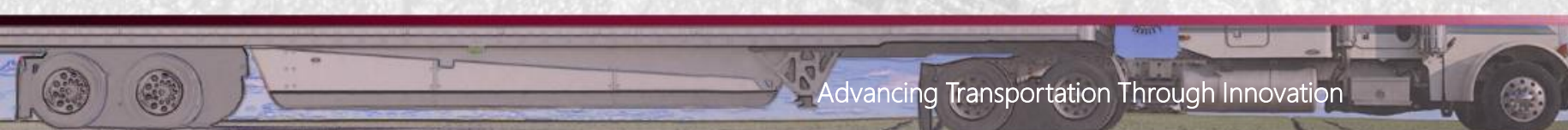


Truck and Bus Operator Health and Wellness



Agenda

- 10:15a-10:25: Introductions
- 10:25a-55a: Dr. Guang Chen: Delivery schedules linked to job satisfaction, opinions on safety regulations/laws, and regulation/laws compliance, NIOSH Survey of U.S. Long-Haul Truck Driver Health and Injury.
- 10:55a-11:10a: Dr. Karl Sieber: New NIOSH Health Research Initiative
- 11:10a-11:40a: Dr. Erin Mabry: Update on Commercial Driver Individual Safety Risk Factors study
- 11:40a-noon: Discussion and comments on National Occupational Research Agenda for Transportation, Warehousing and Utilities



Feasibility of a Longitudinal Study of Commercial Motor Vehicle Driver Health Status

Karl Sieber, Ph.D.
James Yiin, Ph.D.
Kristen Iker, M.P.H.
Lynne Pinkerton, M. D.

National Institute for Occupational Safety and Health (NIOSH)



National Institute for Occupational Safety and Health
Division of Surveillance, Hazard Evaluations, and Field Studies



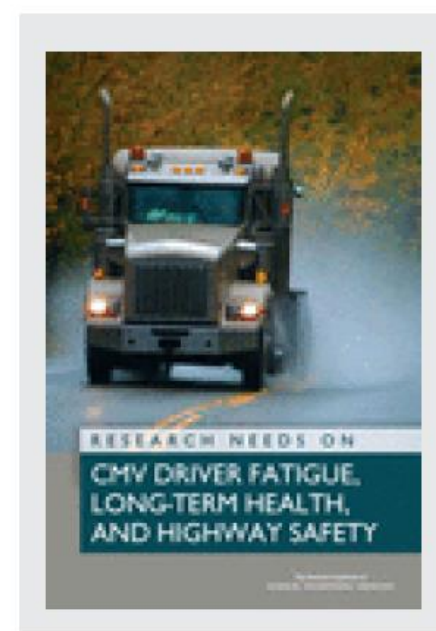
Outline

- I. Background
- II. Previous Findings
- III. Feasibility Questions

Background



Commercial Driver Fatigue, Long-term Health, and Highway Safety: Research Needs



FMCSA's Charge to the Panel:

“to assess the state of knowledge about the relationship of such factors as hours of driving, hours on duty, and periods of rest to the fatigue experienced by truck and bus drivers while driving

... will also assess the relationship of these factors to drivers' health over the longer term. Will identify improvements in data and research methods that can lead to better understanding in both areas.”

The Report contains 18 conclusions and 13 recommendations.

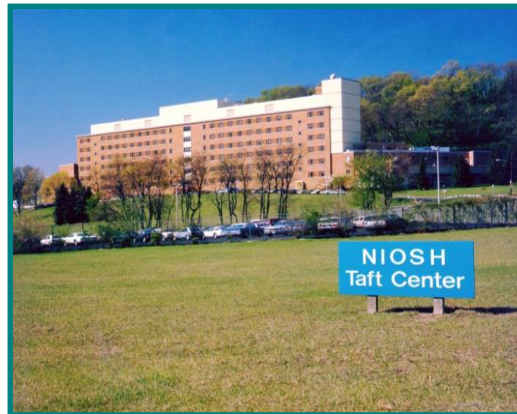
Panel Recommendations

Recommendation 10: The **Dept. of Health and Human Services** and/or U.S. DOT should fund, design, and conduct an ongoing survey permitting longitudinal comparisons of CMV drivers to track changes in their health status, and factors associated with changes, over time.

It would be highly desirable to enable linking of survey data to relevant electronic health records, with a focus on conditions that threaten drivers' health and safety.

National Institute for Occupational Safety and Health (NIOSH)

- ❖ Part of the Centers for Disease Control and Prevention
- ❖ The Federal agency charged with conducting research and making recommendations for the prevention of work-related injury and illness. Not a regulatory agency.
- ❖ Created by the 1970 OSH Act (PL 91-596)



Previous Findings

Long-Haul Truck Driver Survey

Research needs cited by stakeholders:

- ❖ **Prevalence data for selected health conditions and risk factors specific to trucking operations.**
 - Chronic disease
 - Fatigue
 - Sleep debt

- ❖ **Data on working conditions, injury causes and outcomes, and health behaviors.**

Findings of Concern

Compared to the national working population, we found that for long-haul truck drivers:

- Prevalence of obesity is twice as high (69% vs. 31%).
- Prevalence of morbid obesity is twice as high (17% vs. 7%).
- Prevalence of current cigarette smoking is more than double (51% vs. 19%).
- Prevalence of self-reported diabetes is elevated (14% vs. 7%).
- Over twice as many drivers are not covered by health insurance or a health care plan (38% vs. 17%).
- A lower percentage of drivers perceived their health status as excellent, very good, or good (84% vs. 94%).

Feasibility of Conducting A Longitudinal Study of Truck Driver Health Status



Key Domains of Factors Influencing Driver Health

Predictor Domain	Predictors/Variable Set	Database/ Data Source	Private or Public	Outcomes
Driver	<ul style="list-style-type: none"> • Demographics (age, race, gender) • Health conditions (high body mass index [BMI], apnea, hypertension, smoking, excessive use of alcohol) • Medications used • Frequency of acute and/or chronic fatigue (average hours driving per week, average hours on the job per week, average hours of sleep per night) • Medicine and drug use • Medical conditions • Years driving (cumulative exposure to vibration, diesel exhaust, etc.) 			<ul style="list-style-type: none"> • Extent of long-term sleep insufficiency • Frequency of conversion from low to high blood pressure • Frequency of conversion to type II diabetes • Frequency of cardiovascular disease

Key Domains of Factors Influencing Driver Health

Domain	Predictors	Database/Data Source	Private or Public
Carrier	<ul style="list-style-type: none">• Operation type• Fleet size• Scheduling• Logistics• Fatigue management program• Safety culture• Method of compensation		

What Might A Longitudinal Study Look Like?

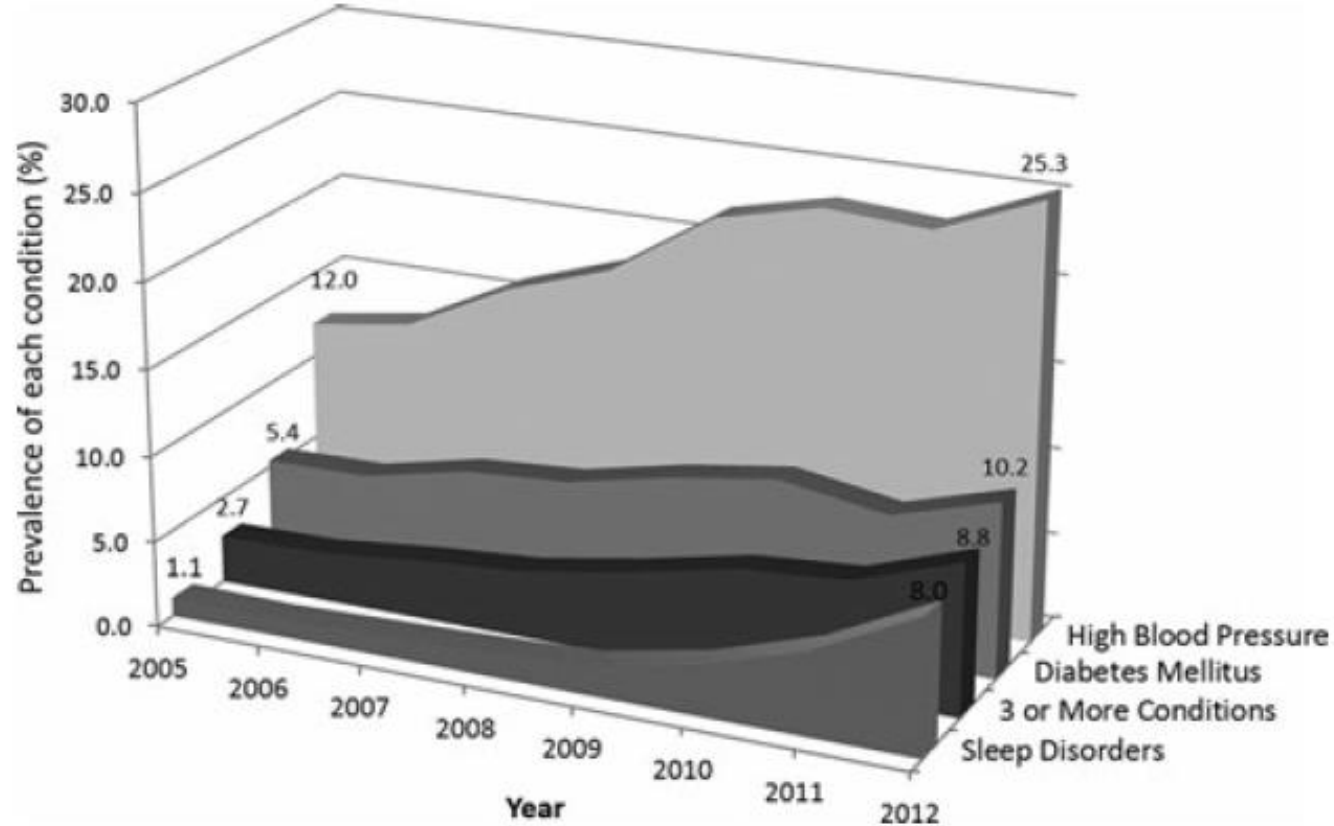


FIGURE 2. Change in prevalence of select conditions among study population from 2005 through 2012.

Thiese MS, Moffitt G, Hanowski RJ, Kales SN, Porter RJ, Hegmann KT. *Commercial Driver Medical Examinations: Prevalence of Obesity, Comorbidities, and Certification Outcomes.* JOEM, 2015

We Would Like Your Input !!!

- **Potential Data Sources/ Data Bases**
- **Health Conditions of Particular Interest**
- **Working Conditions and Lifestyle Factors**
- **How Could This Study Be of Most Use to Your Organization???**

Contact Information



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Disclaimer: The findings and conclusions in this presentation have not been formally disseminated by NIOSH and should not be construed to represent any agency determination or policy.



Delivery schedules linked to job satisfaction, opinions on safety regulations, and behaviors of regulation compliance

NIOSH Survey of U.S. Long-Haul Truck Driver Health and Injury

Guang X. Chen, W. Karl Sieber, Jan Birdsey, James W. Collins,
Edward M. Hitchcock, Jennifer E. Lincoln, Stephanie G. Pratt, Cynthia F. Robinson, Maria Sweeney

2018 TRB Truck and Bus Operator Health and Wellness subcommittee meeting, January 10, 2018, Washington,



Truck driver safety statistics

In 2014



3,500

Fatal crashes involving large trucks



55,710

Occupational nonfatal injuries



761

Heavy Truck driver Occupational fatalities

Selected results from NIOSH long-haul truck driver survey

Unrealistically tight delivery schedules

- **16%** reported often
- **58%** reported sometimes



Opinions

- **22%** think HOS would NOT improve safety AT ALL
- **13%** think increasing of speed limit would improve safety VERY MUCH

Behaviors of noncompliance

- **10%** reported HOS being often violated
- **5%** reported often speeding

- Chen et al., 2015; Speeding is defined as driving => 10 mph over the speed limit

-

Study objective (1)

Unrealistically tight delivery schedules

- **16%** reported often
- **58%** reported sometimes



Opinions

- **22%** think HOS would NOT improve safety AT ALL
- **13%** think increasing of speed limit would improve safety VERY MUCH



Behaviors of noncompliance

- **10%** reported HOS being often violated
- **5%** reported often speeding



Study objective (2)

- Assess drivers' opinions on their safety needs



Survey methods and study population



National Survey of
Long-Haul Truck Driver
Health and Injury

Sieber et al., 2014. AJIM

- A nationally representative sample of 1,265 long-haul truck drivers (LHTDs) at 32 truck stops across U.S.
- LHTDs eligible for the survey
 - Had driven a heavy truck for at least 12 months
 - Spend at least one night away from home during each delivery run

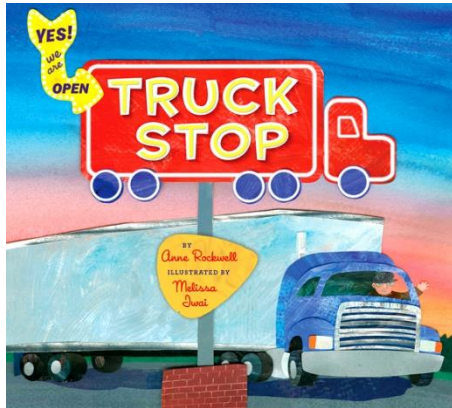
Collecting data on drivers' opinions on safety

1. Build more truck stops/parking area
 2. Strictly enforce traffic laws on car and truck drivers equally
 3. Pay drivers by the hour for loading and unloading time
 4. Equalize the car and truck maximum speed limit on interstate highways
 5. Designate truck only lanes on interstate highways
 6. Strictly enforce the hours-of-service (HOS) regulations
 7. Pay drivers by the hour for driving time
 8. Require a short rest break after 4 hours continuous driving
 9. Increase the current maximum speed limit on interstate highways by 10 miles per hour
 10. Require speed governors for all large trucks
 11. Decrease the current maximum speed limit on interstate highways by 10 miles per hour
- Eleven safety related activities were selected
 - Drivers were asked whether they agree that each activity would improve safety
-

Statistical methods

- Description method was used to provide estimates for drivers' opinion on they safety needs.
- Logistical regression was used to assess the association among unrealistically tight delivery schedule, job satisfaction, opinion on and compliance with hours-of-service rules and maximum speed limits.

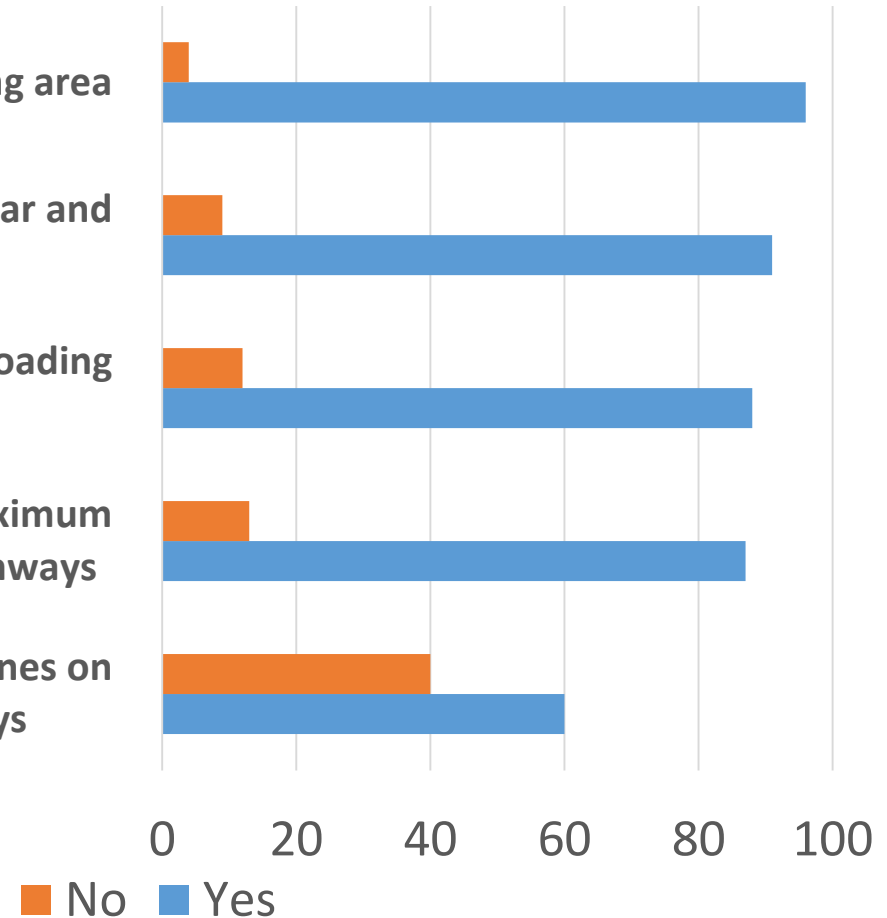
Top 5 safety needs identified by the most LHTDs



Build more truck stops/parking area is the top safety need

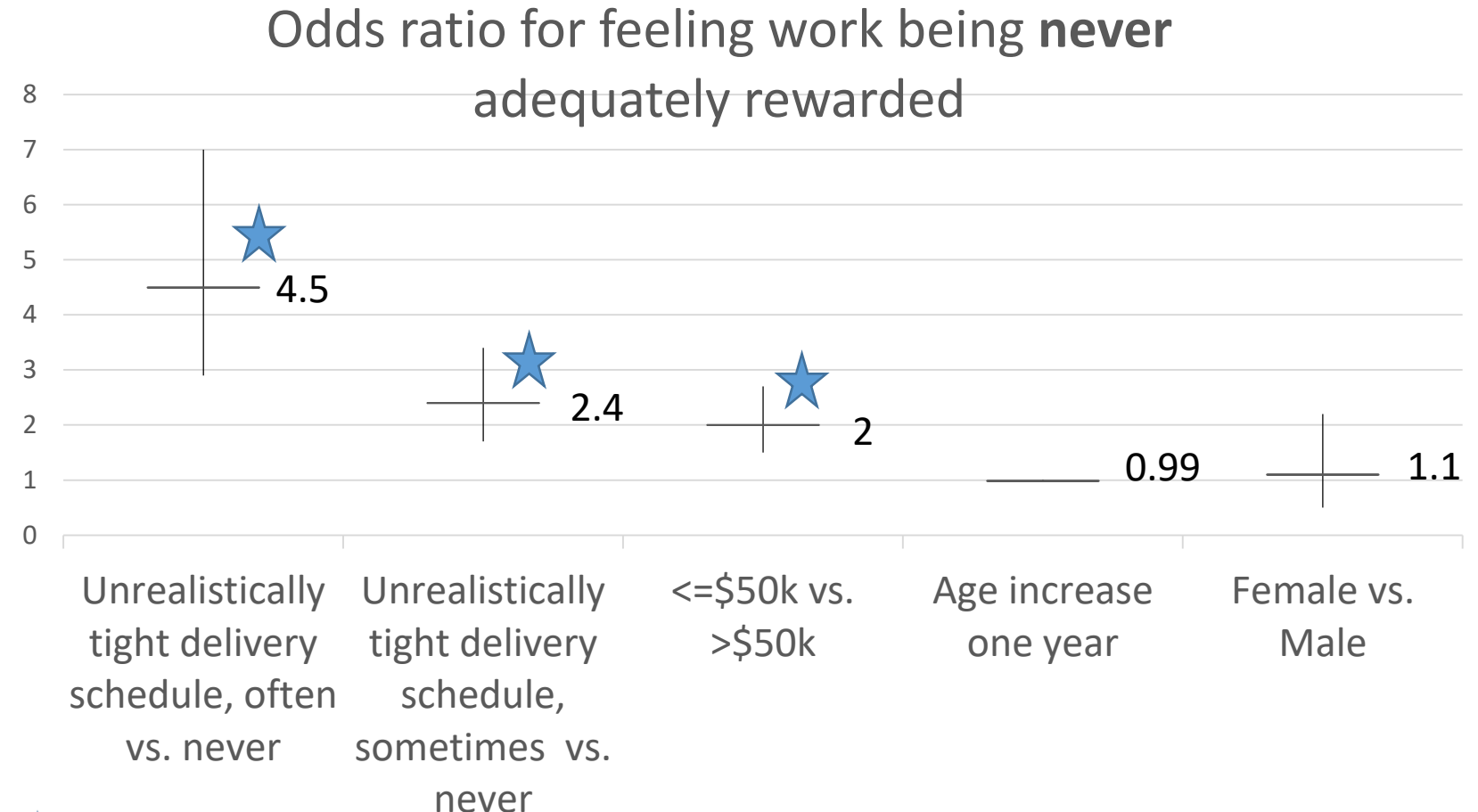
identified by the most LHTDs among 11 safety related activities

- Build more truck stops/parking area
- Strictly enforce traffic laws on car and truck drivers equally
- Pay drivers by the hour for loading and unloading time
- Equalize the car and truck maximum speed limit on interstate highways
- Designate truck only lanes on interstate highways



Factors associated with job satisfaction

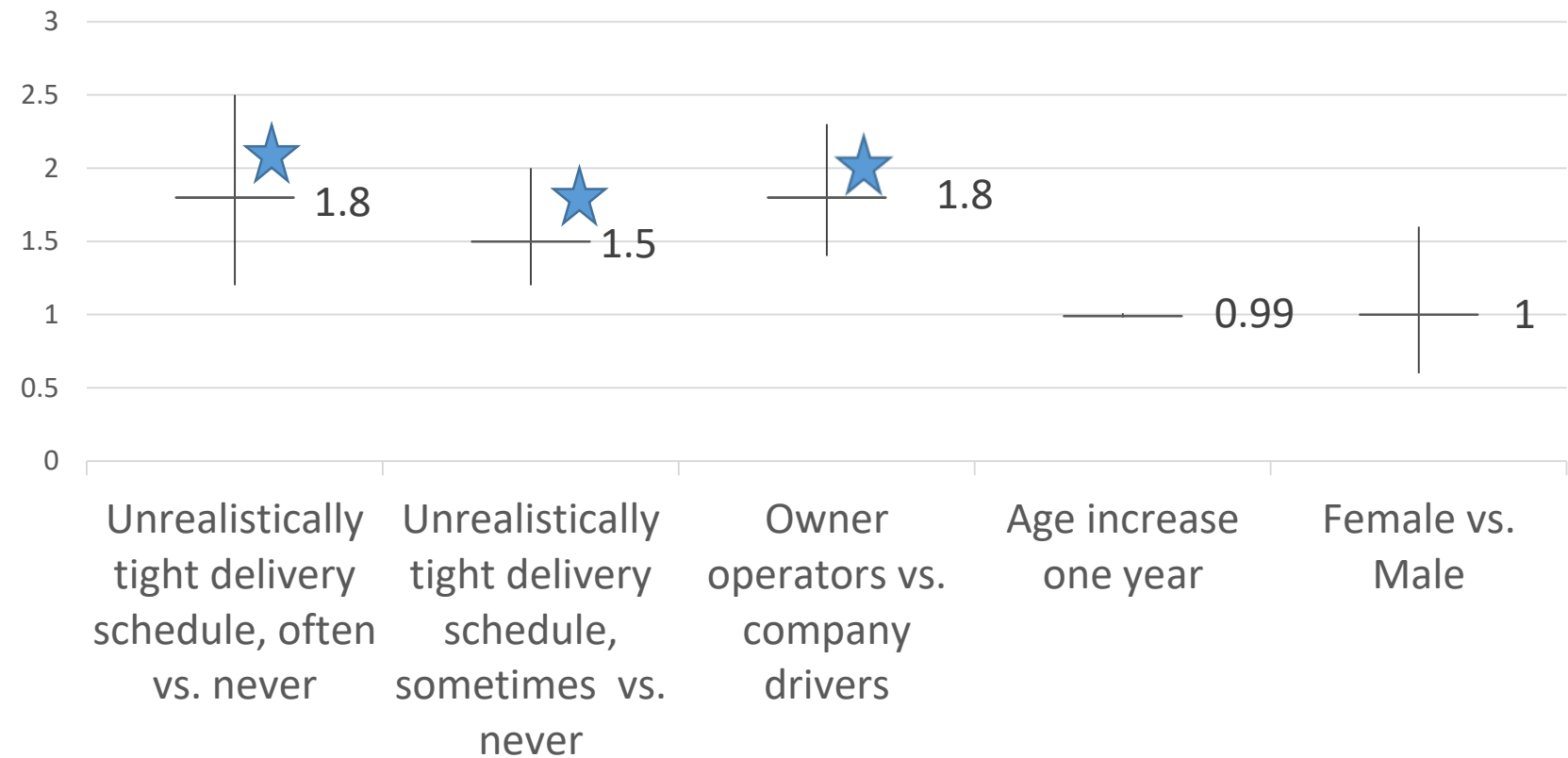
I ♥
MY
JOB



★: Significant at the 0.05 level

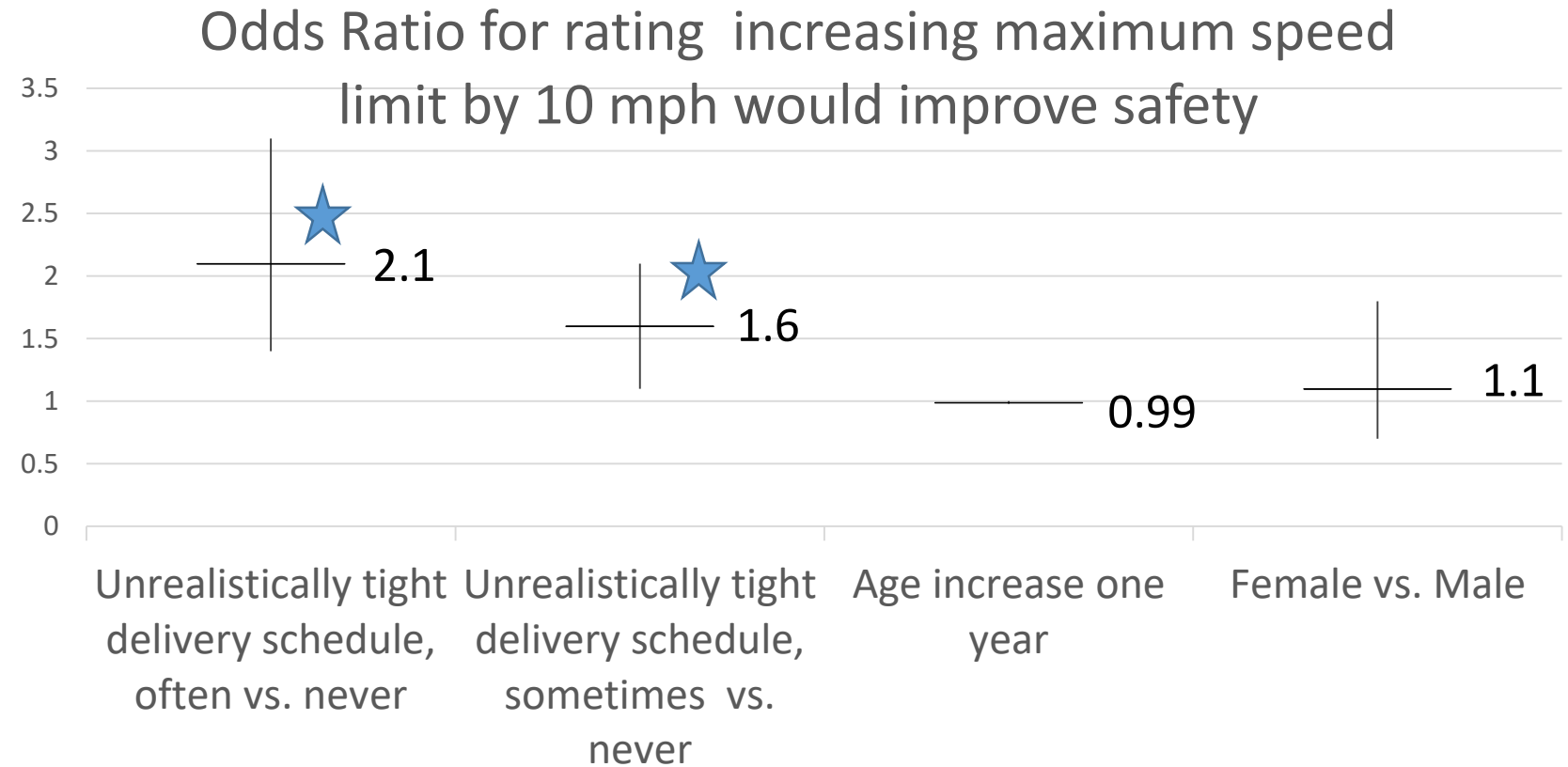
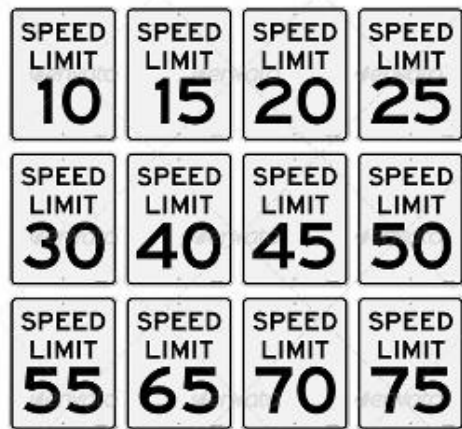
Factors associated with driver opinion on HOS regulations

Odds ratio for voting HOS would NOT improve safety



★: Significant at the 0.05 level

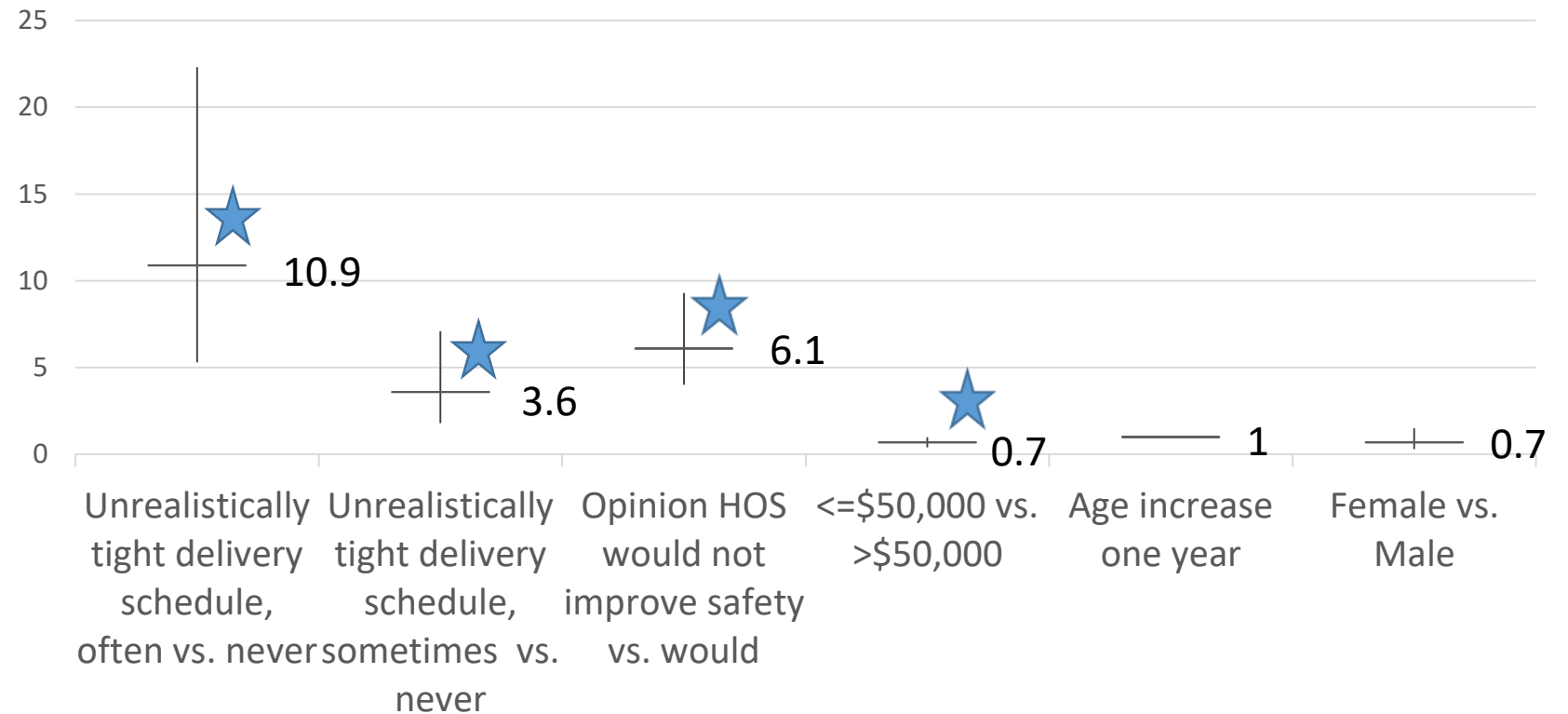
Factors associated with driver opinion on speed limit



★: Significant at the 0.05 level

Factors associated with behavior of HOS noncompliance

Odds ratio for reporting HOS rules being often violated



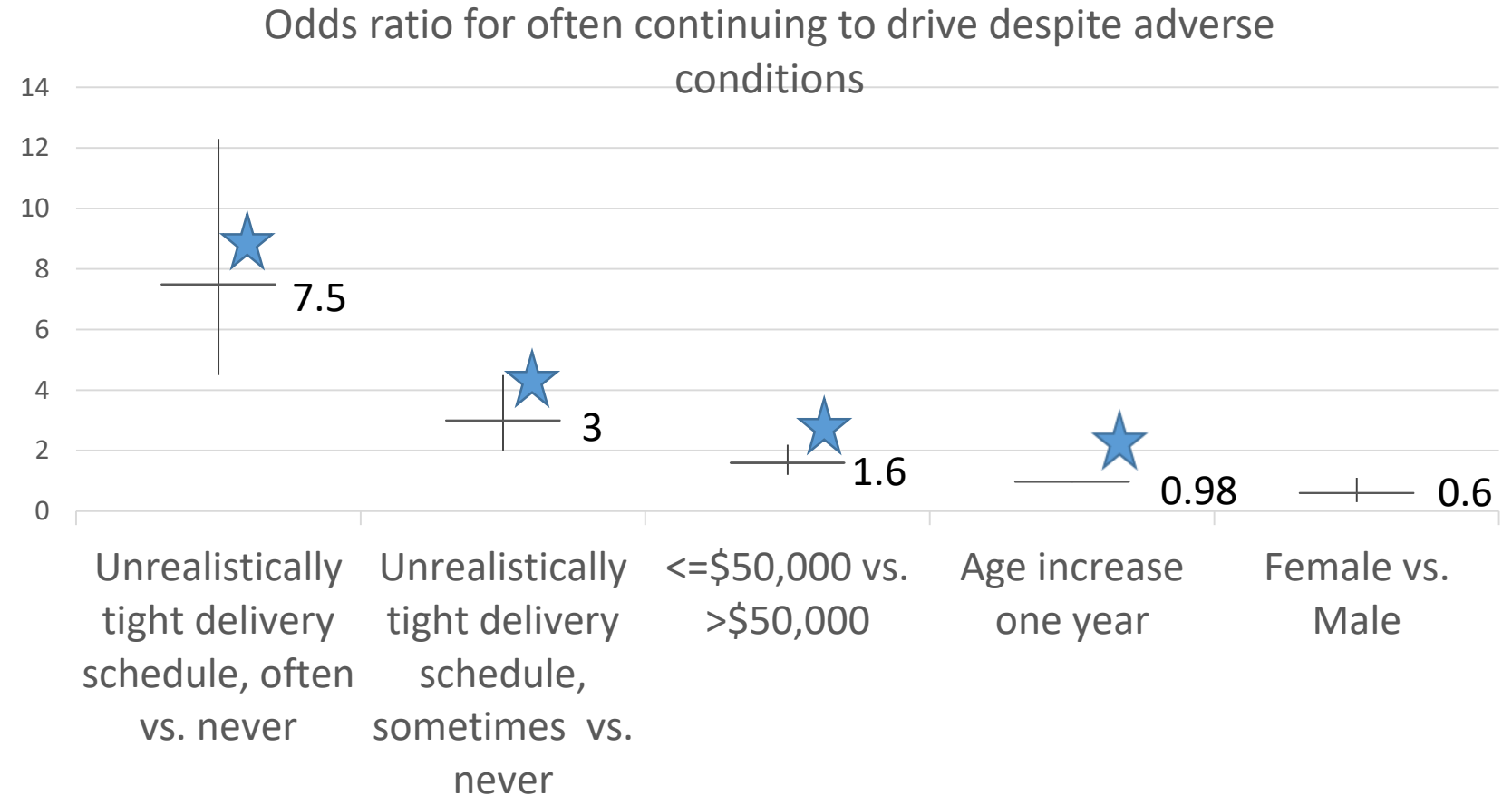
★: Significant at the 0.05 level



Factors associated with driver continuing to drive despite adverse conditions



Adverse conditions include fatigue, bad weather, or heavy traffic



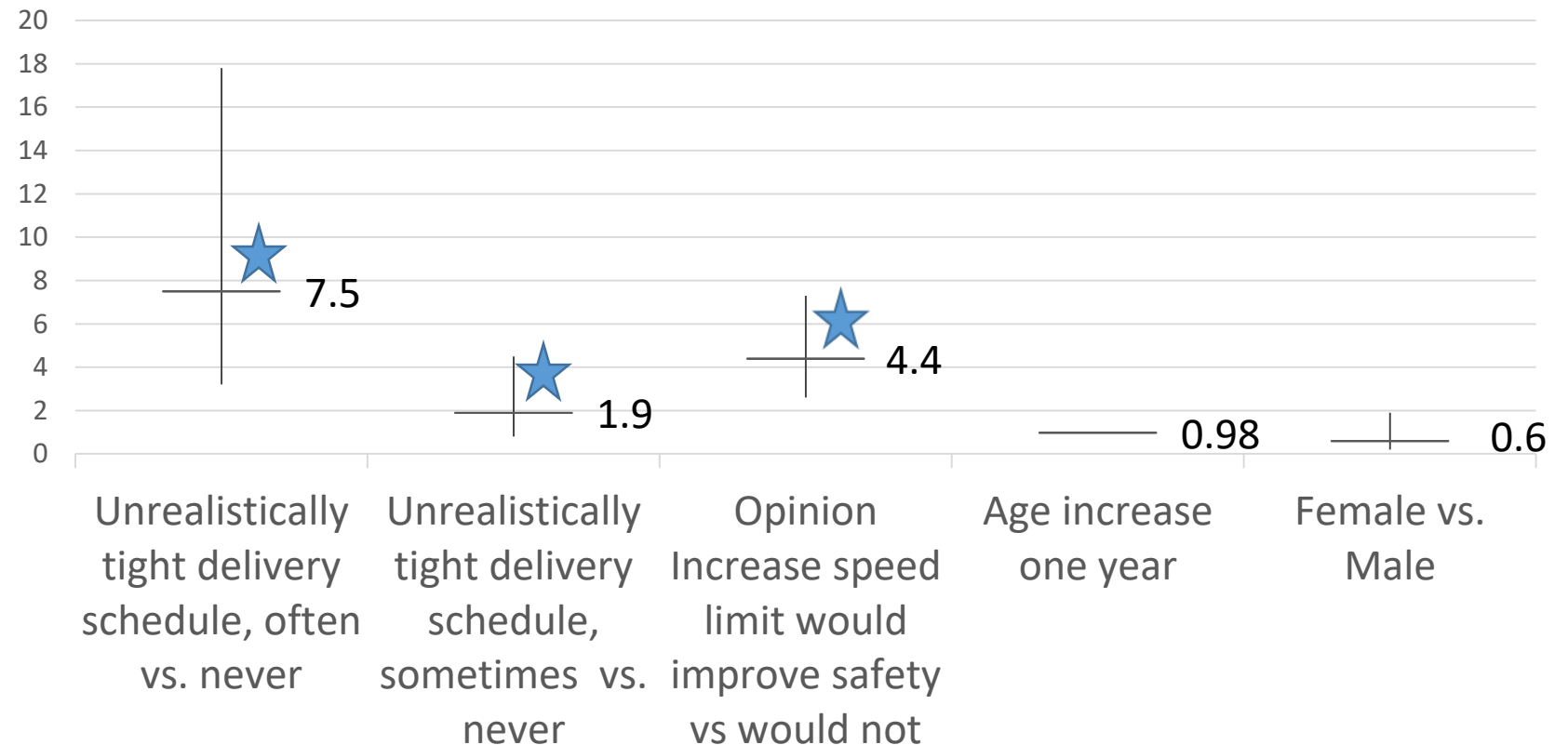
★: Significant at the 0.05 level

Factors associated with driver speeding behavior



Speeding is defined as driving =>10 mph than speed limit

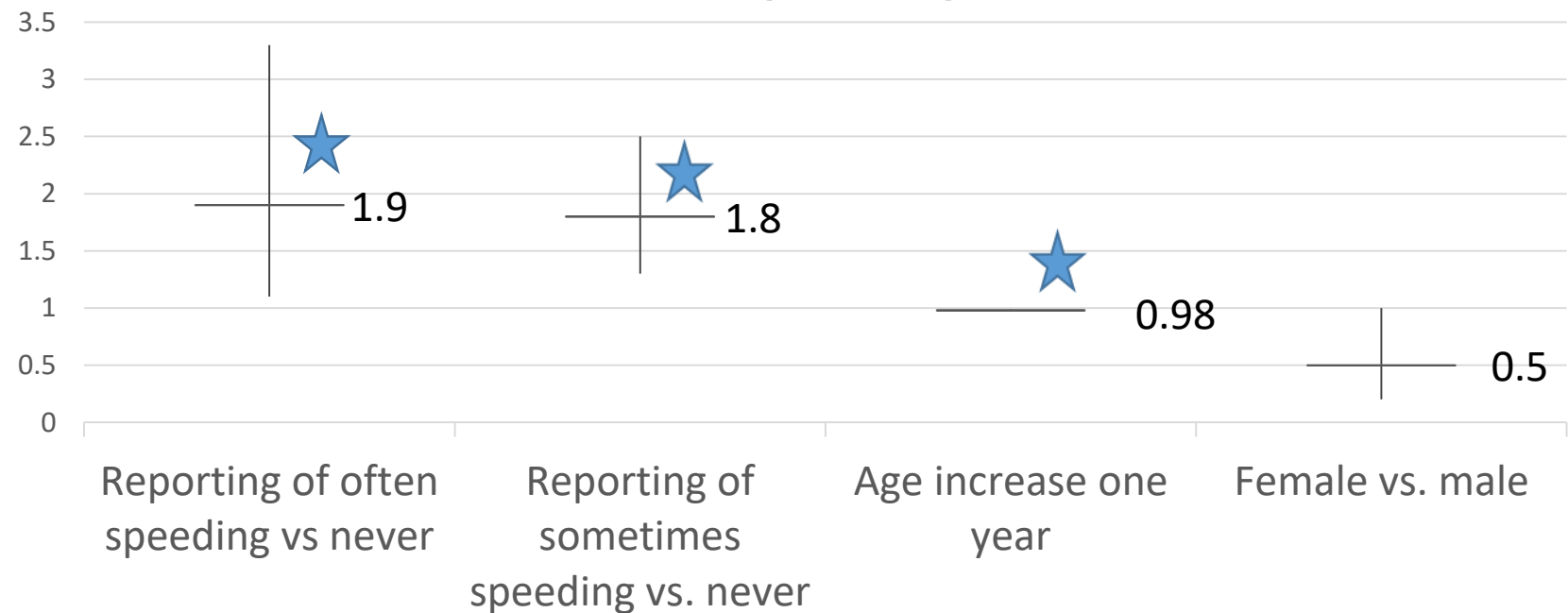
Odds ratio for reporting often speeding



★: Significant at the 0.05 level.

Factors associated with receiving moving violation ticket in the previous 12 months

Odds ratio for receiving moving violation ticket



★: Significant at the 0.05 level.

Quantified the interactions among



- **16%** reported often
- **58%** reported sometimes

Unrealistically tight delivery schedules

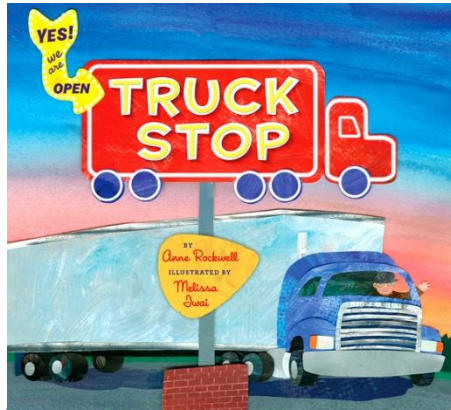
Opinions

- Job dissatisfaction
- **22%** think HOS would NOT improve safety AT ALL
- **13%** think increasing of speed limit would improve safety VERY MUCH

- HOS, **10%** reported HOS being often violated
- **5%** reported often speeding

noncompliance

Ranked safety needs from drivers' perspective



Build more truck
stops/parking
area is the top
safety need

identified by the most LHTDs
among 11 safety related activities

- Ranked the 11 safety needs by the number of LHTDs who voted it would improve truck safety

Earnings, job satisfaction, and safety



- High annual income linked to high level of job satisfaction
- Results of the association between Income and safety related behaviors were mixed
 - $\leq \$50,000$ were less likely to report HOS being often violated
 - $\leq \$50,000$ were more likely to report continuing to drive despite fatigue, bad weather or heavy traffic because they must deliver or pick up a load at a given time

Age impact



Younger drivers were more likely to report:

- continuing driving despite adverse conditions (such as fatigue, bad weather, or heavy traffic)
- receiving moving violation tickets in the previous 12 months than older drivers

Implication for prevention

Carriers can

Schedule reasonable delivery time

Promote safety culture in which drivers can say no

Provide training on safety benefits of HOS, and speed limit

Additional training & supervision for young drivers

Drivers can

Understand the safety benefits of sleep hygiene, HOS, and speed limit

State & private
partners can

Build more truck stops/parking area

Provide education on safety benefits of HOS and maximum speed limit



Limitations

LIMITATION



- Sampling bias
- Interview bias: recall, social desirability, and human error
- Causality could not be determined

Strengths

The survey was conducted through partnership

- Public and private organizations
- The survey design and instrument were products of input from a stakeholder meeting and focus group discussions with LHTDs
- Data collected are relevant to U.S. LHTD safety





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Disclaimer: 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.

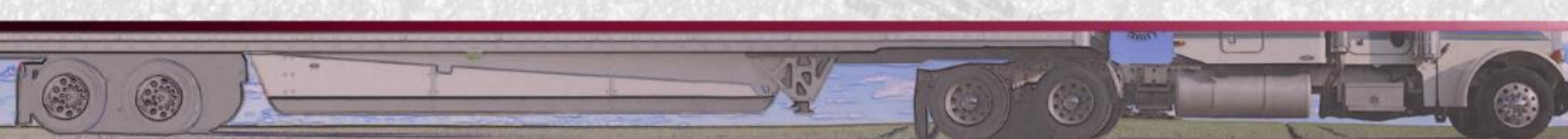
Commercial Driver Individual Differences Study (CDIDS) Update

Erin Mabry, Jeff Hickman, Laurel Marburg, Feng Guo,
Huiying Mao, Rich Hanowski, and Joel Whiteman



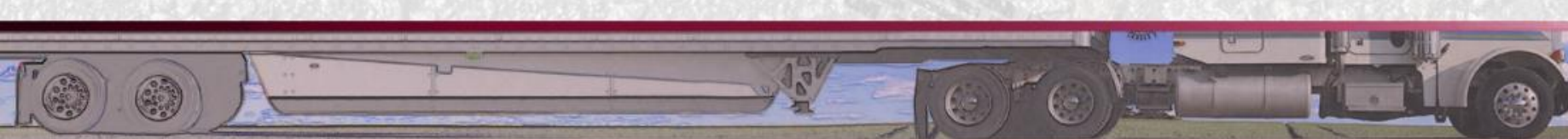
CDIDS Overview

- ❑ Identify and prioritize CMV driver individual differences with respect to risk from 21,000 drivers
- ❑ Risk factors include:
 - Medical factors
 - Personal factors
 - Situational factors
- ❑ Extreme groups based on risk outputs will be assessed



CDIDS Primary Objectives

- ❑ OBJECTIVE 1: prevalence of demographic characteristics, work experience, lifestyle and behavioral habits, medical conditions, etc.
- ❑ OBJECTIVE 2: personal, medical, and situational factors increase crash or violation risk
- ❑ OBJECTIVE 3: factors associated with presence of OSA
- ❑ OBJECTIVE 4: follow CMV drivers for up to three years



Measures



Questionnaires

Approved by OMB

649-F

Initial Driver Survey

- Demographic
- Prior crash/violation history
- Training
- Sleep behaviors
- Lifestyle behaviors
- Life experiences
- Risky driving index

Follow-up Questionnaire

- Life experiences
- Job satisfaction
- Sleep behaviors
- Compensation



649-F Medical Certification

General Information

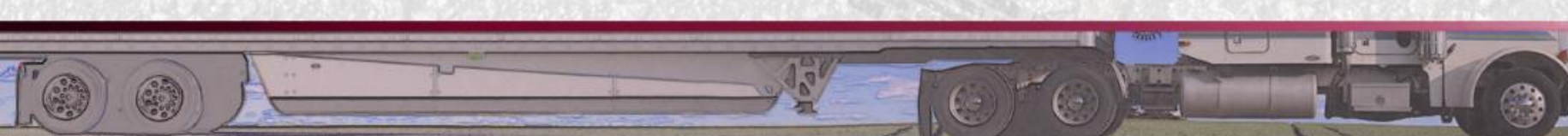
- Driver Information
- Health History
- Medications
- Physician comments

Testing

- Height
- Weight
- Vision
- Hearing
- Blood Pressure/Pulse Rate
- Laboratory and Other Test Findings

Physical Examination

- General Appearance
- Eyes
- Ears
- Mouth and Throat
- Heart
- Lungs and Chest (not including breast examination)
- Abdomen and Viscera
- Vascular System
- Genitor-urinary System
- Extremities
- Spine and Other Musculoskeletal
- Neurological



Brief Medical Exam

- January 2015
- Heart rate
- Blood pressure



Initial Driver Survey

- Demographic information
- Epworth Sleepiness Scale (ESS)
- Berlin Questionnaire (BQ)
- Survey of Recent Life Experiences (SRLE)
- Dula Dangerous Driving Index (DDDI)
- Social Desirability Scale (SDS)



Follow-up Survey

- SRLE
- Job in General (JIG) Scale
- ESS
- BQ
- Compensation
- OSA and sleep disorder-related questions



Safety Data

- Participating carrier
- Motor Carrier Management Information System (MCMIS)
- Commercial Driver License Information System (CDLIS)



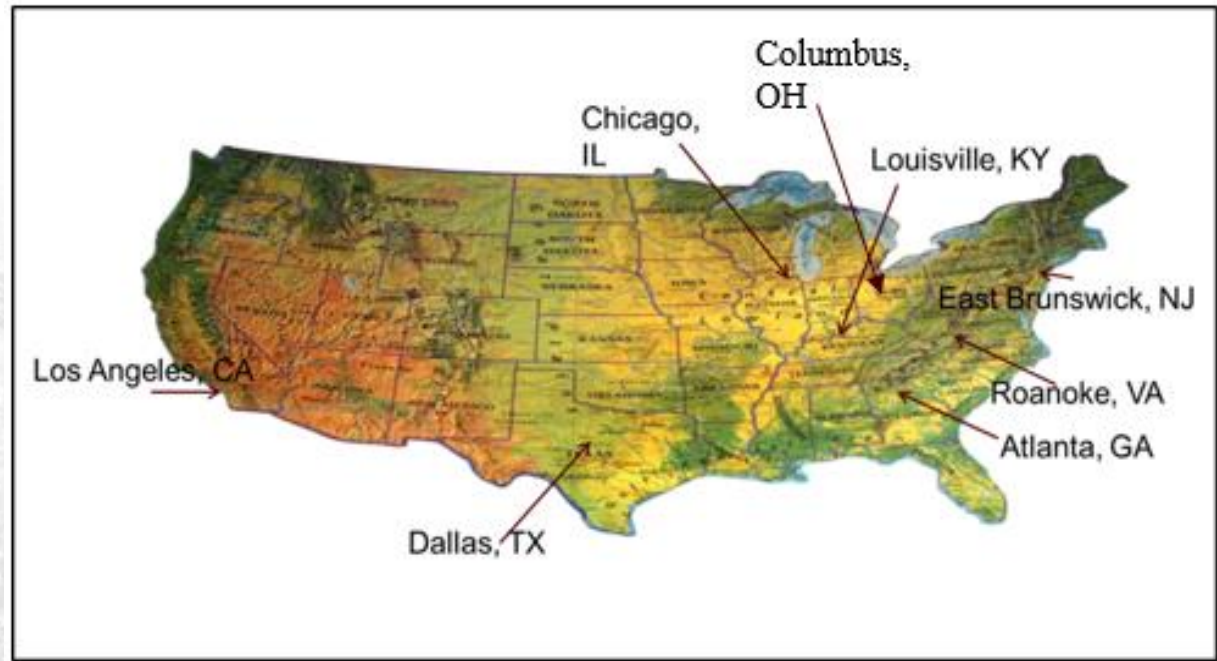
Driver Exposure

- ❑ Driver tenure at participating carrier
- ❑ Unknown outside of participating carrier
- ❑ June 2013 to May 30, 2016



Participant Recruitment

- Point of initial contact at driver orientation
 - New to carrier, but not entry-level drivers
- Medical site in Roanoke, VA



Methods

- ❑ Fleet personnel introduce study
- ❑ Potential participants watch video
- ❑ Turn in to fleet personnel
 - DL code
 - Name code
- ❑ Immediate cash payment or mail to VTTI (\$20)
- ❑ ~62% response rate
- ❑ VTTI received Initial Driver Survey and ICF



Study Driver

- In study if (one or more):
 - Completed Initial Driver Survey (consented driver)
 - 649-F
 - Brief Medical Screen



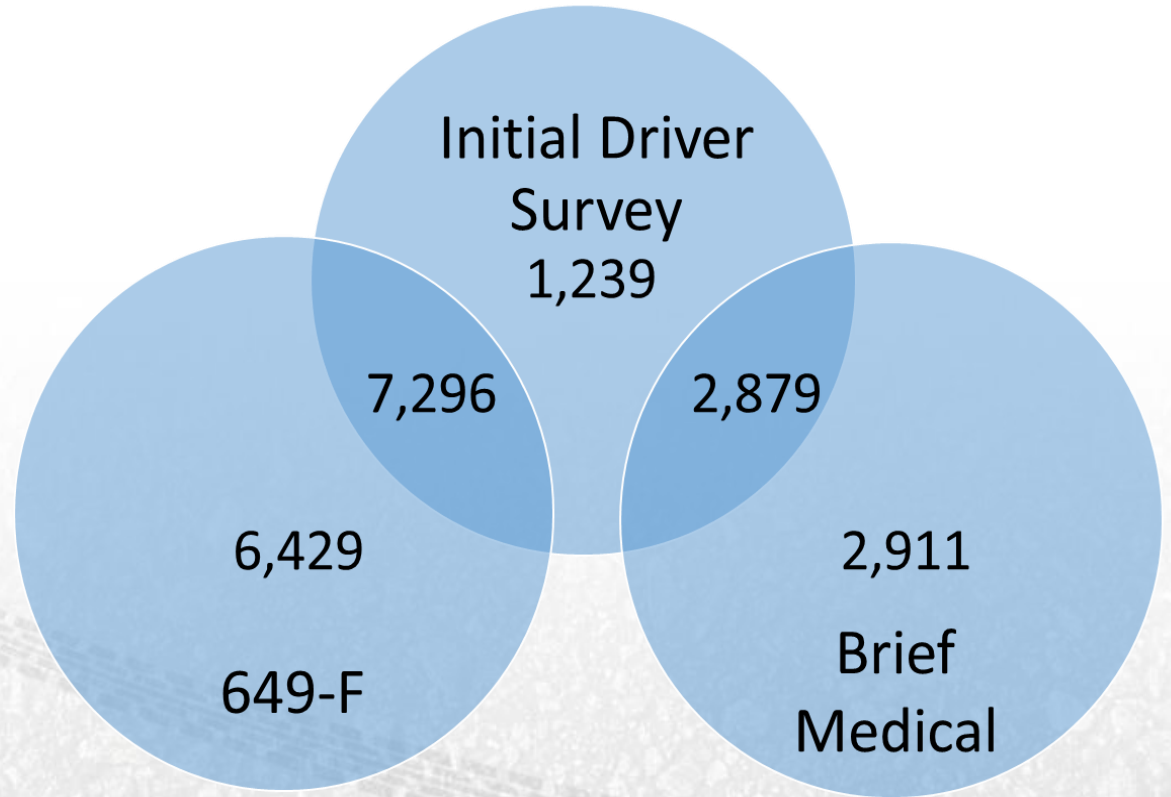
Follow-up Methods

- High-risk event
 - Preventable on-road crash or DOT recordable crash
 - Driver was consented driver
- 5 controls
- Telephone and US mail
- Paid \$10
- ~25% response rate



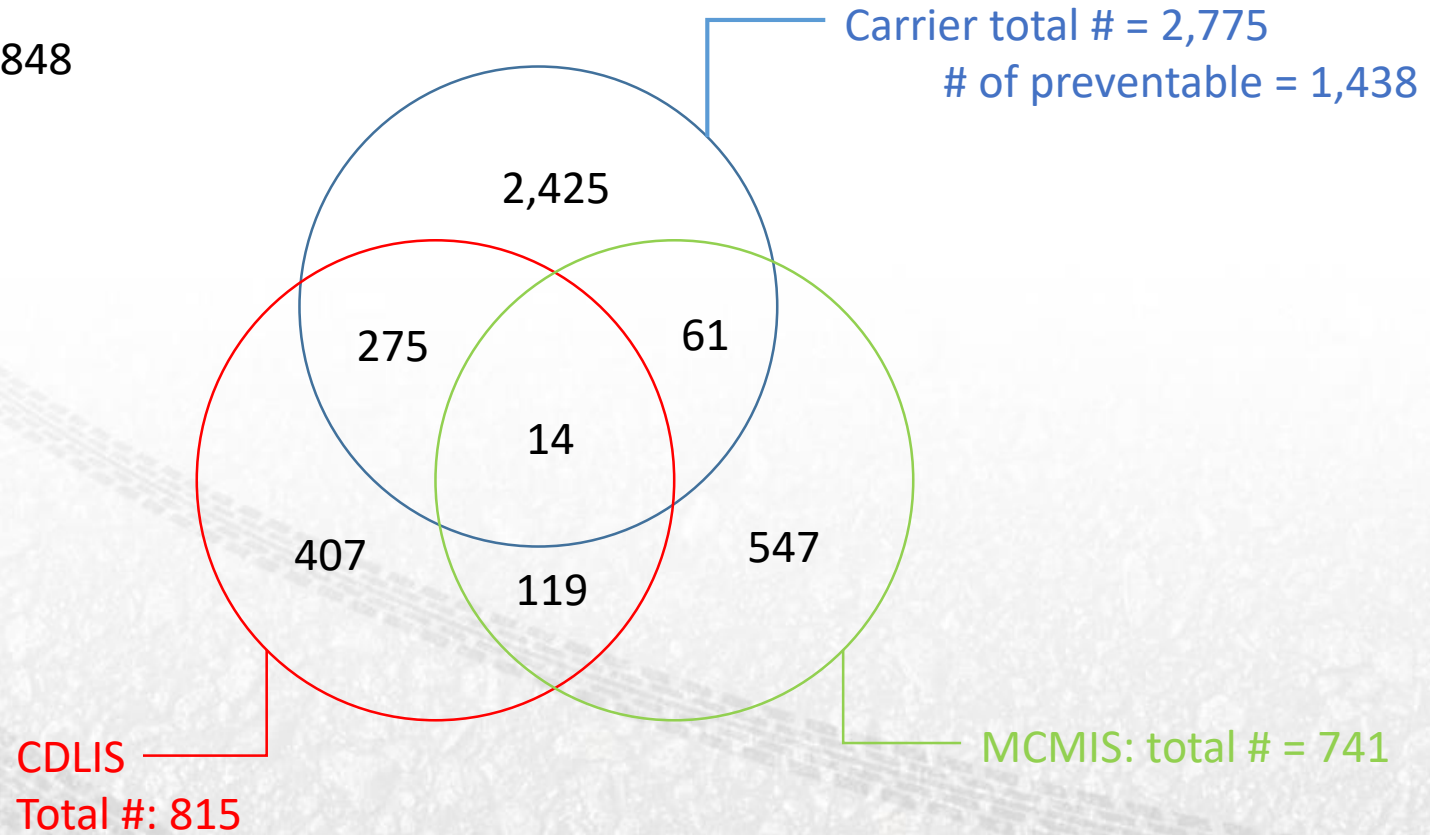
Completion Counts

- 1st completed measure
- 20,754 unique drivers
 - No duplicates



Crashes

Total number of crashes: 3,848
Relates to 3,186 drivers



Violations

Violation Type	Count	Violation Type	Count
DUI, drugs and/or alcohol, impaired driving, administrative per se DUI	6	Following improperly	22
Refused test for alcohol	2	Improper lane or location	200
Possession open container	1	Improper passing	16
Hit and Run, Behaviors after accidents	2	Reckless, careless, negligent driving	26
Driving after Withdrawal	8	Texting, handheld phone while driving	23
Driver License/Vehicle Reg. & Title, Miscellaneous Duties	20	Failure to yield	26
Misrepresentations	4	Failure to signal or wrong signal	6
Miscellaneous Duty Failure	11	Improper turn	22
Operating without, failure to use, or improper use of Equipment Required	184	Wrong way driving	3
Protective equipment not used (safety belt, helmet, etc.)	86	Miscellaneous maneuvers	44
obstructing or impeding traffic with motor vehicle	55	Speeding	504
Failure to obey (driving/on road)	384		



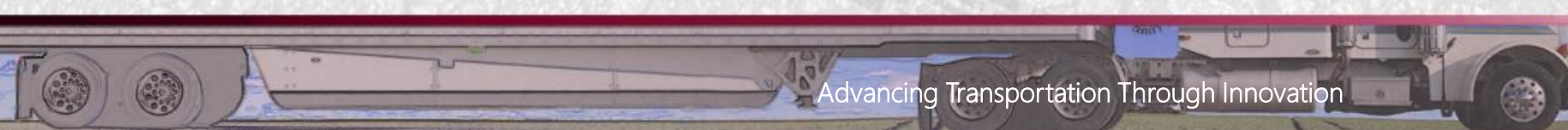
National Occupational Research Agenda for Transportation, Warehousing and Utilities

- ❑ Objective 3: Promote and improve the health and well-being of TWU workers
 - Impact of specific working conditions and consequent lifestyle implications in a range of health and well-being outcomes
 - Prevalence of mental disorders among TWU workers
 - Data are also lacking on the onset and progression of excess body weight for workers entering TWU
 - Economic costs of chronic diseases and other health conditions to workers, employers, productivity, and the health care system.
 - Improve access to health care, screening and treatment for chronic diseases and tobacco use



□ Objective 3: Promote and improve the health and well-being of TWU workers

- Cost-effectiveness of screening and treatment in terms of impacts on worker well-being, performance of safety-sensitive work, productivity, and long-term health costs.
- Use of workplace (including truck stops) interventions, such as health and wellness programs, research is needed that evaluates their effectiveness, acceptance, and return-on-investment.
- Translate and disseminate evidence-based prevention and treatment strategies.
- Given job conditions and poor health outcomes, workers in the transportation industries might be at-risk for diminished life expectancy; however, no research has assessed this hypothesis.



Submitting Comments

- ❑ The request for comments and instructions for submitting comments may be accessed at: <https://www.gpo.gov/fdsys/pkg/FR-2017-12-01/pdf/2017-25876.pdf>.
- ❑ The research agenda may best be accessed at: <https://www.regulations.gov/>. Please enter the docket number, CDC-2017-0114, in the search bar.

