

Assessment of the Prevalence, Nature, and Risk of Distracted Driving Among Large Truck Drivers in Canada: A Naturalistic Driving Study

Driver Distraction and Inattention
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Introduction

- Cell phone use significantly increases the risk of SCE (safety-critical event) involvement for both light vehicle and commercial vehicle drivers (Klauer et al., 2016; Guo et al., 2017; Olson et al., 2009; Hickman et al., 2010; Hammond et al., 2016; Hammond et al., 2021).
 - Electronic devices, such as cell phones, contribute to SCEs.
 - Texting on a cell phone is the riskiest behavior.
 - Talking/listening did not increase the likelihood of being involved in an SCE.
- Regulations have been issued in Ontario to restrict CMV drivers from reaching for or holding a cell phone (76 Fed. Reg. 75470, 2011; Canadian Council of Motor Transport Administrators, 2018).



Studies	High Risk Behavior	Low Risk Behavior
Hanowski et al. (2005)	High visual attention carry the highest degree of risk	
Olson et al. (2009)	Text messaging on a cell phone, Interact with dispatching device, reaching for other electronic devices (camera, radio, earpiece), adjust instrumental panel	Talking/listening a hand-held phone, eating
Hickman et al. (2010)	Any cell phone usage, dialing a cell phone, reaching for a cell phone or a headset/earpiece, talking/listening hand-free cell phone, texting/emailing/accessing the internet	Talking/listening on a hand-held cell phone
Blanco et al. (2016)	Handle/interact with dispatching, electronic recording, or navigational device, read/look at dispatching, electronic recording, navigational devices	Talk/listen to handheld/hands-free phone, dial handheld phone
Hammond et al. (2016)*	Intercom use, reach for object, remove/adjust clothing	
Hammond et al. (2021)	Electronic dispatching device, other electronic devices, adjusting instrument panel, adjusting/monitoring other devices integral to vehicle, reaching for an object, hand-held holding, browsing, texting	Hands-free call via earpiece, hands-free talk/listen

* Motorcoach data – little to no cell phone use



Concerns and Objectives

- Truck drivers may be ignoring the law and are likely to use a cell phone.
- Driver behaviors are constantly changing as cell phone capabilities change over time.
- Primary focus of recent research has centered on cell phones, navigation systems, and audio systems.
- Primary Objectives:
 1. Estimate frequency of cell phone use with CMV drivers.
 2. Estimate risk of cell phone use with CMV drivers.



Methods

- 39 participants from six truck fleets in Ontario.
 - Continuous kinematic vehicle data and five video views
 - Questionnaire data
- Collected data for approximately 6 months/driver (2 phases of data collection).

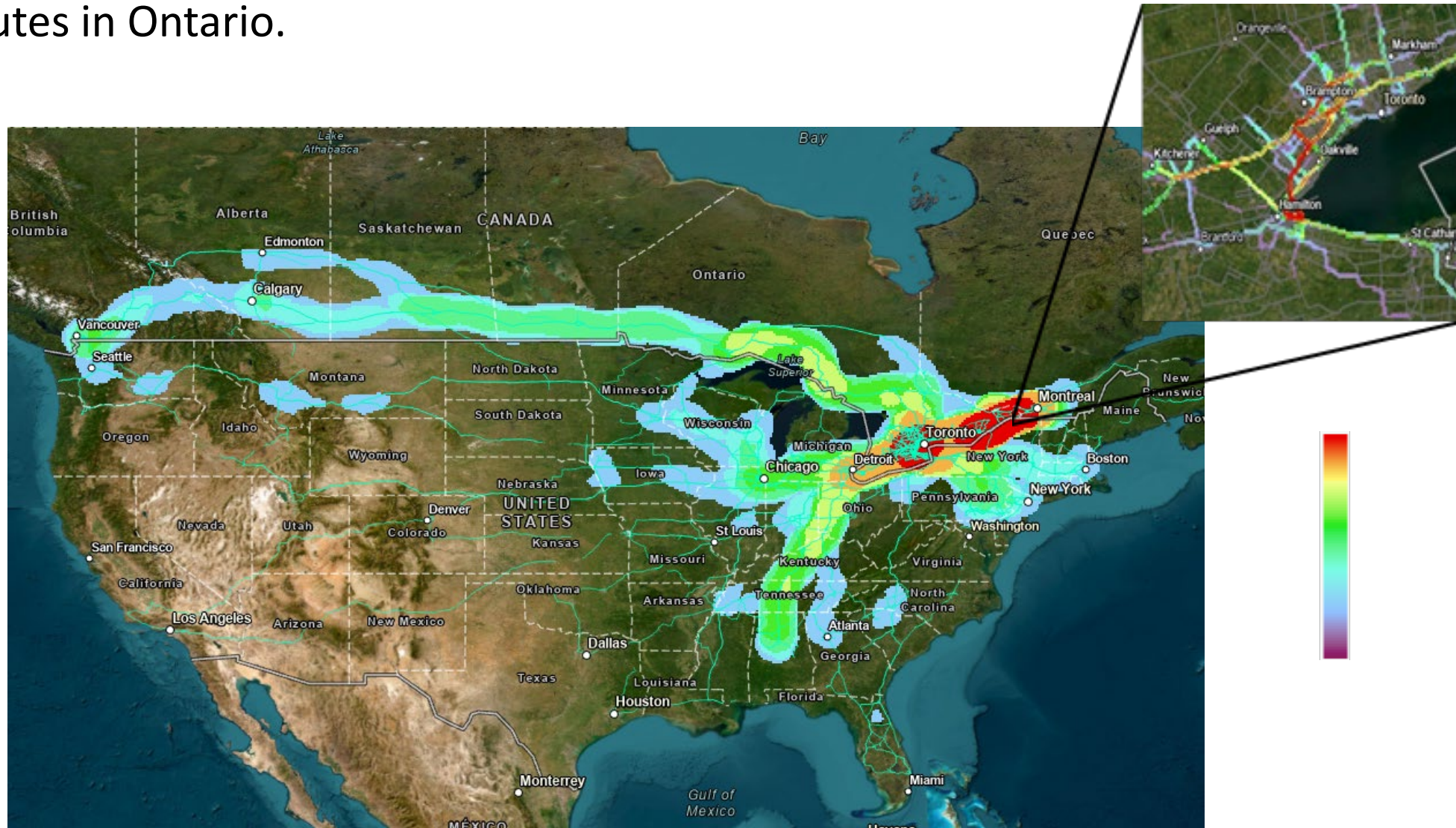
Demographic Information	Maximum	Average	Minimum
Age	76	49.8	27
Education	Bachelor's degree	High school	Incomplete high school
CMV driving experience (years)	47	19.68	1
Driving experience (years)	54	30.76	5
CMV training (weeks)	36	9	0





Data Analysis and Results

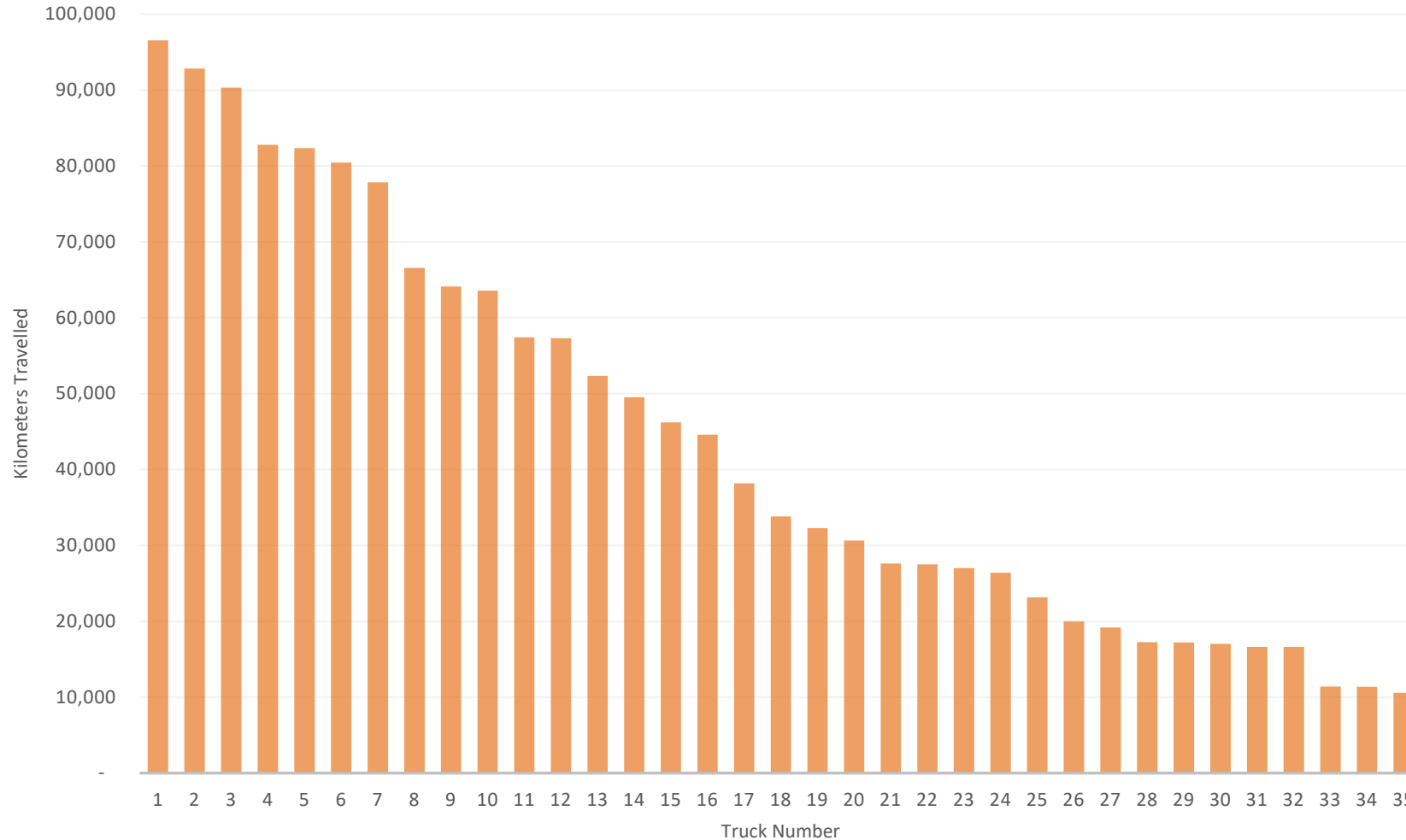
- Broad coverage of Canadian roads (coast to coast), with the highest concentration of routes in Ontario.





Kilometers Driven

- Total kilometers driven by all vehicles was 1,528,618.
- Average kilometers driven per vehicle was 43,675.





SCEs by Trigger Type

Event Type	Hard Brake	Lane Deviation	Swerve	Driver Reported	Total SCEs	SCEs Reduced
Crash	6	0	8	1	15	15
Near-crash	112	29	34	0	175	175
Crash-relevant	153	69	50	0	272	272
Unintentional lane deviation	7	1,189	106	0	1,302	273

Original Secondary Task Coding	Aggregated Secondary Task for Analysis
Adjusting/monitoring climate control Adjusting/monitoring other/unknown instrument panel device Adjusting/monitoring radio Interact with built-in GPS	HVAC/Radio visual/manual
Adjusting/monitoring other devices integral to vehicle	Adjusting/monitoring other devices integral to vehicle
Cell phone, browsing Cell phone, texting Cell phone, dialing hand-held Cell phone, locating/reaching/answering	Hand-held phone visual/manual
Cell phone, holding	Hand-held phone manual
Cell phone, holding and glancing, hand-held	Hand-held phone visual
Cell phone, talking/listening, hand-held	Hand-held talking/listening
Cell phone, browsing hands-free mounted	Mounted phone visual/manual
Cell phone, dialing hands-free mounted	Mounted phone visual/manual
Cell phone, look at hands-free mounted	Mounted phone visual
Cell phone, video calling hands-free mounted	Mounted phone visual
Cell phone, talking/listening, hands-free	Hands-free talking/listening
Cell phone, other	Other cell phone
Electronic dispatching device, Interact with	Interact with electronic dispatching device
Other electronic device, interact	Interact with other electronic device
CB radio, interact	Interact with CB Radio
Put on/adjust/remove headset/earpiece	Put on/adjust/remove headset/earpiece

Estimate Frequency of Secondary Task Engagement



Secondary Task	Percentage of Baseline Observations	Frequency of Baseline Observations
HVAC/radio visual/manual	1.95	59
Adjusting/monitoring other devices integral to vehicle	1.13	34
Drinking	2.35	71
Eating	3.38	102
Personal hygiene	2.58	78
Hand-held phone visual/manual	2.12	64
Hand-held phone manual	0.20	6
Hand-held phone visual	0.20	6
Hand-held talking/listening	0.13	4
Mounted phone visual/manual	1.36	41
Mounted phone visual	2.45	74
Hands-free talking/listening	13.35	403
Other cell phone	0.03	1
Interact with electronic dispatching device	0.17	5
Interact with other electronic device	0.13	4
Interact with CB radio	0.33	10
Put on/adjust/remove headset/earpiece	0.46	14
Removing/adjusting clothing	0.23	7
Put on/remove glasses or sunglasses	0.50	15
Reading	0.07	2
Dancing	0.43	13
Passenger in adjacent seat - interaction	0.03	1
Smoking/vaping	7.95	240
External distraction	2.98	90
Move/reach for object in vehicle	2.22	67
No Secondary Task	52.5	1585



Odds Ratios

Secondary Task	Odds Ratio	Lower Confidence Limit	Upper Confidence Limit
All secondary tasks	2.03*	1.69	2.43
HVAC/radio visual/manual	2.29*	1.35	3.88
Adjusting/monitoring other devices integral to vehicle	3.85*	2.09	7.09
Drinking	1.10	0.59	2.06
Eating	1.32	0.77	2.27
Personal hygiene	1.77*	1.05	3.00
Hand-held phone visual/manual	3.66*	2.27	5.91
Hand-held phone manual	2.01	0.38	10.60
Hand-held phone visual	3.72	0.85	16.30
Hand-held talking/listening	2.06	0.19	22.14
Mounted phone visual/manual	5.80*	3.31	10.18
Mounted phone visual	1.18	0.56	2.51
Hands-free talking/listening	0.98	0.72	1.34
Put on/adjust/remove headset/earpiece	3.05*	1.17	7.95
Removing/adjusting clothes	1.14	0.22	5.96
Put on/remove glasses or sunglasses	5.97*	2.60	13.72
Dancing	0.36	0.05	2.85
Reading	11.05	1.68	72.74
Smoking/vaping	1.58*	1.08	2.32
External distraction	3.73*	2.54	5.49
Move/reach for object in vehicle	5.68*	3.75	8.60
Other non-specific internal eye glance	0.84	0.47	1.51
Other known secondary task	3.84*	1.50	9.81



Conclusions

- Canadian large truck drivers engaged in cell phone use in 19% of baseline epochs, including 7% that were a higher risk visual/manual interaction.
- The prevalence and significant odds ratios for visual/manual interaction with a mounted cell phone was a unique finding. Visual/manual tasks with a mounted cell phone were shown to increase SCE risk by 5.8 times compared to drivers not engaging in a visual/manual task with a mounted cell phone.
- The prevalence of cell phone use was significantly higher among younger CMV driver compared to older CMV drivers.
- The risks calculated for this study are similar to those calculated for other CMV driver studies in that interactions with cell phones resulted in an average odds ratio of 3.5.



Implications

- Additional training and/or enforcement of cell phone laws may be required to reduce interaction with mounted cell phone by CMV drivers.
- Additional training for the younger/novice CMV drivers may also be needed to reduce interactions with cell phones.
- Potentially need to revise the policy of cell phone use both at the provincial/federal level as well as trucking fleets.



Questions?

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