Evaluating the Sleeper-Berth Provision

A Preliminary Investigation into Usage Characteristics and Safety-Critical Event Involvement

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Outline

- Background
- Description of the data set
- Address the following three research questions:
    1) What driver characteristics are associated with increased SBP use?
    2) What work characteristics are associated with increased SBP use?
    3) What is the relationship between SBP use and safety-critical event occurrence?

Hours-of-Service and Shift Restart Methods

- Hours-of-Service (HOS) regulations set guidelines for commercial motor vehicle driver's maximum daily drive time, workday hours, and work week hours
- HOS includes required rest periods to take to start a new shift
- These rest periods include:
  - "10+ hours"
  - "34+ hours"
  - Sleeper-berth provision (SBP)

Hours-of-Service and Shift Restart Methods

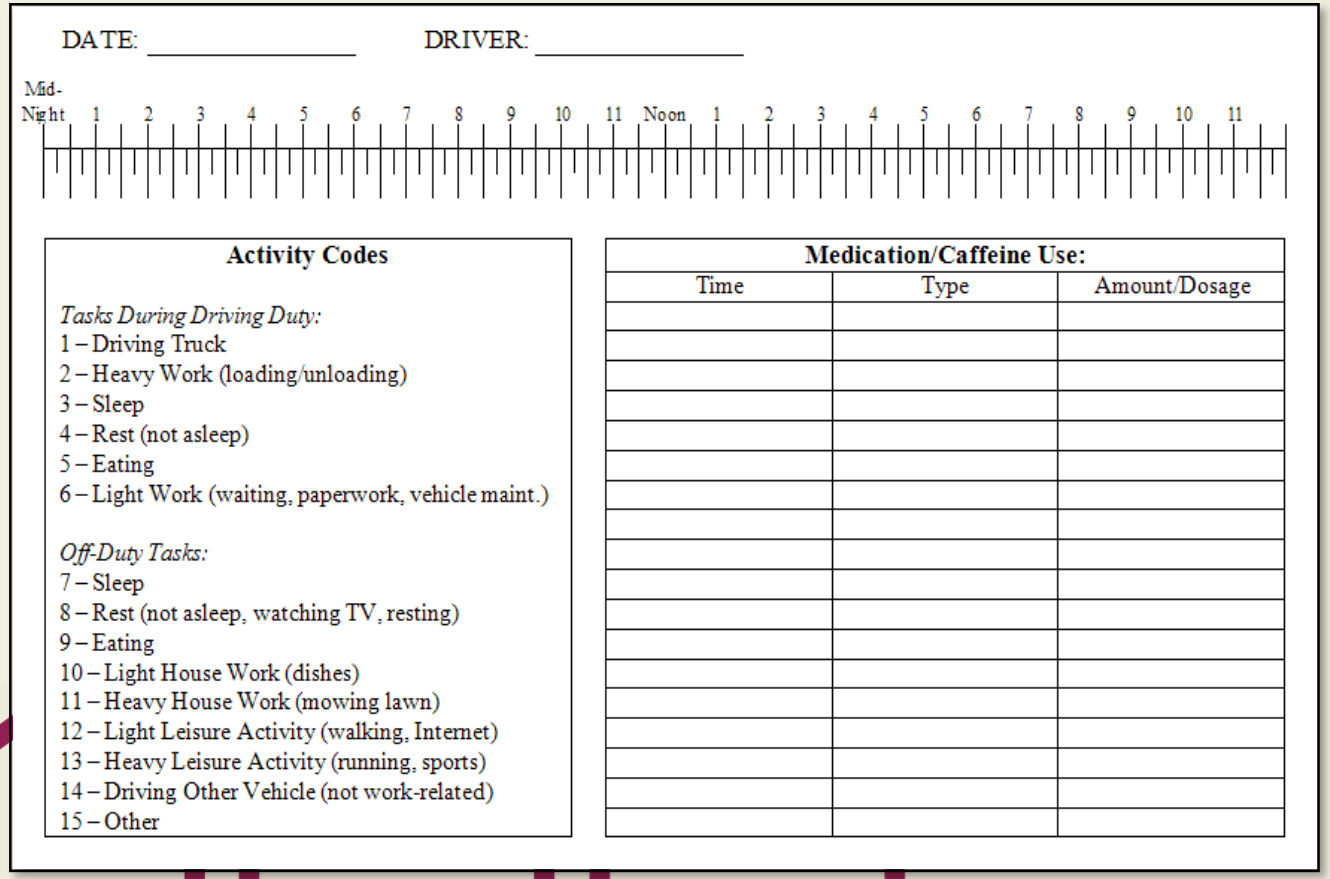
- Sleeper-berth provision (SBP)
  - Drivers must spend at least 8 (but less than 10) consecutive hours in the sleeper berth
    - Rest period does not count as part of the 14 hour work window for driving
  - Driver must take a second rest period of at least 2 (but less than 10) consecutive hours, which can be spend in sleeper berth, off duty, or a combination of the two
    - Rest period does count as part of the 14 hour work window for driving
  - After completing second rest period, your available hours are calculated at the time you completed the first required rest period

Sleeper Berth Provision

Task	Task Duration	14-Hour Window Time Remaining After Task	11-Hour Driving Time Remaining After Task
On duty (not driving)	2 h	14 – 2 = 12 h	11 – 0 = 11 h
Driving	5 h	12 – 5 = 7 h	11 – 5 = 6 h
Sleeper berth	8 h	7 h	6 h
Driving	6 h	7 – 6 = 1 h	6 – 6 = 0 h
Off duty break	2 h	14 – 6 – 2 = 6 h	11 – 6 = 5 h

Methods: The Data Set

- Driving video data and activity register data collected in the Naturalistic Truck Driving Study (Blanco et al.)



DATE: _____ DRIVER: _____

Mid-Night 1 2 3 4 5 6 7 8 9 10 11 Noon 1 2 3 4 5 6 7 8 9 10 11

Activity Codes

Tasks During Driving Duty:
1 – Driving Truck
2 – Heavy Work (loading/unloading)
3 – Sleep
4 – Rest (not asleep)
5 – Eating
6 – Light Work (waiting, paperwork, vehicle maint.)

Off-Duty Tasks:
7 – Sleep
8 – Rest (not asleep, watching TV, resting)
9 – Eating
10 – Light House Work (dishes)
11 – Heavy House Work (mowing lawn)
12 – Light Leisure Activity (walking, Internet)
13 – Heavy Leisure Activity (running, sports)
14 – Driving Other Vehicle (not work-related)
15 – Other

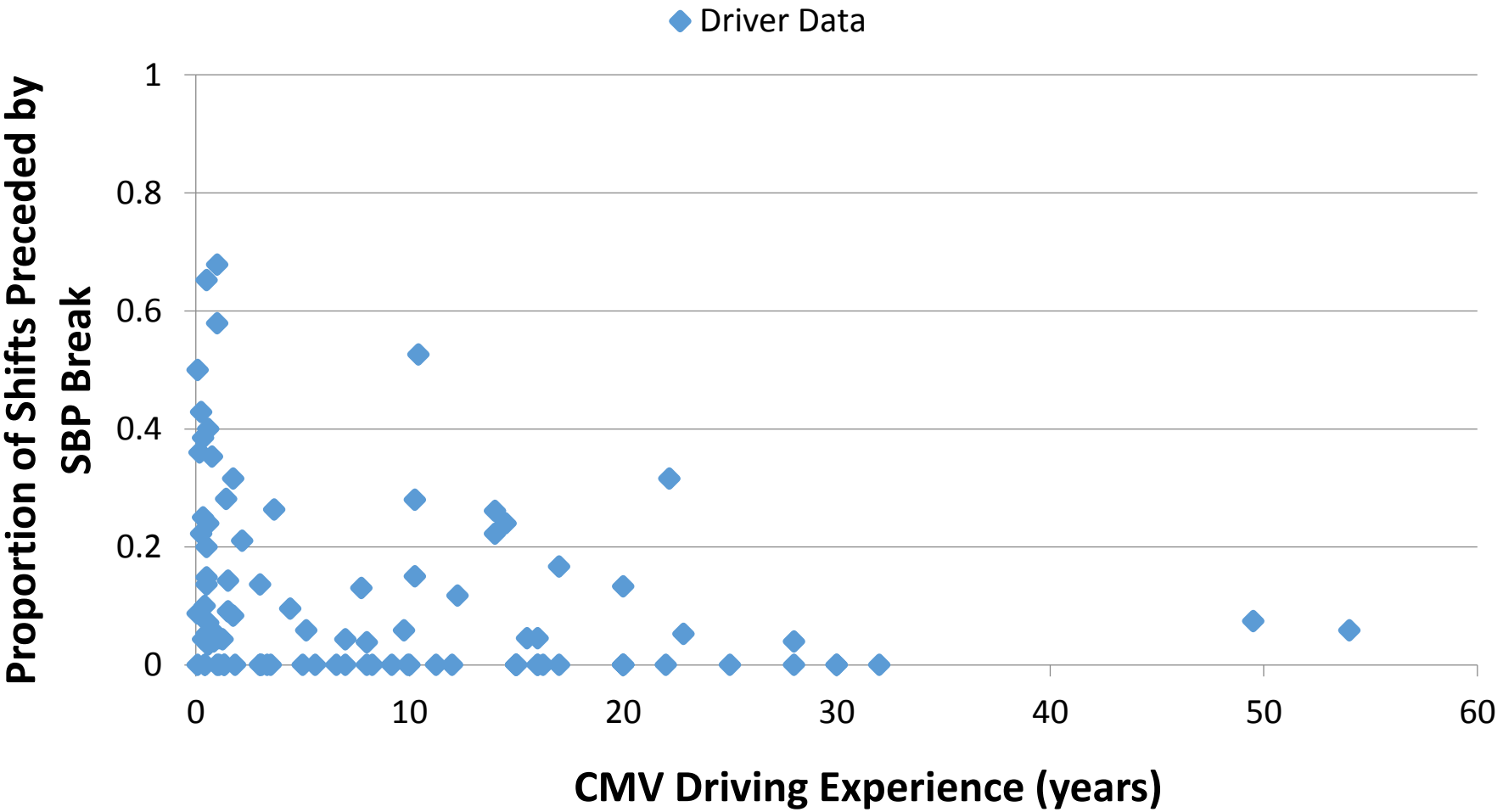
Medication/Caffeine Use:

Time	Type	Amount/Dosage

Methods: Hybrid Data Set

- The video data and speed information used to verify/update the time of driving marked in the activity register
- Baselines and SCEs, by definition, must occur during driving, so activity registers were adjusted to reflect that a baseline or SCE occurred only during driving and not during other activities
  - Blanco et al. (2011) adjusted the driving periods in the activity register to ensure all SCEs occurred during marked driving periods
  - The current study followed the same process for the previously selected baselines
- Hybrid data set then used to identify shift-restart breaks

Results- Research Question 1



Results-
Research Question 2

Shift-Restart Method	N	Average Drive Hours Preceding the Break	Average Work Hours Preceding the Break
10+ hour	1,227	7.57	10.84
34+ hour	253	7.56	10.98
SBP	183	8.11	12.05

Results- Research Question 3

Shift-Restart Method	SCE Count	SCE Percentage of Events	Baseline Count	Baseline Percentage of Events	Total Event Count
10+ hour	1,599	36%	2,831	64%	4,430
34+ hour	280	36%	504	64 %	784
SBP	222	29%	538	71%	760

Results-
Research Question 3

- The relationship between SCE rate and shift-restart method was tested two ways

- Mixed-effect negative binomial model results:
  - No significant difference found in the SCE rates in shifts following a SBP break and the SCE rates in shifts following 10+ hour or 34+ hour restart breaks (t = -0.63, p = 0.5284)

- Odds ratio results:
  - 10+ hour restart and 34+ hour restart methods were found not to be significantly different [$OR_{10+,34+}$ = 1.02, 95% CI = (0.87, 1.19)]
  - Both the 10+ hour restart and 34+ hour restart methods were associated with significantly higher risk than the SBP [$OR_{10+,SBP}$ = 1.37, 95% CI = (1.16, 1.62); $OR_{34+,SBP}$ = 1.35, 95% CI = (1.09, 1.67)]

Summary

- SBP appears to be used more frequently among drivers:
  - with less CMV driving experience
  - who did not report having arthritis or dizziness, vertigo, or another balance disorder
  - who did not report taking medications regularly
  - with longer drive and work hours
- SBP was associated with no higher—and, for some comparisons, even a lower—risk than the other shift-restart methods
- Future work & Limitations

Acknowledgements & Contact Information

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