Effectiveness of a slip-resistant footwear program for reducing workers’ compensation injury claims in food services

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What I’ll discuss today...

- Injury problem of STFs in the workplace
- Overview of previous NIOSH research on STF prevention
- NIOSH evaluation of a SRF program
Injury Problem of STF in the Workplace
Non-fatal fall same-level
Non-fatal lost workday injuries by type of event

## Non-fatal STF injuries by type of event

<table>
<thead>
<tr>
<th>Injury Event</th>
<th>Number of injuries</th>
<th>Percent of total STFs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls on the same level</td>
<td>142,770</td>
<td>63%</td>
</tr>
<tr>
<td>Slips or trips without a fall</td>
<td>33,720</td>
<td>15%</td>
</tr>
<tr>
<td>Falls to lower level</td>
<td>47,180</td>
<td>21%</td>
</tr>
<tr>
<td>Total STFs</td>
<td>227,760</td>
<td>100%</td>
</tr>
</tbody>
</table>

Same-level STFs can be severe

50% of all same-level STFs resulted in > 10 days of lost work time

Photo by: © 2013 Halfpoint / pojoslaw
## Estimated direct cost by type of STF event

<table>
<thead>
<tr>
<th>Injury Event</th>
<th>Cost (billions)</th>
<th>Total Cost (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls on the same level</td>
<td>$10.38</td>
<td></td>
</tr>
<tr>
<td>Slip or trip without falling</td>
<td>$2.18</td>
<td>$12.6</td>
</tr>
<tr>
<td>Falls to lower level</td>
<td>$4.98</td>
<td></td>
</tr>
<tr>
<td>Overexertion involving outside sources</td>
<td>$13.11</td>
<td></td>
</tr>
<tr>
<td>Other exertions or bodily reactions</td>
<td>$3.69</td>
<td></td>
</tr>
</tbody>
</table>

(Source: 2019 Liberty Mutual Safety Index)
STF injuries caused by slipping

- Foot slides out of place, away from a person’s base of support
- 7 injury surveillance systems from US, UK, and Sweden combined (Courtney et al. 2001)
- Slipping / slipperiness caused 40-50% of injuries
## STF injuries by industry

<table>
<thead>
<tr>
<th>Industry sector</th>
<th>Number of workers</th>
<th>STF lost workday rank</th>
<th>% same level STFs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care industry</td>
<td>16.5 million</td>
<td>Second</td>
<td>93%</td>
</tr>
<tr>
<td>Food services and drinking places</td>
<td>12 million</td>
<td>Second</td>
<td>87%</td>
</tr>
</tbody>
</table>

NIOSH Research on STF Prevention

Non-fatal fall same-level
NIOSH research on STFs in health care

Evaluation of a comprehensive slip, trip and fall prevention programme for hospital employees


*Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Division of Safety Research, 1095 Willowdale Road, Morgantown, WV 26505-2888, USA; †BJC Health Care, Corporate Health Services, St. Louis, MO 63110, USA; ‡Finnish Institute of Occupational Health, 00259 Helsinki, Finland; †Liberty Mutual Research Institute for Safety, 240 Seaport Blvd, Boston, MA 02110, USA; ††Johns Hopkins University School of Public Health, Baltimore, MD 21205, USA; †Johns Hopkins University School of Medicine, St. Louis, MO 63110, USA

In 2007, the Bureau of Labor Statistics reported that the incidence rate of lost workday injuries from slips, trips and falls (STFs) on the same level in hospitals was 35.2 per 10,000 full-time equivalents (FTEs), which was 75% greater than the average rate for all other private industries combined (20.2 per 10,000 FTEs). The objectives of this 10-year (1996–2005) longitudinal study were to: 1) describe occupational STF injury events in hospitals; 2) evaluate the effectiveness of a comprehensive programme for reducing STF incidents among hospital employees. The comprehensive prevention programme included analysis
Liquid contamination leading cause of slipping

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Photo by: © 2006 Danakia / Danakia
Liquid contamination leading cause of slipping

Photo by: © 2011 Diego Cervo / Diego Cervo

Photo by: © 2011 Magaiza / Magaiza
Liquid contamination leading cause of slipping

Photos by: J.Bell / NIOSH
Food service workers and nursing care aides

Photo by: © 2012 Lisa / Lisa F. Young

Photo by: © 2016 jacoblund / Jacob Ammentorp Lund
Evaluation of a comprehensive STF prevention program

- Identification of risk factors
- Designed, implemented, and evaluated a best practices slip, trip, and fall prevention program
- Significant 59% reduction in STF-related workers’ compensation (WC) claims
Comprehensive STF prevention program

- General awareness and training
- Environmental changes – indoor and outdoor
- Ice and snow control
- Object / clutter / cord control
- Keep floors clean and dry
- Slip-resistant footwear (SRF)

Photo by: www.shoesforcrews.com
Evaluation of a comprehensive STF prevention program

- Questions about individual components
- Bundled package of disparate prevention efforts
NIOSH SRF Evaluation Study

Objective | Methods | Results | Conclusions | Dissemination
Objective of NIOSH SRF evaluation study

Isolate and evaluate the injury prevention effectiveness of a SRF program in reducing slipping-related injuries

Photo by: J. Bell / NIOSH
Methods: Company partner

- Large company providing contracted food services
- Contracted food services industry has highest rate of STF injuries

Methods: K-12 Education food service
Methods: Study population

- 226 school districts’ food service operations
- Located in 25 states
- Multiple schools within a district

States with at least one school district in the study population
Methods: Study population

- 4 ½ year duration
- Dynamic cohort
- ~17,000 workers in the intervention and control groups combined
Methods: Pre-existing STF prevention program

- Requirement to wear SRF
- Workers obtain own SRF
- Payroll deduction program available
Methods: Choosing the intervention SRF

1. One brand / sole type to minimize variation
2. Commercially available and acceptable to food services
3. Come in a variety of sizes / styles
4. Have strong unbiased evidence of slip-resistance performance
Methods: Choosing the intervention SRF

- GRIP slip-resistance rating scheme
- Used by the British Health and Safety Executive
- Whole shoe, human subjects testing
- Subjected to a variety of contaminant conditions

www.hsl.gov.uk/publications-and-products/grip/
Intervention: Choosing the intervention SRF

- Highly ranked performance in wet, greasy conditions
- 5-star rating from GRIP testing and rating
- Same brand as payroll deduction

www.hsl.gov.uk/publications-and-products/grip/
Methods: Participation

- Participation was voluntary
- No cost to workers
- 5 styles for frontline food service
- 2 managerial styles
- Slip-on overshoe

Photo by: J.Bell / NIOSH
Methods: Participation

- Participation was voluntary
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- 5 styles for frontline food service
- 2 managerial styles
- **Slip-on overshoe**

Photo by: J.Bell / NIOSH
Methods: Data used in study

- Information on workforce was anonymous
- Unique, anonymous number
- Monthly payroll data
- Basic demographic data (age and gender)
Methods: Injury definition and rate calculation

- Each injury narrative was read manually and coded for whether it was the type of incident that SRF could have prevented
- Slipping on liquid or grease contamination, indoors in temperate conditions (hereafter “slipping injuries”)
- 0/1 or 1/1 by worker by month
- Logistic regression adjusted for repeated measures
Methods: Randomized controlled trial (RCT) design

- School districts were randomized to either the intervention or control group
- Balance known and unknown factors between the treatment groups such that any differences seen between the two could be attributed to the intervention – SRF

RCT study designs are the gold standard in research
Methods: Study timeline (53 months, ~ 4 ½ years)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention (126 school districts)</td>
<td>Baseline pre-intervention (status quo)</td>
<td>Follow-up post-intervention (no cost 5-star rated SRF)</td>
</tr>
<tr>
<td>Control (101 school districts)</td>
<td>Baseline pre-intervention (status quo)</td>
<td>Follow-up post-intervention (status quo)</td>
</tr>
</tbody>
</table>

*Status quo* – company requirement to wear SRF but workers generally pay for their own SRF, any brand they chose
## Results: Risk factors for slipping injuries

<table>
<thead>
<tr>
<th>Gender</th>
<th>Injuries per 10,000 worker months</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3.88</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2.80</td>
<td>0.72</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 55</td>
<td>2.34</td>
<td></td>
</tr>
<tr>
<td>&gt;=55</td>
<td>4.23</td>
<td>1.82*</td>
</tr>
</tbody>
</table>

*Significant difference at p <0.05 using logistic regression analysis
### Results: Randomization

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Proportion of workforce &gt;=55 years</th>
<th>Proportion of workforce female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>29.3%</td>
<td>92.4%</td>
</tr>
<tr>
<td>Intervention</td>
<td>28.8%</td>
<td>91.9%</td>
</tr>
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</table>
## Results: Participation

<table>
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<tr>
<th>Treatment</th>
<th># workers</th>
<th>SRF participation rate</th>
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<td>Control</td>
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<td>Baseline</td>
<td>4,800</td>
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<td>Follow-up</td>
<td>6,647</td>
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<td>Baseline</td>
<td>5,384</td>
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<td>Follow-up</td>
<td>7,490</td>
<td>94%</td>
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## Results: Effectiveness

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*Significant difference at p <0.05 using logistic regression analysis
Conclusions: Participation

- Participation highest (94%) when SRF provided at no cost
- Study of SRF wearing habits of 475 workers from 36 restaurants
- 91% participation (Verma et al, 2012)
Conclusions: Effectiveness

- First RCT documenting the effectiveness of SRF in an actual workforce
- 67% reduction in injuries in intervention group
- 14% increase in control group

Photo by: J.Bell / NIOSH
Conclusions: Strengths

- **Strengths:**
  - RCT
  - 4 ½ years
  - ~17,000 workers
  - 25 states

- Bridge gap between performance of SRF in laboratory settings vs. a functional work environment

- Isolate the effect of a single intervention

Photo by: J.Bell / NIOSH
Conclusions: Older workers

- Prior to intervention, workers 55+ had significantly higher slipping claims rate
- US showing continual increase in active workforce over 55+
- 25% 55+ in 5 years (Toossi and Torpey, 2017)
Conclusions: Areas for future research

- Future research on cost effectiveness is warranted
- Barriers to use of highly rated footwear
- How do workers select footwear
- Possibilities for other brands and rankings
Resources for SRF selection and programs

- **iDAPT** [www.ratemytreads.com](http://www.ratemytreads.com)
Dissemination

- Help workers and employers in decision to invest in SRF
- Convey study findings through via infographic
- Share via NIOSH social media (Facebook, Twitter, Instagram)
- NIOSH Science Blog & Spanish translation

Infographic: [www.cdc.gov/niosh/topics/falls/pdfs/Kitchen-Fnl_508.pdf](http://www.cdc.gov/niosh/topics/falls/pdfs/Kitchen-Fnl_508.pdf)
Original article
Scand J Work Environ Health Online-first -article

doi:10.5271/sjweh.3790

Effectiveness of a no-cost-to-workers, slip-resistant footwear program for reducing slipping-related injuries in food service workers: a cluster randomized trial
by Bell JL, Collins JW, Chiou S

To our knowledge, this is the first randomized controlled study providing evidence for the effectiveness of a no cost to workers slip-resistant footwear (SRF) program in reducing slipping-related workers’ compensation injury claims in food service workers. These findings may be useful to both employers and workers in their decision on whether to invest time and resources in a SRF program.
And…any questions for me?

JBell@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.