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Elevated occupational transportation fatalities among older workers in Oregon: An empirical investigation

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ABSTRACT

Older workers have an elevated risk of being killed on the job, and transportation incidents involving vehicles or mobile machinery are especially deadly for this group. The present study was designed to address the research gap in understanding contributing factors to these incidents and recommend evidence-based guidelines for interventions. We gathered and analyzed data from several sources, including the Oregon Fatality Assessment and Control Evaluation program, the Oregon Workers' Compensation system, the Census of Fatal Occupational Injuries, the Bureau of Labor Statistics, and peer reviewed research literatures. Rates and rate ratios (RR) were used to evaluate excess risk among groups. The results of this study show that older workers in Oregon have an elevated risk of fatality both in all events (RR = 3.0, 95% CI 2.2–4.0) and transportation events (RR = 3.6, 95% CI 2.4–5.4). Additional analyses and extant literature supports our hypotheses that multiple risk factors contribute to the phenomenon, including (a) hazard exposure, (b) organization of work, (c) physical fragility, and (d) normative cognitive, sensory, and psychomotor changes that occur with age. The evidence-based framework proposed may provide valuable guidance for developing safety interventions that protect older workers.

1. Introduction

Older workers are at increased risk of being killed on the job. Although older workers are injured less often than younger workers, the injuries they experience are more severe, and include more fatalities (Kisner and Pratt, 1999; Grandjean et al., 2006). In 2010, workers 65 years and older had a rate of 104.3 work-related illnesses or injuries per 10,000 full-time workers, compared to a rate of 117.9 for all workers (Bureau of Labor Statistics, 2010b). However, when an older worker is injured, severity is greater based on lost workdays. In 2010, workers aged 65 years and older had a median of 16 lost workdays per injury or illness, as opposed to 8 lost workdays for all workers combined (Bureau of Labor Statistics, 2010a). Injuries to older workers are also more likely to be fatal. In 2010 the rate of fatal occupational injuries of workers over age 65 (11.9 per 100,000 FTEs) was over three times as high as the fatality rate for all workers (3.6 per 100,000 FTES) (Bureau of Labor Statistics, 2012b). The elevated risk of severe and fatal injuries to older workers is a socially important public health problem because the number of older Americans is growing rapidly as the baby boomer generation ages (those born in the years between 1946 and 1964). In addition, many Americans are remaining in the workforce beyond the standard retirement age of 65 (Popkin et al., 2008; Silverstein, 2008). Current economic conditions may drive retirement age even later for workers who experienced significant depreciation in retirement funds and/or home values (Association of Occupational and Environmental Clinics (AOEC) and the Society of Occupational and Environmental Health (SOEH), 2009). According to the Bureau of Labor Statistics (BLS), there are currently more than 5.5 million people 65 years and older in the workforce, or around 3.6% of the workforce. By 2016, this percentage is expected to rise to 6.1% of the total labor force, or an increase of over 80% (Bureau of Labor Statistics, 2008b).

Protecting older workers from transportation-related injuries and fatalities is a particular social priority. Roadway crashes are the leading cause of death in the workplace (Pratt, 2003), but they are particularly deadly for older workers. Between 2003 and 2008, workers 65 years and older had an occupational highway transportation fatality rate ratio of 3.77 compared to workers age 16–24 years old (Myers et al., 2011). Tiesman et al. (2011) found that older workers ≥65 years had the highest fatality rate due to occupational traumatic brain injury, and motor vehicle crashes accounted for 26% of all occupational traumatic brain injury fatalities in that age

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group. In addition, male workers had a significantly greater risk of occupational TBI than women. These data are consistent with findings of Janicek, who argued that the greatest need for occupational fatality prevention interventions was among older male workers in transportation and agricultural occupations (Janicak, 2003).

While the literature shows an elevated risk of transportation-related occupational fatalities among older workers, there is a pressing need to identify contributing factors that may be addressed with interventions. For example, one potential contributing factor is normative changes in cognitive, psychomotor, and vision abilities that occur with age. Occupational driving and the operation of mobile machinery require abilities that notably depreciate with aging, such as vision, reaction time, and cognitive executive function (Dawson et al., 2010). Researchers have also investigated other factors that may contribute to increased risk, such as marital status (e.g., never married) or occupational status (e.g., lone worker occupations) (Whitlock et al., 2004; Olson et al., 2009). However, such social factors may not be easily amenable to intervention. In general, there is a lack of systematic research investigating potential causes of this social problem that can be manipulated to reduce risk. This research gap is a barrier to creating effective interventions to reduce transportation-related fatalities among workers 65 years and older.

The current project was designed to address the research gap and provide evidence-based guidance for interventions. Our goals were to (1) to characterize the at-risk population and levels of excess risk through descriptive data analysis, rates, and rate ratios and (2) evaluate the evidence for potential explanations for increased fatality risk among older workers in transportation events. Our hypotheses are that four factors may each partially explain increased risk of transportation-related occupational fatalities among workers 65 years and older are:

1. *Hazard exposure*: Older male workers have higher levels of employment in hazardous transportation occupations.
2. *Organization of work*: Differences between small and large employers in safety management programs and work organization for older employees.
3. *Physical fragility*: Physical vulnerabilities and disease conditions that increase with age.
4. *Cognitive, sensory, and psychomotor changes*: Normative changes in cognition, sensory, and psychomotor abilities with age.

2. Methods

To test our hypotheses we gathered and analyzed data from several sources, including the Oregon Fatality Assessment and Control Evaluation program, the Oregon Workers' Compensation system, the national Census of Fatal Occupational Injuries, the Bureau of Labor Statistics, and peer reviewed research literatures. Due to the exploratory and qualitative nature of most of our questions, we did not conduct meta-analyses or select pre-established empirical criteria for accepting or rejecting hypotheses. Instead, our aim was to consider empirical evidence to test each factor for inclusion in our conceptual model for explaining elevated risk, and then qualitatively evaluate whether the balance of evidence suggested no support, some support, or strong support for the proposed model.

2.1. Data

2.1.1. Oregon occupational fatalities

Deaths from traumatic work-related fatalities that occurred between 2003 and 2009 in Oregon were identified through the Oregon Fatality Assessment and Control Evaluation (OR-FACE) program. FACE is a collaborative program between states and the National Institute for Occupational Safety and Health (NIOSH). The OR-FACE program was established in 2003 and conducts surveillance, investigation, assessment, and outreach related to preventing traumatic occupational fatalities in Oregon. Certain types of fatalities, even if they occur at work, are outside the scope of the OR-FACE program, and are therefore not included in the datasets used for the current study. Such excluded fatalities include deaths of institutionalized persons, fatal heart attacks and strokes (unless causally related to a traumatic injury or exposure), fatal events that occur during a person's recreational activities that are not required by an employer, and fatal events that occur during a person's commute to or from work. OR-FACE receives notifications of traumatic occupational fatalities from a variety of sources, including death certificates, news media, and Oregon Occupational Safety and Health Division (OR-OSHA). Historically the OR-FACE program has operated special emphasis programs of prevention research and outreach for high-risk populations, such as loggers. The topic of the current manuscript is one such special emphasis program.

2.1.2. Denominator data

To calculate fatality rates, the number of workers was estimated from the Bureau of Labor Statistics' Current Population Survey (CPS). The CPS is a monthly survey of about 60,000 occupied households (civilian, non-institutionalized). To be eligible to participate in the CPS, individuals must be 15 years of age or older and not in the Armed Forces. The CPS provides data on labor force status (employment, unemployment, and not-in-labor force) as well as the demographic characteristics of workers and non-workers (U.S. Census Bureau, 2006). Fatality rates calculated for this analysis excluded anyone younger than 15 years, since they are out of the scope of the survey.

2.1.3. Oregon Workers' Compensation

Oregon law requires employers to provide workers' compensation insurance for their employees, with some exceptions (e.g. sole proprietors). Claims that result or will likely result in three or more days of regularly scheduled work, hospitalization, or possibility of permanent disability (e.g., disabling claims) must be reported to the Department of Consumer and Business Services, which administers laws in workers' compensation, occupational safety and health, insurance, and other areas. Data include information needed to administer claims, such as source and nature of injury, injury event, occupation, employer information, employee demographics, hospitalization status, and claim status. In addition, a separate file containing claim costs for resolved accepted, disabling claims was used to assess days of time lost from work. This information excludes current death or permanent total disability benefits.

2.1.4. National fatality data

Data from the Census of Fatal Occupational Injuries (CFOI) were used to estimate national work-related deaths. CFOI tracks all fatal occupational injuries that occur within a state's boundaries. A fatal work-related injury is defined as a fatality to a non-institutionalized person, working at the time of the incident, and on the physical premises of the employer. Inclusion criteria for CFOI and FACE are similar (Hammond et al., 2012).

2.1.5. Peer-reviewed research literatures

Research literatures were systematically reviewed to gather evidence for hypotheses beyond what was available in Oregon FACE and Workers' Compensation databases. Search strategies differed by keyword but limits remained the same throughout each search. Databases searched included PubMed, Psych Info, Science Direct, Academic, Search Premier, Ovid, and Google Scholar. Priority was