law and to limit your use to one for private study, scholarship, or research and not to systematically reproduce or in any way make available multiple copies of the publication.

**The Stephen B. Thacker CDC Library reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.**

**Terms and Conditions for items sent by e-mail:**

The contents of the attached document may be protected by copyright law. The CDC copyright policy outlines the responsibilities and guidance related to the reproduction of copyrighted materials at CDC. If the document is protected by copyright law, the following restrictions apply:

- You may print only one paper copy, from which you may not make further copies, except as maybe allowed by law.
- You may not make further electronic copies or convert the file into any other format.
- You may not cut and paste or otherwise alter the text.

# Characterizing Hazards and Injuries Among Home Care Workers

**Brad Wipfli, PhD,**
**Ryan Olson, PhD,**
**Robert R. Wright, PhD,**
**Layla Garrigues, RN, and**
**Joanne Lees, BA**

*This project extends research on hazardous exposures and injuries among home care workers. Historical data from Oregon home care workers were analyzed to identify the most common lost time injuries and contributing factors, and 7 focus groups were conducted with workers (n = 53) to gather data on demographics, health, and perceptions of occupational hazards. Results indicate that workers are at particular risk for back, knee, and shoulder injuries during client and material moving tasks and that workers' self-reported task exposures and risk perceptions are highly aligned with injury data.*

## Introduction

Home care workers (HCWs) are exposed to significant safety hazards and have high injury rates. In the United States, the lost time injury rate for HCWs is nearly four times higher than the average for all occupations (424 vs. 117 per 10,000 full-time workers). The average HCW injury or illness requires a median of 10 days away from work, with 28.1% of injuries requiring 31 or more days away from work (Bureau of Labor Statistics [BLS], 2010a). Moreover, the population of 1.7 million HCWs in the United States is expected to grow 46% by 2018 (BLS, 2010b). Despite this high injury prevalence, there has been little safety surveillance research to characterize task exposures and injury hazards among HCWs.

Although a variety of workers provide care for people in private homes (e.g., home healthcare nurses, certified nursing assistants, direct care workers), the present article is focused on personal and home care aides as defined by the BLS (2010b). Research with hospital-based caregivers has identified client lifting and transferring as particularly hazardous because these tasks involve asymmetrical weight distribution, excess bulk, and horizontal reaching that place excessive forces on the low back, knees, and shoulders (Gagnon et al., 1987; Nelson et al., 2003). In addition, hospital-based caregivers spend 20-30% of their time in bending or twisting postures during other tasks such as bed making or patient bathing (Owen & Garg, 1991). Although HCWs perform many of the same tasks as hospital staff, they have a 25% higher injury rate (BLS, 1997). This disparity is probably due to a variety of factors, including limitations in supervision, physical assistance from coworkers, access to normal organizational support structures (e.g., safety committees, health promotion programs), and access to hospital resources and equipment. As lone workers, HCWs often perform dangerous manual client transfers without coworker or mechanical assistance. Isolation may also result in lower social support from coworkers, which is associated with injuries and illnesses (Eriksen et al., 2003, 2004). Hazard control in homes is particularly challenging for HCWs who are not employed by a private agency because such workers manage dual-relationships with clients who are also their employers. Clients are private citizens who are not likely to understand environmental hazards or the importance of special equipment for protecting worker safety and health. Nevertheless, workers depend on client-employers to help provide them with a safe work environment, including the procurement of special tools, lifting assists, or mobility devices.

The limited safety assessment research conducted specifically with HCWs has focused on estimating injury rates (Meyer & Muntaner, 1999; Myers et al., 1993) and examining the relationship between physical job demands and injuries (Kim et al., 2010). Baron and Habes (2004) conducted a multimethod investigation relevant to the current project. The authors examined safety hazards among HCWs in Northern California using interviews with key personnel, an analysis of 9 months of workers' compensation claims ($n$ = 17), an ergonomic assessment of the working conditions in one client's home, and focus groups with HCWs ($n$ = 35). Focus groups included a rating activity where workers identified tasks that caused them the most pain, a body-diagram activity where workers identified areas with frequent pain and injuries, and a structured group discussion. The limited nature of the workers' compensation dataset prevented firm conclusions about injury patterns and contributing factors. In focus groups, workers were most concerned about lifting/transferring clients and pain and injuries in the lower back and shoulders, and also reported having inadequate tools and equipment to work safely.

The long-term goal of the current project is to improve safety surveillance and injury prevention interventions for HCWs. The goal of the current study was to address research gaps on hazardous exposures among HCWs and evaluate the generality of prior findings from Baron and Habes (2004). More specifically, we set out to (a) review a larger lost time injury dataset to characterize injuries and contributing factors, and (b) conduct focus groups with HCWs to validate and extend prior findings about tasks that cause workers pain or concern for injury.

## Methodology

### Lost Time Injury Data

Work-related injury and illness data for HCWs were obtained from the Oregon Home Care Commission (OHCC, 2012), which oversees publicly funded (primarily Medicaid) in-home care programs for low-income individuals who are disabled or elderly. The data set contained

information about injuries and illnesses resulting in lost work time (i.e., lost time injuries) reported by publicly funded HCWs between 2008 and 2010, including date, affected body part, specific nature of the injury (amputation, burn, carpal tunnel, contagious disease, contusion/bruise, dislocation, fracture, infection, inflammation, laceration, poisoning, respiratory disorder, sprain, strain), cause (strains; slip, trip, fall; struck by object; cut, puncture; motor vehicle accident; infectious disease; carpal tunnel), and a brief description of the incident.

### Focus Groups

#### Participants

Seven focus groups were conducted with HCWs ($n$ = 53) from a metropolitan area and additional rural cities. Focus groups ranged from 3 to 12 HCW participants. Four focus groups were conducted in English, two in Spanish, and one in Russian. Printed materials were translated into Spanish and Russian for the corresponding focus groups, and translators were present during these sessions. Focus groups conducted in English included some nonnative English speakers ($n$ = 11), including several individuals who identified Korean as their first language.

#### Procedures

The Oregon Health & Science University Institutional Review Board approved the study protocol and materials. HCWs were recruited from Home Care Commission training classes and offered a $20 gift card as a participation incentive. Interested individuals stayed for 1 hour after the conclusion of the training class to participate in a focus group.

After consenting to participate, HCWs completed a one-page survey of demographics, home care work history, work task frequency, and 6-month injury history. Participants next completed a work task "pain/concern" sorting activity. Each participant received a set of 20 slips of paper with common work tasks printed on them, such as driving to or for a client, bathing/toileting, dressing, client lifting/transferring, and house cleaning. Blank slips were provided for participants to submit additional tasks. Participants then placed slips into one of three small bins that were labeled with faces from a visual analog scale for pain or discomfort. Workers were told the following explanations for the three bins: For happy faces, "This task causes me little-to-no pain or concern for injury"; for medium discomfort faces, "This task causes me moderate pain or concern for injury"; and for high discomfort faces, "This task causes me high pain or concern for injury." If participants did not regularly complete one of the tasks they did not place it in one of the bins.

Each focus group concluded with a structured discussion led by researchers. The aim of the discussion was to discover HCWs' perceptions about safety hazards or barriers to safety in their environment, including tasks or situations that were not captured by the sorting activity. Questions from researchers covered topics such as work task frequency, physical demands, tools or medical devices used or needed, workers' greatest causes of pain and discomfort, and which household objects workers frequently lifted or moved.

#### Data Analysis

Researchers conducted descriptive analyses (e.g., frequencies, means) of lost time injury data to identify patterns among injuries, affected body parts, and injury causes. Researchers also performed similar descriptive analyses on focus group survey data. For the sorting activity, points were assigned to each task based on the bin in which they were placed (1, 2, or 3 for low, medium, and high pain/concern, respectively). Points were totaled and tasks were ranked from highest to lowest pain/concern score. These rankings were compared to an unranked list from Baron and Habes (2004) to evaluate the generality of findings from California HCWs to the current sample.

## Results

### Lost Time Injury Data

Between 2008 and 2010, there were 481 lost time injuries reported by approximately 11,000 HCWs in publicly funded home care programs in the state. Workers averaged 25.8 hours per week during the same time period, which translates to an annual rate of 352 lost time injuries per 10,000 full-time workers (U.S. average for all occupations = 117; BLS, 2010b). The average lost time per injury was 27.9 days. Approximately one-third of all injuries were to the low back, followed in frequency by injuries to the shoulders, knees, and neck (Figure 1). Over half of all

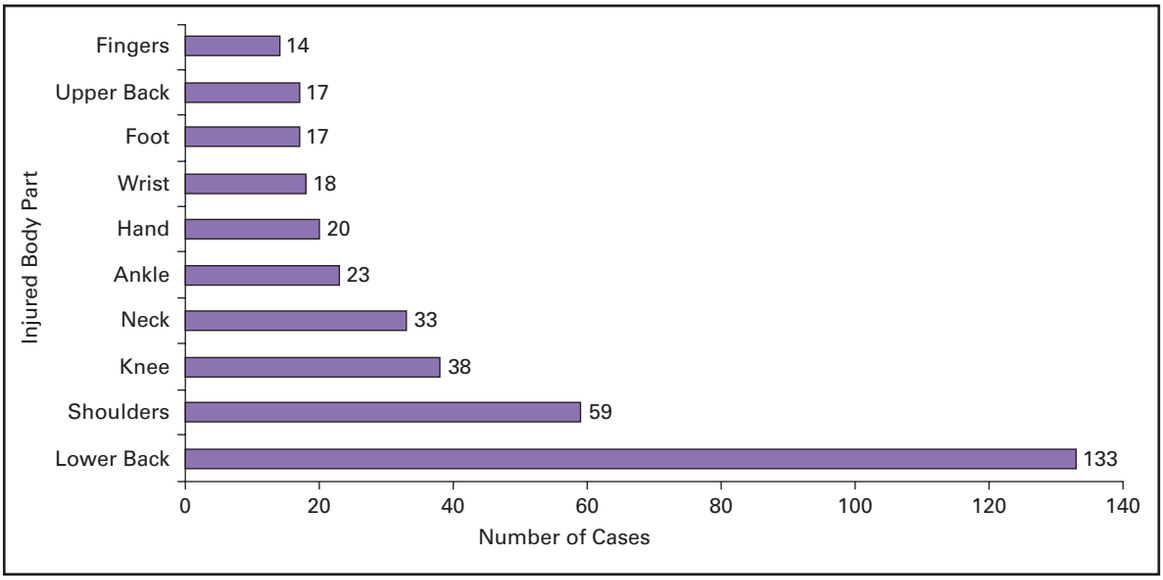


**Figure 1.** Frequency of lost time injuries by body part or region among Oregon home care workers, 2008-2010. Data provided by the Oregon Home Care Commission.

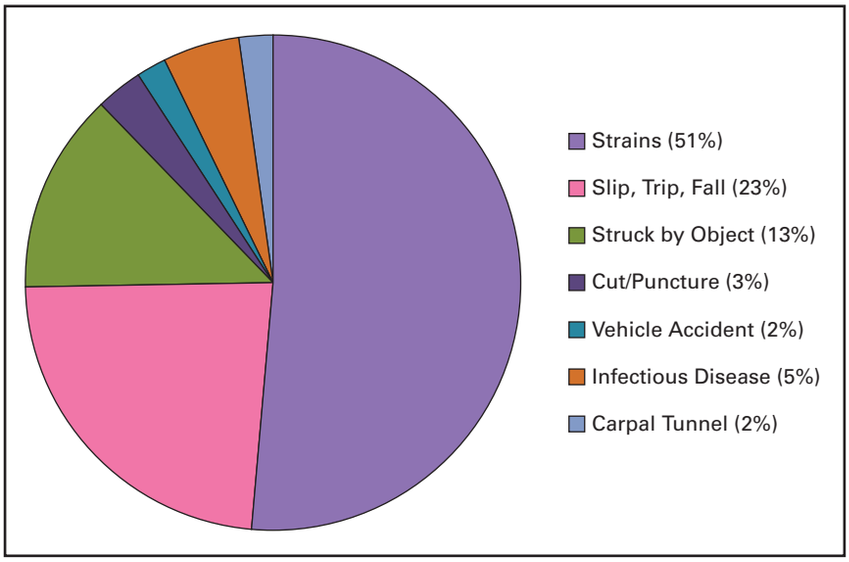


**Figure 2.** Causes of lost time injuries among Oregon home care workers, 2008-2010. Data provided by the Oregon Home Care Commission.

injuries were strains that occurred while transferring clients or lifting objects (51%), followed by slips/trips/falls (23%), and being struck by an object (13%) (Figure 2).

### Focus Groups

Participants ($n$ = 53) were predominantly female (85%), Caucasian (66%), and married or in a relationship (63%). On average, participants were 47.5 years old ($SD$ = 12.7), had 12.3 years of education ($SD$ = 3.5), and a body mass index (BMI) of 29.0 ($SD$ = 6.6; overweight ≥ 25, obese ≥ 30). Participants averaged 5.5 years ($SD$ = 5.7) experience as a HCW and had an average of 1.4 clients ($SD$ = 0.80). One participant was a full-time live-in caregiver. The remaining 52 participants worked an average of 28.5 hours per week ($SD$ = 19.1). In the sorting activity, the following activities were identified as causing the most pain or concern for injury: transferring/lifting clients, moving household objects, and supporting the client when walking or falling. The ten "most painful/concerning" tasks from the sorting activity in the current study showed 80% overlap with the 10 most painful tasks identified by the Baron and Habes sample (2004; Table 1).

Structured group discussions provided additional information about HCWs' concerns and perceived safety barriers. For instance, several workers noted a mismatch between their physical

size or strength and their clients' physical size. One worker remarked that client lifts and transfers were difficult because she "transfers someone who's probably 20 pounds heavier," while another HCW mentioned that she had difficulty because the client was "way bigger and way taller ... and I'm only 4 foot 11." Related to this concern, workers expressed frustration with a lack of appropriate equipment and tools. For example, one HCW remarked that "I have to lift the person physically and put them in their chair—there's no Hoyer Lift because there's no room for it ... and there's no training for me, I just have to get trained by the person who was working there before me, and you cannot be certain that they are doing it the right way." Objects that HCW identified as causing particular concern for personal injury included wheelchairs (empty or with clients sitting in them) and mattresses/beds due to their weight and the frequency of moving them. Additional concerns included the feeling of having too many tasks to accomplish in the allotted time, clients' expectations to complete tasks not included in approved task lists, and pressure to perform extrarole social care (e.g., providing companionship). Concerns raised during discussions were similar across English, Spanish, and Russian groups.

## Discussion

The present study characterized hazards and injuries for HCWs serving clients in publicly funded programs in Oregon. The injury rate for Oregon HCWs was three times higher than the national average for all occupations, but comparable to the national average for HCWs. However, the average of 27.9 lost workdays per injury among Oregon HCWs was high compared to the national median of 10 workdays lost per injury for HCWs (BLS, 2010a). Patterns in injury data showed that workers were at particular risk for back, shoulder, and knee injuries while transferring clients or moving household objects. Workers' opinions about demanding or hazardous tasks were highly aligned with injury statistics (e.g., concern about client transfers and moving heavy objects like wheelchairs). Similar to findings from California focus groups, workers reported feelings of having inadequate tools and/or training to perform some of their tasks during open discussions. Demographic data from focus group samples characterize a population that is mostly older and overweight/obese, which are factors that may increase injury susceptibility and recovery time after injury (Krause & Lund, 2004).

Additional topics raised in focus groups suggest that HCWs are vulnerable to work overload, as they feel burdened with too many tasks to accomplish during allotted work time and feel

**Table 1. Comparison of Tasks Causing the Most Pain or Concern for Injury Among Home Care Workers Across Oregon and California Samples**

| RANK | TASK |
|---|---|
| **OREGON (Current Study)** | |
| 1 | *Unassisted client lifting and transferring* |
| 2 | *Moving household objects* |
| 3 | *Supporting client while walking or catching while falling* |
| 4 | Prolonged standing |
| 5 | *Push/pull/lift wheelchair* |
| 6 | Yard work |
| 7 | *Bathing* |
| 8 | *Cleaning bathroom* |
| 9 | *Cleaning floors* |
| 10 | *Cleaning kitchen* |
| **CALIFORNIA (Baron & Habes, 2004)** | |
| NA | *Unassisted client lifting & transferring* |
| NA | *Bathing* |
| NA | Dressing |
| NA | *Push/pull/lift wheelchair* |
| NA | *Supporting client while walking or catching while falling* |
| NA | *Cleaning bathroom* |
| NA | Carrying groceries |
| NA | *Cleaning floors* |
| NA | *Cleaning kitchen* |
| NA | *Moving household objects* |

*Note:* Italics indicate tasks that appear in both lists. Tasks from Baron & Habes (2004) were unranked.

pressure from clients to provide extra-role social support. Work overload is associated with a number of detrimental outcomes (Beehr & Glazer, 2005), including job stress, poor diet, and low physical activity levels, which may all contribute to work-related injuries and excess recovery time in this population. In sum, for many HCWs job stress, lifestyle behaviors, unhealthy body weight could exacerbate the risk of injury posed by physical hazards and task demands.

## Recommendations with Implications for Practice

Our results suggest several recommendations for research and practice. First, because lifting and transferring is the most common cause of injury among HCWs, research on effective strategies for improving caregiver access to mechanical assists and low-tech transfer tools should be explored. Regarding client transfers, it is never recommended that workers perform transfers alone without mechanical assistance. In reality, however, workers do perform transfers manually or with low-tech tools. In an ergonomic evaluation of manual patient transfer techniques, Hess, Kincl, and Mandeville (2007) showed that using a slide board was the least risky and most preferred method for both workers and mock clients. A combination of making slide boards more available and training workers to use them may be effective at reducing injuries in some contexts. Based on our review of the literature, research on the effectiveness of existing training programs for HCWs is also needed, with particular emphasis on programs that address hazards for back, shoulder, and knee injuries, and ways to work with client-employers to control those hazards. Due to the absence of formal safety committees and supervision in publicly funded programs, interventions that involve interactive safety training or provide workers with social support structures would also be valuable.

Observational studies of HCWs are scarce due to the isolated and dispersed nature of the job. Therefore, little is known about HCWs' actual exposure levels to dangerous or demanding tasks. Therefore, it would be valuable for future researchers to use observation or daily diary methods to gather more naturalistic and quantitative exposure data, such as frequency counts or time spent lifting and transferring clients or moving household objects. Daily process data produced by diary methods would also make it possible to study relationships between daily physical task exposures and pain or discomfort, as well as explore for interactions between task exposures, stress, and lifestyle and coping behaviors. Such findings would provide valuable information about the daily routine of this at-risk work force that could inform the development of engineering, training, and motivational interventions.

The average BMI of 29.0 for workers in our sample suggests that future interventions for HCWs integrate health promotion with health protection (injury prevention; e.g., Sorensen et al., 1998). Poor health of HCWs may exacerbate the impact of exposures to physical safety hazards. Therefore, promoting healthy lifestyle habits (e.g., diet, exercise) in conjunction with tool use and hazard reduction could reduce both injury frequency and the number of workdays lost after injury. When considering total worker health in this way, addressing issues such as extra-role behavior and work overload may also be warranted. And finally, as the population of HCWs rises, we should experiment with and evaluate new ways to organize home care work that enhance social support for health and safety.

## Conclusion

The current study addresses a safety surveillance research gap by further characterizing safety hazards and injury patterns among HCWs. Using methods that partially replicated and extended a prior study (Baron & Habes, 2004), the authors reviewed a lost time injury data set to characterize injuries and contributing factors, and conducted focus groups to identify tasks that HCWs rate as causing pain or concern for injury. Lost time injury data showed that workers are at particular risk for back, knee, and shoulder injuries that occur when lifting and moving clients and household objects. Focus group data characterize a population that is mostly female, older, and overweight/obese, and indicate that workers' concerns about safety hazard exposures are highly aligned with injury data. Based on these results, several areas of future research and practice are recommended, including interventions that provide HCWs with improved

access to appropriate equipment and tools, evaluation of existing training programs, using observation or daily diary methods to gather data on task exposures, interventions that integrate health promotion with health protection (injury prevention), and altering the organization of work to provide more social support for health and safety. ☗

***Brad Wipfli, PhD,*** *is a Research Associate at Oregon Health & Science University, Portland, Oregon.*

***Ryan Olson, PhD,*** *is a Scientist at Oregon Health & Science University, Portland, Oregon.*

***Robert R. Wright, PhD,*** *is a Postdoctoral Researcher at Oregon Health & Science University, Portland, Oregon.*

***Layla Garrigues, RN,*** *is a Doctoral Student at Oregon Health & Science University, Portland, Oregon.*

***Joanne Lees, BA,*** *is a Trainer with Hollin Consulting, Bollington, Macclesfield, Cheshire, England.*

*The authors are grateful to Francisco Borja Lopez de Castro of the University of Valencia for his help with focus groups, data entry, and analysis.*

*This project was supported with funding from the Northwest Center for Occupational Health & Safety 5 T42 OH008433-03 (Noah Seixas, PI).*

*The authors declare no conflicts of interests.*

*Address for correspondence: Robert R. Wright, PhD, Center for Research on Occupational & Environmental Toxicology, Oregon Health & Science University, 3181 SW Sam Jackson Park Rd., L606, Portland, OR 97239-3098 (wrightr@ohsu.edu).*

DOI:10.1097/NHH.0b013e31825b10ee

## REFERENCES

Baron, A. D., & Habes, D. J. (2004). *Health Hazard Evaluation Report #2001-0139-2930: Alameda County Public Authority for In-Home Support Services*. Retrieved from http://www.cdc.gov/niosh/hhe/reports/pdfs/2001-0139-2930.pdf.

Beehr, T. A., & Glazer, S. (2005). Organizational role stress. In J. Barling, E. K. Kelloway, & M. R. Frone (Eds.). *Handbook of Work Stress* (pp. 7–33). Thousand Oaks, CA: Sage.

Bureau of Labor Statistics (1997). *Injuries to Caregivers Working in Patients' Homes: Issues in Labor Statistics*. Retrieved from http://www.bls.gov/opub/ils/pdf/opbils11.pdf.

Bureau of Labor Statistics (2010a). *Nonfatal Occupational Injuries and Illnesses Requiring Days Away From Work, 2009*. Retrieved from http://bls.gov/iif/.

Bureau of Labor Statistics (2010b). *Occupational Handbook, 2010-2011 Edition*. Retrieved from http://www.bls.gov/oco/ocos326.htm.

Eriksen, W., Bruusgaard, D., & Knardahl, S. (2003). Work factors as predictors of sickness absence: A three-month prospective study of nurses' aides. *Occupational and Environmental Medicine, 60(4)*, 271–278.

Eriksen, W., Bruusgaard, D., & Knardahl, S. (2004). Work factors as predictors of intense or disabling low back pain: A prospective study of nurses' aides. *Occupational and Environmental Medicine, 61(5)*, 398-404.

Gagnon, M., Chehade, A., Kemp, F., & Lortie, M. (1987). Lumbo-sacral loads and selected muscle activity while turning patients in bed. *Ergonomics, 30(7)*, 1013–1032.

Hess, J. A., Kincl, L. D., & Mandeville, D. S. (2007). Three single-person manual patient transfer techniques for bed-to-wheelchair transfers. *Home Healthcare Nurse, 25(9)*, 3-9.

Kim, I., Geiger-Brown, J., Trinkoff, A., & Muntaner, C. (2010). Physically demanding workloads and the risks of musculoskeletal disorders in homecare workers in the USA. *Health & Social Care in the Community, 18(5)*, 445-55.

Krause, N., & Lund, T. (2004). Returning to work after occupational injury. In J. Barling, & M. R. Frone (Eds.). *The Psychology of Workplace Safety* (pp. 265-295). Washington, D.C.: APA.

Meyer, J. D., & Muntaner, C. (1999). Injuries in home health care workers: An analysis of occupational morbidity from a state compensation database. *American Journal of Industrial Medicine, 35(3)*, 295-301.

Myers, A., Jensen, R.C., Nestor, D., & Rattiner, J. (1993). Low back injuries among home health aides compared with hospital nursing aides. *Home Health Care Services Quarterly, 14*(2/3), 149-55.

Nelson, A., Fragala, G., & Menzel, N. (2003). Myths and facts about back injuries in nursing. *American Journal of Nursing, 103(2)*, 32-40.

Oregon Home Care Commission (2012, February). *Oregon Home Care Commission Overview*. Retrieved from www.oregon.gov/DHS/spd/adv/hcc/index.shtml.

Owen, B., & Garg, A. (1991). Reducing risk for back pain in nursing personnel. *Journal of the American Association of Occupational Health Nurses, 39(1)*, 24-33.

Sorensen, G., Hebert, J. R., & Himmelstein, J. (1998). The effects of a health promotion-health protection intervention on behavior change: The WellWorks study. *American Journal of Public Health, 88*(11), 1685-1690.