

Understanding Individual, Organizational and Work Environment Factors Associated with Fatigue-Related Road Safety Behaviors

Preliminary Findings

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International Conference on Managing Fatigue, San Diego, CA

March 23, 2017



Why Study Taxi Drivers and Fatigue?

- Drive for a living
- Shift work
- Job demands and stress
 - Long days and nights = long workweeks^{1,2}
 - Workplace violence
- Sedentary work
 - Exercise and healthy eating an effort
 - Poor health status^{3,4}



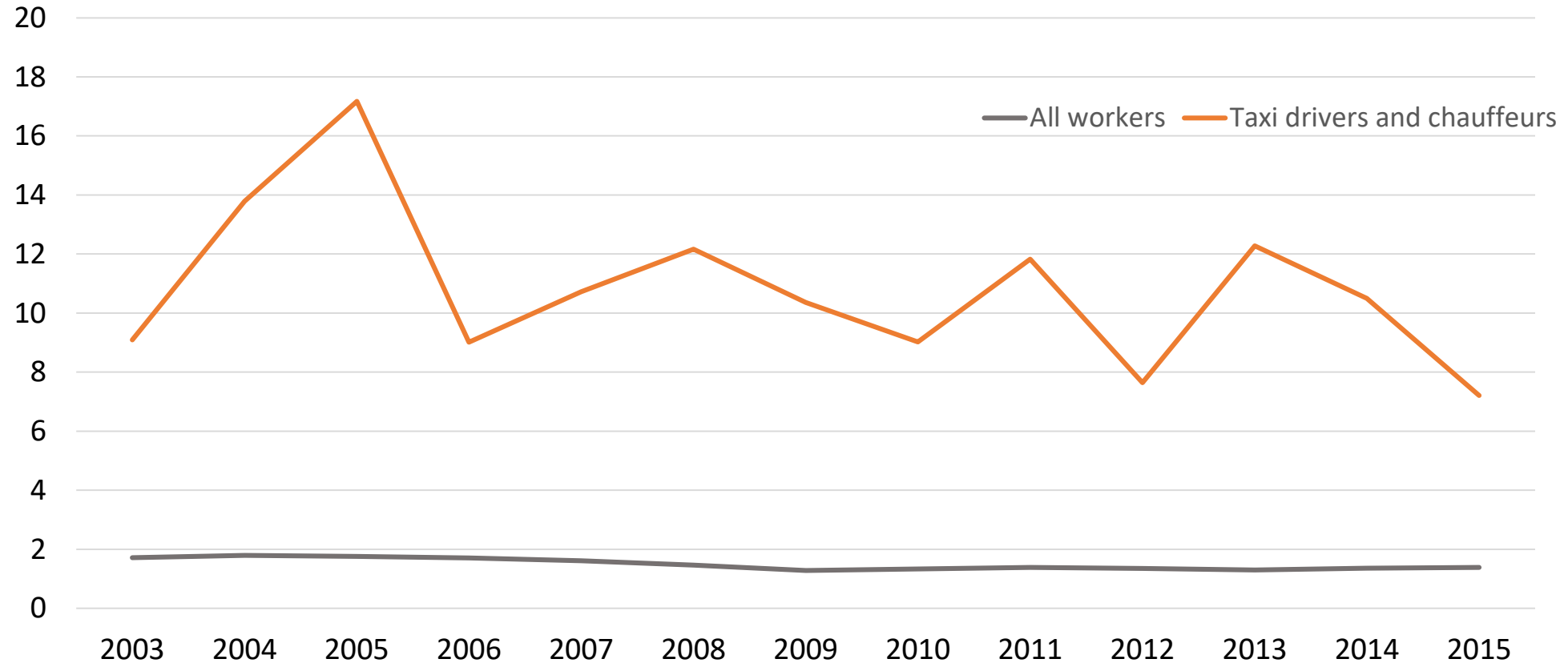
¹McDonough K and Stewart D. 2010. Workplace Violence Against Taxi Drivers. Occupational Health Internship Program Report, New York Taxi Workers Alliance.

²Burgel BJ et al, 2014. Work-related Violence Experienced by Urban Taxi Drivers. AJIM;57:1377-1385.

³Gany F et al, 2015. Step On It! Impact of a Workplace New York City Taxi Driver Health Intervention to Increase Necessary Health Care Access. AJPH;105:786-792.

⁴Gany F et al, 2014. Supporting South Asian Taxi Drivers to Exercise through Pedometers (SSTEP) to decrease cardiovascular disease risk. J Urban Health;91:463-476.

Fatality Rates Over More Than a Decade Reveal Consistently Higher Rates With No Clear Trend



Taxi Driver and Chauffeur Fatality Rates Due to Transportation-related Incidents, U.S. – 2003-2015

Taxi Driver Survey

- Objectives:
 - Describe **road safety** behaviors and **motor vehicle crashes**
 - Evaluate **safety** measures to reduce **violence** and workplace violence events
 - Understand the **socio-demographic characteristics** of the workforce
- Study Populations:
 - Houston
 - Los Angeles



Survey Content

- Business-related characteristics
- Job demands
- Passenger violence
- Crashes
- Safety equipment
- Safety climate¹
- Road safety behaviors²
- Socio-demographics

Taxicab Driver Survey

Survey ID _____ Staff ID _____

Section A – Taxicab driving
First, I'm going to ask you questions about driving a taxicab in this city.

Survey Date: _____
MM/DD/YY

Airport: ___ Bush/Intercontinental
___ Hobby

1a. What month and year did you start working as a taxicab driver?
_____ mm/yy

1b. What month and year did you start working as a driver in this city?
_____ mm/yy

1c. What company do you work for?

1d. What month and year did you start working for this company?
_____ mm/yy

2a. Do you own or lease the taxicab you drive?
Own -----1 ----->
Lease-----2 ----->

2b. Are you authorized to sublease your car to another driver?
Yes -----1 No-----0 N/A-----97

2c. Do you lease your taxicab on a long-term basis or a daily/weekly basis?
Long term -----1
Daily -----2 Weekly-----3
N/A-----97

3a. Do you own or lease the plate/medallion you use?
Own -----1
Lease-----2 ----->

3b. Do you lease your plate/medallion on a long-term basis or a daily/weekly basis?
Long term -----1
Daily -----2 Weekly-----3
N/A-----97

4a. In a typical day, how many hours do you drive your taxicab during the daytime?
_____ hours daytime

4b. And at night? _____ hours nighttime

5. In a typical work week, how many hours do you drive your taxicab?
_____ hours per week

6. In a typical work week, how many miles do you drive your taxi? _____ miles per week

6b. In a typical work week, how much of your taxi driving is on the highway? _____ %

Form Approved
OMB No. 0920-1028
Exp. Date 08/31/2016

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¹Hahn SE, Murphy LR, 2008. A Short Scale for Measuring Safety Climate. Safety Science 46:1047-1066.

²Newnam S, Von Schuckmann C, 2012. Identifying an Appropriate Driving Behavior Scale for the Occupational Driving Context.. Safety Science 50:1268-1274.

Fatigue-related Outcomes

- Objective:
 - Describe the association of individual, business-related and work environment factors with fatigue
- Outcomes
 - Driving while tired
 - Difficulty driving because of tiredness or fatigue
 - Nodding off while driving



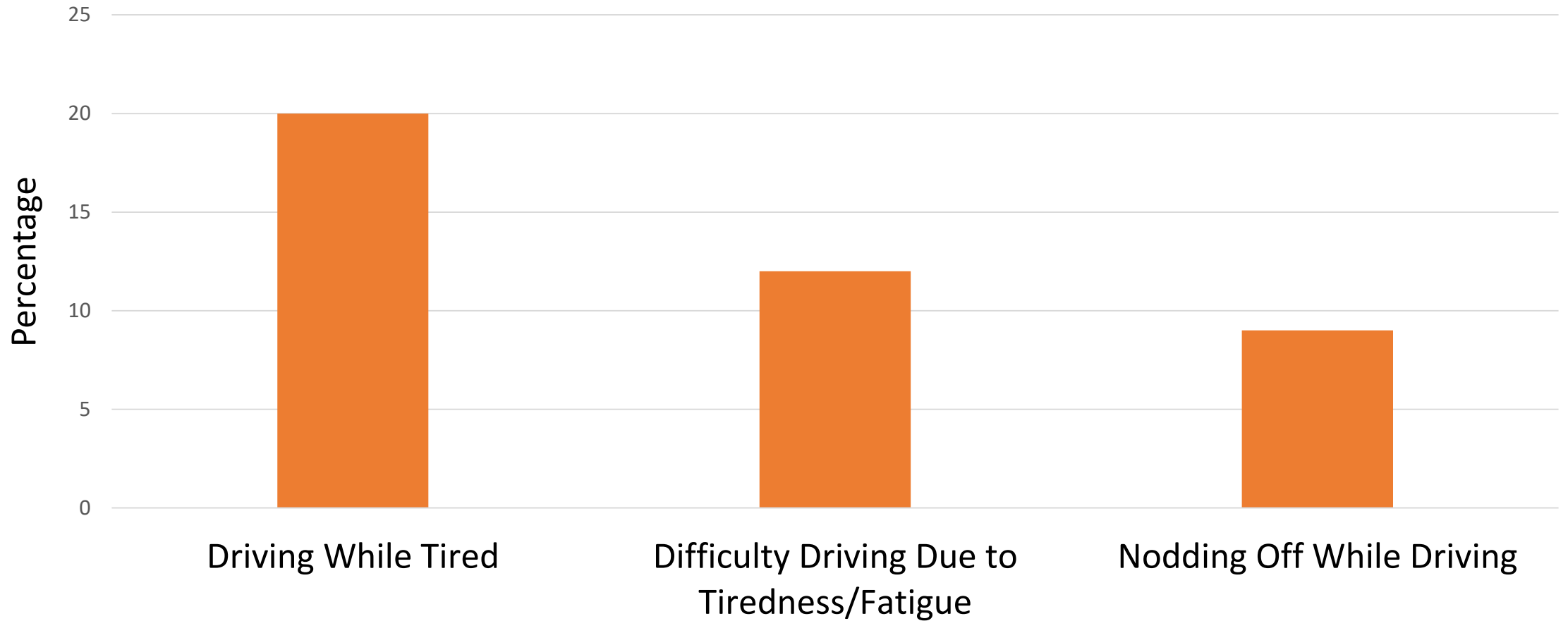
Variables Considered

- Individual factors
 - Sex, Age, Race/ethnicity
 - Nativity, Religion
 - Marital status, Education level
- Business-related
 - Tenure: overall, city and company
 - Lease vs own: plate, taxicab
 - Time of day driving, hrs/workweek
 - Highway driving in % per week
- Work environment
 - Job demands scale
 - Safety climate scale, questions
- Workplace violence
 - Prevalence
- Safety measures
 - Safety training
 - Security camera
- Crash history

Houston Taxi Drivers Surveyed

- 496 licensed drivers completed the survey
- Demographics:
 - 88% men
 - Average age 42
 - Predominantly black (38%) or white (25%)
 - Majority U.S. born (63%)
 - 82% completed high school diploma
 - 58% married or in a relationship
 - 41% owned taxicab
 - 33% owned plate/medallion

Prevalence of Fatigue-Related Outcomes



	Driving While Tired	Difficulty Driving	Nodding Off While Driving
Independent variables	OR _{adj} (95% CI)	OR _{adj} (95% CI)	OR _{adj} (95% CI)
Increasing # of years driving for company	1.1 (1.0–1.1)	1.1 (1.0–1.1)	1.1 (1.1–1.2)
Not feeling free to report safety problems to company management	4.5 (2.0–10.6)	5.1 (2.2–11.8)	3.4 (1.3–9.0)
Identifying as Asian	3.7 (1.9–7.2)	2.9 (1.4–6.1)	4.5 (2.2–9.4)
Increasing education	0.6 (0.4–0.8)	0.6 (0.4–0.8)	0.6 (0.4–0.9)
Involved in crash while driving taxi <12 months	2.1 (1.0–4.5)	2.6 (1.2–5.9)	-
Passenger-related violence <12 months	2.9 (1.7–4.9)	2.6 (1.4–4.9)	-
Leasing versus owning	2.6 (1.4–4.7)	-	-
Increasing # of hours driving in workweek	0.7 (0.5–1.0)	-	-

Opportunities for Intervention

- Organizational improvements in safety climate
 - Number of years driving for the company and a single safety climate item were consistently associated with all three outcomes
- Sub-populations identified as more vulnerable
 - Occupational safety and health resources focused on Asian drivers
 - Educational level should be considered for standardized trainings



Opportunities for Intervention

- Safety management systems
 - Road safety programs, including fatigue management
 - Workplace violence prevention measures



Study Strengths and Limitations

- Strengths
 - Rich data describing drivers and business-related aspects in addition to work environment and other outcomes
 - Large city in Southwest with little regulation represented
- Limitations
 - Cross-sectional study design
 - Findings are preliminary, not final

Furthering Impact

- Findings will be submitted to conference special journal issue
 - Dissemination of abstract, presentation and journal publication
 - Social media
 - Present to study partners and stakeholders
- Analyze data from Los Angeles evaluate replication of findings



Thank you!

Further questions, contact:

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The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

Independent variables	Driving While Tired OR_{adj} (95% CI)	Difficulty Driving OR_{adj} (95% CI)	Nodding Off While Driving OR_{adj} (95% CI)
Increasing # of years driving for company	1.08 (1.03-1.13)	1.08 (1.02-1.13)	1.10 (1.05-1.16)
Not feeling free to report safety problems to company management	4.54 (1.95-10.58)	5.07 (2.18-11.81)	3.37 (1.26-8.98)
Identifying as Asian	3.74 (1.93-7.23)	2.89 (1.38-6.05)	4.50 (2.16-9.38)
Increasing education	0.56 (0.41-0.75)	0.59 (0.42-0.83)	0.59 (0.41-0.86)
Involved in crash while driving taxi <12 months	2.12 (1.00-4.48)	2.64 (1.19-5.86)	-
Passenger-related violence <12 months	2.85 (1.67-4.86)	2.63 (1.41-4.90)	-
Leasing versus owning	2.58 (1.43-4.66)	-	-
Increasing # of hours driving in workweek	0.69 (0.48-0.98)	-	-