# Health Intervention Research with Commercial Drivers

#### Ryan Olson, PhD



# Where are we going?

- Social importance
- Intervention research
- Oregon studies in progress

## **Social Importance**



Obesity prevalence about **2**× the general population An obese worker incurs \$1000 more in health care costs yearly Obesity + injury = 80% greater costs and lost time Obesity, diabetes, sleep apnea **double+** crash risk

Average cost of fatal truck crash is \$7+ million

# Addressing the Sleep, Exercise, and Eating Wheel Integrated multi-level interventions needed



- 1. Organization of work & vehicle engineering
- 2. Driver selection, onboarding,
  - & training
- Evidence-based health protection & promotion programs



# Body Weight Management Intervention Research

## Body Weight Management Research is Exceedingly Scarce



- Case studies
  - Davis et al. (2004;6 case studies reviewed)
  - Krueger et al. (2007;
    11 case studies reviewed)
  - Companies doing much, but data limited
- Non-peer reviewed, uncontrolled, pre/post
  - Roberts and York (1999):
     -3.1 BMI, ns (weight not reported) 58% drop out

## Body Weight Management Research is Exceedingly Scarce

- Peer-reviewed, uncontrolled, pre/post design
   Olson et al. (2009): -7.8 lbs, p=.001
   Thiese et al. (2015): -7.0 lbs, p=.03
- Peer-reviewed, non-random control/comparison group
  - Holmes et al (1996): -3.9 lbs, +2.6 lbs, p=.01
  - Sorensen et al. (2010): -.06 lbs, +.49 lbs, ns
- Peer reviewed, randomized controlled trials
  - \*French et al. (2010): -0.14 BMI, ns (weight not reported)
  - \*\*Wong et al. (2013): -2.25 lb, .90 lb, p<.001</p>
  - Puhkala et al. (2014): -7.5 lbs, +1.5 lbs, significant by Cl
  - Solson et al. (2016) results follow...

\*bus operators; \*\*various commercial drivers

# Common tactics in more effective programs?

#### Too few to draw firm conclusions...

- Education PLUS social accountability and consequences
- Evidence-based health coaching techniques
- Goal setting and behavioral self-monitoring





- Total Worker Health<sup>®</sup> approach
  - Improvements in health
     <u>AND</u> safety
- Pilot study (2009, 2013)
  - Medically meaningful weight loss + reduced hard braking
  - 2-yr weight loss maintenance (self-report)
- Randomized controlled trial (NHLBI 1R01HL105495)





## **An Evidence-Based Approach** SHIF

#### Weight Loss Competition (6 mo.) supported with:

#### **Computer-Based** Training

this movie Dr. Christian Thompson describes some the physiological impacts of prolonged sitting

Later you will learn about exercises that Dr. Thompson recommends to combat the effects of prolonged sitting

5

6

4

2 3



8

7

9



**Motivational** Interviewing



11:24 AM

**Self-monitoring** 





### "SEE" Behavioral Clusters at Baseline (Olson et al, 2016a)

- Hierarchical cluster analysis of drivers
  - Similarity of cases across eight health factors
    - Distance metric: interval squared Euclidean distance
    - Linking observations: Wards linkage
  - Interpretation and final cluster selection
- Questions:
  - How do clusters differ?
    - Patterns in behavior
    - Stress & social support
    - Work outcomes (e.g., lost workdays)
    - Demographics and health conditions





# 6-month Outcomes (Olson et al, 2016b)

Significant increases in:

- Fruit & vegetables
- Exercise

Trend in sleep time

• +15 min/night



# **18-month Outcomes**

#### (Olson et al, unpublished)

Contact author for status of publication

# Oregon Studies In Progress



## SHIFT Onboard:

# Success & Health Impacts For Transit operators during Onboarding

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National Heart, Lung, and Blood Institute



# **SHIFT Onboard Study Goals**

- Document work exposures and health consequences among new bus operators
- Adapt SHIFT tactics to:
  - Support early job success
  - Protect against weight gain
- Evaluate intervention effectiveness
  - Randomized controlled trial with 6+ transit agencies



#### **Conceptual Integration with Standard Training**



Study measurements



## Controls for TEAM Truck Drivers' Sleep, Safety, & Health

Ryan Olson, Pete Johnson, Steven Shea, & Miguel Marino





A NIOSH CENTER OF EXCELLENCE



## The Hierarchy of Controls Applied to Total Worker Health®



## **Tech4Rest Study Goals**



- Pilot intervention and experimental procedures
  - Determine the effectiveness of an enhanced cab intervention alone and in combination with a behavioral sleep intervention
- Conduct cost-utility analyses for interventions

# **Engineering Controls**

#### Active-suspension seat.

- 1. Smart sensors
- 2. Pneumatic system
- 3. Mechanical linkage
- 4. Bi-directional horizontal suspension
- 5. Linear electromagnetic actuator
- 6. Regenerative amplifier, computer, & control algorithms





#### Enhanced mattress system. Memory

foam matrix mattress with faded reveal of the underlying Latto-flex wing suspension system. The system is wrapped and integrated with a custom cloth mattress cover.

# Behavioral Sleep Program



- Team and individual goal setting
- Walking competition + sleep hygiene tracking
- Online training
- Bi-weekly coaching

Contact author for unpublished details on behavioral program

## **Take Home Points**





Pay, lottery prizes, and incentives

 Free, confidential health assessments

Randomly selected drivers will get to participate in a weight loss competition and health promotion program.

Healthy Healthy Lifestyle KEEP RIGHT

To enroll or learn more, contact: www.ohsushift.com shift@ohsu.edu

(503) 9-SHIFT-9

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#### Labor/Industry Partners & Students Over 40 organizations and over a dozen students



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