

# Immediate Work-Related Inpatient Hospitalizations in the Washington State Trucking Industry: 2003-2016

---

*Technical Report #96-05-2017*

Naomi J. Anderson, MPH

Safety and Health Assessment and Research for Prevention (SHARP) Program  
Washington State Department of Labor & Industries  
PO Box 44330  
Olympia, WA 98504-4330

[www.Lni.wa.gov/SHARP](http://www.Lni.wa.gov/SHARP)



# Introduction

Work-related injuries that result in an immediate inpatient hospitalization are serious, costly, and preventable. Truck drivers are at higher risk for occupational injuries than most other workers in Washington State (WA). The immediate inpatient hospitalization surveillance system in WA links workers' compensation (WC) claims to inpatient hospitalization records to identify these injuries and learn more about these incidents, to strengthen prevention and intervention efforts.

The Trucking Injury Reduction Emphasis (TIRES) defines the Washington State "Trucking Industry" as including employers with Washington State Labor & Industries (L&I) business accounts classified in one of the following North American Industrial Classification System (NAICS) codes:

## *'Trucking Industry' Definition*

- General Freight
  - NAICS 484110 Local
  - NAICS 484122 Long-Distance, Less than Truckload
  - NAICS 484121 Long-Distance, Truckload
- Specialized Freight
  - NAICS 484220 Local
  - NAICS 484230 Long-Distance
  - NAICS 484210 Used Household & Office Goods Moving
- Waste Collection
  - NAICS 562111 Solid Waste Collection
  - NAICS 562112 Hazardous Waste Collection
  - NAICS 562119 Other Waste Collection
- Couriers and Messengers
  - NAICS 492110 Couriers
  - NAICS 492210 Local Messengers and Local Delivery

## Key Findings

- There were 480 immediate work-related hospitalizations in the Trucking industry linked to WC claims over the 14-year period.
- On average, there were 34 immediate hospitalizations per year.
- The rate of immediate hospitalizations for the Trucking Industry was 10.8 per 10,000 FTE, which is more than 2.5 times that of all industries combined.
  - General Freight Trucking (NAICS 4841) had the highest individual rate, 13.6 per 10,000 FTE.
  - Couriers and Express Delivery Services (NAICS 4921) had the lowest individual rate, 2.7 per 10,000 FTE.
- The majority of hospitalized workers were men (94%).
- Hospitalized workers ranged in age from 15 to 81 years old, the average age was 46.5.
- The most common job title/duty description was truck driving (e.g. 'Truck Driver', 'Driver', 'Trucker', 'Log Truck Driver').
- The leading causes of immediate hospitalizations were "Falls from Elevation" (21%) and "Transportation Accidents" (20%) – where the injured worker was involved either as the driver in the vehicle or a pedestrian outside the vehicle.
- The total incurred cost of the 390 state-funded (SF) claims was over \$59 million.
- SF claim cost ranged from \$174 to over \$3.3 million dollars.
  - Average cost: \$151,000.
  - Median cost: \$50,000.

## Methods

The immediate inpatient hospitalization system links accepted WC claims data to hospital discharge data to identify and characterize inpatient hospitalizations within 1 day of work injury (based on day, not 24-hour period). Please see the Technical Notes at the end of this document for further information.

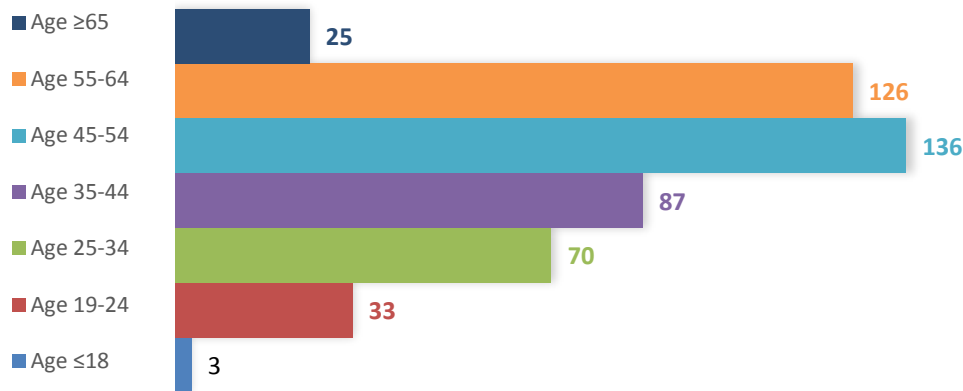
## Results

There were 480 immediate inpatient hospitalizations linked to WC claims for workers employed in the trucking industry in WA, between 2003 and 2016, an average of 34 immediate inpatient work-related hospitalizations each year. Workers covered by the State Fund (SF) made up 81% of the immediate inpatient hospitalizations in the WA trucking industry between 2003 and 2016 (n = 390). Cost data presented in this report are limited to those covered by the SF.

The majority of immediate inpatient work-related hospitalizations in the Washington State Trucking Industry occurred in men (94.4%). Hospitalized workers ranged in age from 15 to 81 years old, the average age of a hospitalized trucking worker was 46.5. Approximately 60% of immediately hospitalized workers in the trucking industry were over 45 years of age (Figure 1). Age distribution was similar by gender.

The most common reported job title/duty description (provided by the worker at claim filing) was 'Truck Driver' (or some variation thereof, e.g. 'Driver,' 'Trucker,' 'City Driver,' 'Truckdriver,' 'Delivery Driver,' 'Log Truck Driver,' 'Contract Driver') for both men (50.6%) and women (37%).

**Figure 1. Age Distribution of immediate work-related hospitalizations in the Trucking Industry, WA 2003-2016.**



## Rates

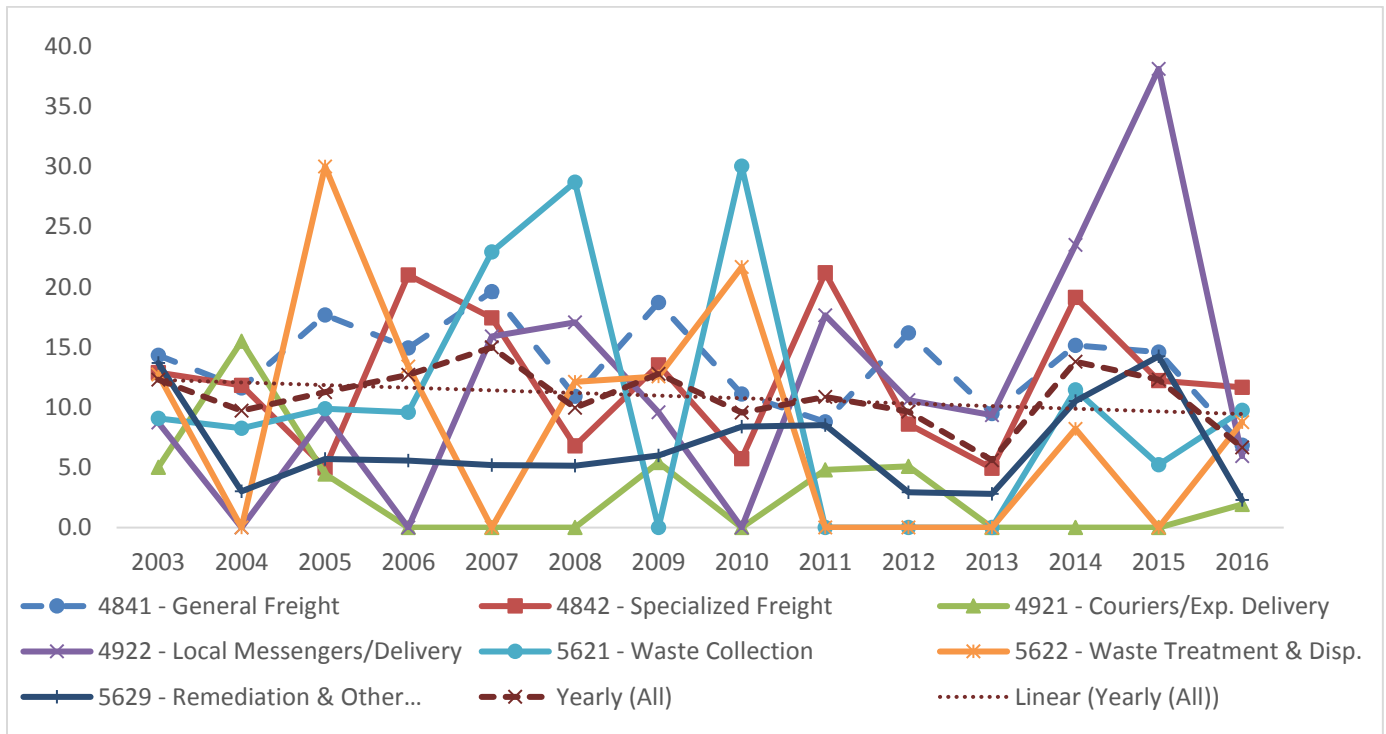
- Workers in the trucking industry had very high hospitalization rates when compared to those of all industries.

**Table 1. Average Rate of Immediate Hospitalizations by North American Industry Classification System Industry Group, Washington State Trucking Industry 2003-2016.**

North American Industry Classification System (NAICS) 4-digit Industry Group Code & Description	Number of SF Hosp.	FTE	SF Rate per 10,000 FTE*
4841 - General Freight Trucking	186	136,630	13.6
4842 - Specialized Freight	103	83,446	12.3
4922 - Local Messengers and Local Delivery	20	16,433	12.2
5621 - Waste Collection	28	25,824	10.8
5622 - Waste Treatment and Disposal	10	12,830	7.8
5629 - Remediation and Other Waste Management Services	34	50,918	6.7
4921 - Couriers and Express Delivery Services	9	33,622	2.7
All Trucking Industries	390	359,703	10.8
<i>ALL WA industries (SF+SI), adjusted immediate work-related hospitalization rate per 10,000 FTE for 2003-2016</i>			3.8

\* Hours for the denominator used in this rate are based on SF only (except for grey shaded total rate in which Self-insured (SI) hours are included) payroll data (reported by employers), where 2,000 hours = 1 FTE.

**Figure 2. Yearly Rate of Immediate Hospitalizations by North American Industry Classification System Industry Group, Washington State Trucking Industry 2003-2016.**



- By quarter of injury, “Transportation Accidents” peaked in the 3<sup>rd</sup> & 4<sup>th</sup> quarters of each year; while the 2<sup>nd</sup> quarter had the most “Falls from Elevation” and the most “Caught In...” injuries.

## Injury Type (Event or Exposure)

Women had a higher proportion of “Fall” injuries (48.1% of all hospitalization, both “Fall from Elevation” and “Fall on Same Level”) leading to immediate hospitalization than men (Table 2, while men had a much higher proportion of injuries from “Transportation Accidents” (21.4% men, vs. 3.7 women, Table 2).

**Table 2. Distribution of Immediate Hospitalizations by Injury Type and Gender, Washington State Trucking Industry 2003-2016.**

Injury Type (Event or Exposure)*	Women (#, col %)		Men (#, col %)		Total (#, row %)	
Fall from Elevation	7	25.9	96	21.2	103	21.5
Transportation Accidents	1	3.7	97	21.41	98	20.4
Struck By/Against	5	18.52	83	18.32	88	18.3
Caught In/Under/Between	0	0.0	48	10.6	48	10.0
Fall on Same Level	6	22.2	40	8.8	46	9.6
Musculoskeletal Disorder	3	11.11	15	3.31	18	3.8
Overexertion	1	3.7	9	2.0	10	2.1
All Other**	4	14.8	65	14.3	69	14.4
<b>Total</b>	<b>27</b>	<b>5.6</b>	<b>453</b>	<b>94.4</b>	<b>480</b>	<b>100.0</b>

\* *Occupational Injury and Illness Classification System, v.1.01.*

\*\* This category includes: Other, Nonclassifiable, Blank, and all categories with <10 total hospitalizations (Abraded, Bodily Reaction, Electrical, Exploded, Noise, Temperature, Toxics, Violence).

**Table 3. Detailed descriptions of the major contributing event/exposures of the Top 3 Injury Types, Washington State Trucking Industry 2003-2016.\***

Fall from Elevation (n=103)	Transportation Accidents (n=98)	Struck By/Against (n=88)
Fall from nonmoving vehicle (54%)	Jack-knifed or overturned, no collision (24%)	Struck by falling object (41%)
Fall to lower level, not elsewhere classified (16%)	Highway Accident, unspecified (11%)	Struck by object, unspecified or not elsewhere classified (26%)
Fall from ladder (13%)	Overtuned (10%)	Contact with objects & equipment, unspecified (7%)
Fall down stairs or steps (5%)	Pedestrian struck by vehicle, mobile equipment, unspecified (8%)	All other (11 categories, <5 ea.) (26%)
All other (10 categories, <5 ea.) (12%)	Pedestrian struck by vehicle, mobile equipment in parking lot or non-roadway area (8%)	
	Moving in opposite directions, oncoming (5%)	
	All other (18 categories, <5 ea.) (34%)	

\* *Occupational Injury and Illness Classification System, v.1.01.*

Event descriptions from the claim filing describe some of the “Struck by falling object” injuries as including: fork-lift drivers dropping loads onto the workers; and pallets, bins, racks, boxes and other items being loaded/unloaded falling on the workers. “Struck by Object... unspecified/not elsewhere classified” injuries included: those hit by parts of the truck/trailer, hit by binders or tools, as well as forklift injuries (forklift hitting the worker).

In no particular order, the 3 leading injury types were “Falls from Elevation,” “Struck By/Against,” and “Transportation Accidents” for most of the 4-digit NAICS Industry Groups (General Freight, Specialized Freight, and Local Messengers & Delivery & Waste Collection). The exceptions were: Couriers & Express Delivery, which had “Fall on Same Level” (instead of “Falls from Elevation”); Waste Treatment & Disposal, where “Caught In/Under/Between” was one of the Top 3 (instead of a “Fall” injury); and in Remediation & Other Waste Management Services, where the leading 3 types were “Falls from Elevation,” “Struck By/Against,” and “Fall on Same Level.”

## Nature of Injury

Injuries that resulted in immediate work-related hospitalizations were acute, traumatic injuries such as “Fractures” (“Fractures,” and “Fractures and other Injuries”), which accounted for 49.4% of hospitalizations during this time period. This distribution of nature of injury is similar to immediate work-related hospitalizations for WA as a whole,<sup>1</sup> and is different from the distribution among cases of work-related injuries or illnesses identified from other data sources. For example, workers’ compensation claims data generally consist of a larger percentage of non-traumatic work-related musculoskeletal disorders.

---

<sup>1</sup> SHARP Technical Report #96-04-2017, Immediate Inpatient Hospitalizations for Work-Related Injury – Washington State, 2014. Available at: [http://www.lni.wa.gov/safety/research/files/immed\\_hospitalizations\\_2014.pdf](http://www.lni.wa.gov/safety/research/files/immed_hospitalizations_2014.pdf).



**Table 4. Distribution of Immediate Hospitalizations by Nature of Injury, Washington State Trucking Industry 2003-2016.**

Nature of Injury*	#	%
Fractures	193	40.2
Fractures and other injuries	44	9.2
Cuts, Lacerations	18	3.8
Other combinations of traumatic injuries and disorders, not elsewhere classified	17	3.5
Soreness, pain, hurt, except the back	15	3.1
Bruises, contusions	12	2.5
Multiple traumatic injuries and disorders, unspecified	12	2.5
Crushing injuries	9	1.9
Sprains, strains, and tears	9	1.9
Concussions	8	1.7
Dislocations	8	1.7
All other categories w/≤7 hospitalizations	80	16.7
Nonclassifiable	41	8.5
Blank	14	2.9

\* *Occupational Injury and Illness Classification System, v.1.01.*

## Part of Body Injured

**Table 5. Distribution of Immediate Hospitalizations by Part of Body Injured, Washington State Trucking Industry 2003-2016.**

Part of Body Injured*	#	%
Multiple Body Parts	118	24.6
Lower Extremities	109	22.7
Upper Extremities	67	14.0
Trunk/Abdomen	47	9.8
Head/Face	45	9.4
Back	25	5.2
Hips/Pelvis/Buttocks	23	4.8
Neck/Shoulders	12	2.5
Body Systems / Internal Organs	12	2.5
Nonclassifiable	7	1.5
Blank	14	2.9

\* *Occupational Injury and Illness Classification System, v.1.01.*

## Source

- Ground surfaces and specific vehicles accounted for the majority of injury sources. Vehicles (of any type) comprised 27% of injury sources.

**Table 6. Distribution of Immediate Hospitalizations by Source of Injury, Washington State Trucking Industry 2003-2016.**

Source of Injury	#	%
Floors, walkways, ground surfaces, unspecified	65	13.5
Ground	45	9.4
Semitrailer, tractor trailer, trailer truck	33	6.9
Highway vehicle, unspecified	30	6.3
Truck, unspecified or not elsewhere classified	26	5.4
Bodily motion or position of injured, ill worker	18	3.8
Forklift, unspecified or not elsewhere classified	14	2.9
Other sources, not elsewhere classified	11	2.3
All other categories w/≤10 ea.	202	42.1
Nonclassifiable	22	4.6
Blank	14	2.9

\* *Occupational Injury and Illness Classification System, v.1.01.*

Less than half of claims had information about a secondary source (n=228, 47.5%) of injury in addition to the primary source. Of the 5 leading secondary sources, 4 were types of vehicles (“Highway vehicles, unspecified;” “Semitrailer, tractor trailer, trailer truck;” “Trailers;” and “Truck, unspecified”), the 5<sup>th</sup> was “ladders, unspecified.”

## Costs

Total incurred costs for Immediate inpatient work-related hospitalizations (SF only, n=390) were approximately \$59,100,000, and ranged from \$174 to just under \$3,400,000 per claim. Immediate hospitalizations from “Transportation Accidents” had the highest median incurred costs and days of

Time Loss (TL) (Table 7). For SF hospitalizations that had TL days (n=311), the number of days ranged from 1-4,983.

**Table 7. Claim Characteristics of State Fund Immediate Hospitalizations by Injury Type, Washington State Trucking Industry 2003-2016.**

Major Injury Types (Event or Exposure)*	#	%	Median Incurred Cost** \$	Median Days of Time Loss†
Falls from Elevation	92	23.6	\$50,000	304
Transportation Accidents	79	20.3	\$108,000	396.5
Struck By/Against	77	19.7	\$36,000	177
Caught In/Under/Between	46	11.8	\$48,000	180.5
Falls on Same Level	33	8.5	\$38,000	137
Work-related Musculoskeletal Disorders (WMSDs)	13	3.3	\$61,000	170
All Other Injury Types w/≤5 ea.	25	6.4	\$20,000	130
Nonclassifiable/Other/Blank	25	6.4	\$28,000	99
<b>Total</b>	<b>390</b>	<b>100.0</b>	<b>\$50,000</b>	<b>212</b>

\* Occupational Injury and Illness Classification System, v.1.01.

\*\* Rounded to the nearest thousand. Claim costs were calculated as incurred by the time of data extraction, older claims will have had more time to develop costs.

† Calculated for those with at least 1 day of paid time loss.

## Event Descriptions – from initial claim filing:

The following event descriptions documented in the incident report provided at the time of claim filing illustrate some of the ways in which workers in the trucking industry suffer injuries that result in immediate hospitalization.

- “I was hooking up a garbage container to the back of the truck when my hand was caught between the dumpster and the truck amputating my little finger.”

- “Jumped out of work truck landed wrong.”
- “Grabbed strap on trailer door to pull it down strap broke and I fell to ground on to gravel approx. 4 ft.”
- “300 LB pallet fall on RT lower leg.”
- Was placing 4X4s on flat bed the forklift driver didn’t wait for him to say clear they put it down on him.”
- “Going S bound in my semi truck another semi pulled out in front of me and I broadsided him.”
- “Fall from truck lift.”
- “Head on collision.”
- “Restrained semi truck driver that over turned on its side catching fire.”

## Limitations

- This report focuses, by definition, on immediate hospitalizations – the claims captured in this report reflect the most acute injuries, which are a subset of the wider pool of trucking industry WC claims. A considerable burden of work-related injuries and illnesses that arise over time from chronic exposures, such as non-traumatic work-related musculoskeletal disorders (e.g. carpal tunnel syndrome),<sup>2</sup> may not be captured.
- The definition of “Trucking Industry” used in this report does not capture all workers involved in “trucking” work activities in Washington State.

---

<sup>2</sup> Work-Related Musculoskeletal Disorders of the Back, Upper Extremity, and Knee in Washington State, 2002-2010. Technical Report #40-12-2015. Available at: [http://www.lni.wa.gov/safety/research/files/wmsd\\_techreport2015.pdf](http://www.lni.wa.gov/safety/research/files/wmsd_techreport2015.pdf).

- This report depends on hospitalized injuries that are linked to workers' compensation (WC) claims, and barriers exist that may reduce the likelihood of the worker filing a WC claim. The extent of underreporting of these injuries is unknown and may vary by industry.<sup>3</sup>

## Conclusions

Workers in the trucking industry face a high risk of immediate hospitalizations for work-related injuries (Table 1) that exceeds the rate for all industries combined. This confirms findings from another assessment relying on all workers' compensation claims data (both hospitalized and non-hospitalized), that identified elevated risk of occupational injuries among similar groups with the Trucking Industry based on number and rate of claims (i.e., the Prevention Index).<sup>4</sup> Resources for injury prevention should be targeted to reducing this burden, and the data presented in this report can help inform these efforts and monitor trends. This report is based on an immediate hospitalization surveillance system which links hospital discharge data to workers' compensation claims, and allows for in-depth characterization of these severe and preventable injuries.

The leading causes of immediate hospitalizations among Trucking Industry workers in Washington State between 2003 and 2016 were "Falls from Elevation" (21%) and "Transportation Accidents" (20%). A "Fall..." injury (from elevation or on the same level) accounted for 31% of immediate inpatient hospitalizations in this population. As expected, Trucking did have 2x the proportion of "Transportation

---

<sup>3</sup> Fan, et al. 2006. Underreporting of Work-Related Injury or Illness to Workers' Compensation: Individual and Industry Factors. *Journal of Occupational and Environmental Medicine*. 48(9):914-922. <http://dx.doi.org/10.1097/01.jom.0000226253.54138.1e>.

<sup>4</sup> SHARP Technical Report #64-1-2013, Prioritizing Industries for Occupational Injury and Illness Prevention and Research, Washington State Workers' Compensation Claims Data, 2002-2010. Available at: [http://www.lni.wa.gov/safety/research/files/bd\\_3f.pdf](http://www.lni.wa.gov/safety/research/files/bd_3f.pdf).

Accidents” (20%) compared to that of all industries in WA in 2014<sup>5</sup> (9%). However, when compared by major injury type (event or exposure), “Fall from Elevation” injuries were the most common type of injury that resulted in an immediate hospitalization in both populations (Trucking, 21.5%, Table 2; All Industries 22.3%<sup>5</sup>).

Nearly 40% of immediate hospitalizations in the Trucking Industry resulted from falls or being struck by something, and 18% of “Transportation Accidents” involved pedestrians, highlighting the need for injury prevention efforts in the Trucking Industry that broaden in scope beyond highway/road incidents.

Prevention activities - policies, training, interventions – should include efforts for safer work from height including around non-moving vehicles and on ladders, and safety for pedestrians in non-roadway areas such as parking lots and loading areas.

For additional information on preventing injuries in the Trucking Industry, please visit us at:

<http://www.keeptruckingsafe.org>.



---

<sup>5</sup> SHARP Technical Report #96-04-2017, Immediate Inpatient Hospitalizations for Work-Related Injury – Washington State, 2014. Available at: [http://www.lni.wa.gov/safety/research/files/immed\\_hospitalizations\\_2014.pdf](http://www.lni.wa.gov/safety/research/files/immed_hospitalizations_2014.pdf).

## Acknowledgements:

This report was supported in part by Grant Number 5U60OH008487 from CDC-NIOSH and by the Washington State Department of Labor and Industries. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH or the Centers for Disease Control and Prevention or the WA Department of Labor and Industries.

The authors would like to thank Darrin Adams for his work in developing the definition used, data management and technical expertise.

## Technical Notes:

For a more detailed description of the immediate inpatient hospitalization surveillance system and its methods, please see SHARP Technical Report #96-04-2017, Immediate Inpatient Hospitalizations for Work-Related Injury – Washington State, 2014.

Available at: [http://www.lni.wa.gov/safety/research/files/immed\\_hospitalizations\\_2014.pdf](http://www.lni.wa.gov/safety/research/files/immed_hospitalizations_2014.pdf)

For complete Occupational Injury and Illness Classification System (OIICS) codes and definitions, please see:

<https://wwwn.cdc.gov/wisards/oiics/Trees/MultiTree.aspx?Year=2007>.

We report the median (for claim cost and days of time loss) in Table 5 because it is a measure of central tendency that is less influenced by outliers.

Several previous SHARP publications describe the injury burden of WA workers, including those in trucking industries, characterize associated costs, rank industries for prevention, and/or identify the main activities that account for the most common injuries.

- Anderson, et al. 2013 - <http://www.occup-med.com/content/9/1/37>,
- Bonauto, et al. 2006 - <http://dx.doi.org/10.1097/01.jom.0000225062.88285.b3>
- Smith and Williams 2014 - <http://www.sciencedirect.com/science/article/pii/S0001457513005095>
- Spielholz, et al. 2008 - <http://dx.doi.org/10.1016/j.jsr.2008.09.005>

WA Trucking Industry Reports:

- 2006-2012: <http://www.lni.wa.gov/safety/research/files/trucking/901482014.pdf>
- 1997-2005: <http://www.lni.wa.gov/safety/research/files/trucking/preventingtruckinginjuries.pdf>