



Cell Phone Use While Driving A Truck or Bus: Not all Sub-Tasks are Created Equal

Jeff Hickman, Rich
Hanowski, and Albert
Alvarez



Introduction

- Simulator research found that drivers while talking had (NSC, 2010):
 - Longer brake response times of 130 ms - 250 ms
 - Did not scan their mirrors as much
 - Failed to detect objects in the environment
- Same studies found that drivers:
 - Reduced their speed
 - Increased their forward headway to the lead vehicle
- Epidemiological research suggests a 4x increase in crash risk (Redelmeir & Tibshirani, 1997)

Naturalistic Research (Olson et al., 2009)

- Distraction more prevalent than indicated in crash databases
 - ~60% of safety-critical events (SCE)
- Work-related tasks very risky
 - Map, calculator, dispatching device, etc.
- Texting was extremely dangerous
- Tasks associated with visual inattention were the riskiest
- Talking/listening on cell phone and/or CB was not risky

Summary of Current Study

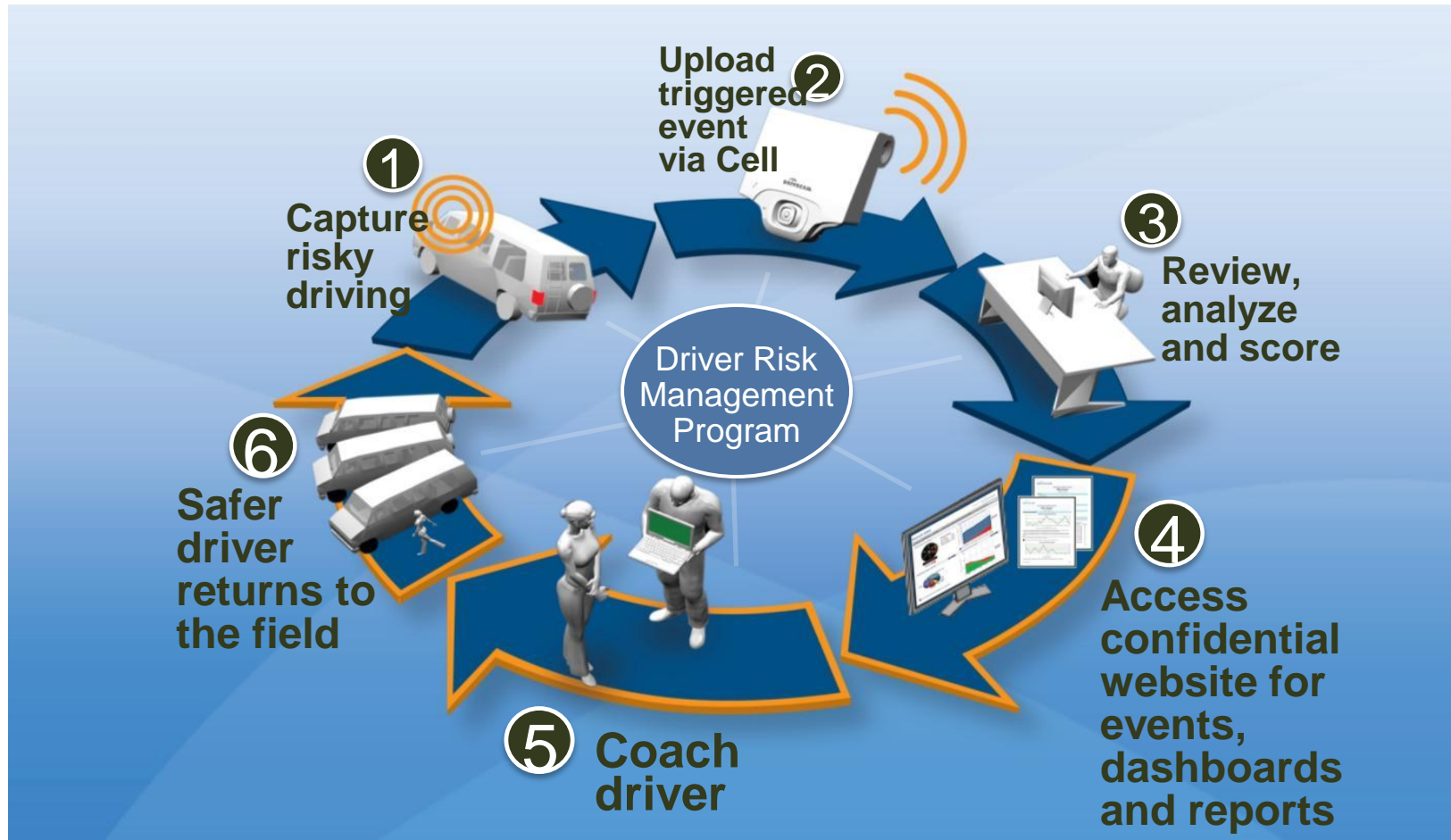
- Use an existing naturalistic dataset to further investigate the findings in FMCSA-funded study by Olson et al. (2009)
 - Try to replicate results
 - Limited information on buses
 - More representative sample
 - More crashes

DriveCam Event Recorder

- Event recorder placed on truck's windshield
- 2 cameras
 - Driver's face
 - Forward view
- 3 accelerometers
 - Y-, x-, and z-axis
- Recording in constant loop
 - Trigger greater than or equal to $|0.5 g|$
 - Saves 8 sec before, 4 sec after trigger
- Event status light



Data Collection/Reduction



Overview of Dataset

- June 6, 2009 to Sep 5, 2009
- 183 different commercial truck and bus fleets
 - 13,306 vehicles (buses, 3 axle or more trucks, tractors/tankers)
 - 1,085 crashes, 8,375 near-crashes, 30,661 crash-relevant conflicts, and 211,171 non-events (or baselines)
- Re-review of cell phone use into discrete subtasks
 - Dialing a cell phone
 - Talking/listening on a cell phone (hands-free and hand-held)
 - Reaching for a cell phone
 - Reaching for hands-free device
 - Texting/email/web

Analysis 1: Overall Odds Ratios

Tertiary Task	Odds Ratio	Lower Confidence Limit	Upper Confidence Limit	Frequency of Safety-Critical Events	Frequency of Baselines
Any Cell Phone Usage	1.14*	1.06	1.23	895	4,262
Dialing Cell Phone	3.51*	2.89	4.27	165	256
Talk/Listen Hands Free Cell Phone	0.65*	0.56	0.76	194	1,626
Talk/Listen Hand Held Cell Phone	0.89	0.80	1.00	372	2,266
Reaching for Bluetooth Device	3.38*	2.64	4.31	104	168
Reaching for Cell Phone	3.74*	2.97	4.71	122	178
Text/Email/Web	163.59*	51.77	516.73	90	3
Food/Drink	1.11	0.97	1.26	268	1,320
Passenger Distraction	---	---	---	30	0
* Asterisk indicates a significant odds ratio. These ratios are also shown in bold.					

SCE = crashes + near-crashes + crash-relevant conflicts

Note of Caution

- Odds ratio is a measure of association (not unlike a correlation)
- A lot of error associated with text/email/web and other distraction
 - Very strong relationship between text/email/web and involvement in a safety-critical event

Analysis 2: Odds Ratios by Policy

Tertiary Task	Odds Ratio	Lower Confidence Limit	Upper Confidence Limit	Frequency of Safety Critical Events	Frequency of Baselines
Any Cell Phone Usage (No Cell Phone Policy)	1.22*	1.04	1.43	194	934
Any Cell Phone Usage (Cell Phone Policy)	1.16*	1.07	1.27	644	2,815
Dialing Cell Phone (No Cell Phone Policy)	3.11*	2.11	4.61	38	72
Dialing Cell Phone (Cell Phone Policy)	3.76*	3.0	4.77	119	161
Talk/Listen Hands-Free Cell Phone (No Cell Phone Policy)	1.31	0.93	1.84	41	184
Talk/Listen Hands-Free Cell Phone (Cell Phone Policy)	0.58*	0.48	0.70	137	1,205
Talk/Listen Hand-Held Cell Phone (No Cell Phone Policy)	0.78*	0.62	0.98	86	649
Talk/Listen Hand-Held Cell Phone (Cell Phone Policy)	0.97	0.85	1.11	265	1,388
Reaching for Bluetooth Device (No Cell Phone Policy)	3.84*	2.38	6.18	28	43
Reaching for Bluetooth Device (Cell Phone Policy)	3.30*	2.44	4.46	70	108
Reaching for Cell Phone (No Cell Phone Policy)	3.38*	2.17	5.27	31	54
Reaching for Cell Phone (Cell Phone Policy)	4.24*	3.15	5.71	80	96
* Asterisk indicates a significant odds ratio. These ratios are also shown in bold.					

Similarities with Olson et al. (2009)

Tertiary Task	Odds Ratios for Tractor Trailers/Tankers Only in the Current Study	Odds Ratios in Olson et al. (2009)
Dialing Cell Phone	5.44*	5.93*
Talk/Listen Hands-Free Cell Phone	0.58*	0.44*
Talk/Listen Hand-Held Cell Phone	1.01	1.04
Reaching for Bluetooth Device	4.43*	6.72*
Reaching for Cell Phone	7.60*	Included in dial cell phone
Text/Email/Web	--	23.24*
Food/Drink	1.53*	1.01

Conclusions (1 of 2)

- Text/email/web is in a category of risk all by itself
 - Large confidence intervals in the current study and Olson et al. (2009)
 - Truck and bus drivers who text, email, or surf the web *are very likely* be involved in a safety-critical event
- Talking/listening on a cell phone does not significantly increase likelihood of SCE
 - Klauer et al. (2006), Sayer et al. (2007), Olson et al. (2009)
 - Current study supports Olson et al. (2009)
 - Tertiary tasks with the greatest visual distraction were the riskiest

Conclusions (2 of 2)

- Cell phone use should be classified into specific sub-tasks
 - Otherwise, the real risk is not being assessed
 - Sub-tasks with the greatest visual inattention have the greatest risk
 - Talking/listening tasks are associated with minimal visual inattention and generally associated with no statistical increase in risk