DISTRACTED DRIVING:
Cell Phone Use While Driving in Maine (2018)

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RESEARCH
GROUP, INC.

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Prepared for:

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Introduction

According to National Highway Traffic Safety Administration (NHTSA) estimates, distracted driving caused an estimated 3,450 deaths in 2016 and about 391,000 injuries in 2015. (NHTSA, 2018). NHTSA also estimates that 10 percent of fatal crashes, 18 percent of injury crashes, and 16 percent of all police-reported motor vehicle traffic crashes in 2013 were reported as effects of driver distraction. State legislatures are responding to the safety threat, as indicated by the Governor's Highway Safety Association's tracking of distracted driving and other traffic safety law implementation. As of February 2016, there are 14 States along with the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands that prohibit drivers of all ages from using handheld cell phones while driving. All of these laws allow primary enforcement, which grants law enforcement the ability to stop motorists solely for cell phone use while driving. Forty-six States, the District of Columbia, Puerto Rico, Guam and the U.S. Virgin Islands ban text messaging for drivers of all ages (all but five have primary enforcement).

NHTSA's high-visibility enforcement (HVE) model is a proven technique to change driver behavior and enhance the effect of traffic laws. With this model, program funds pay for overtime hours so a strong force in ticketing (highly visible and highly focused law enforcement activity) can be demonstrated. The point of this is to increase the public's perceived likelihood to receive a ticket and to increase perceptions of strictness in police enforcement of a law, both thought to impact law adherence. Targeted media advertising prior to the campaign educates the public about laws and associated fines while also publicizing increased law enforcement efforts. Evaluation of the impact of the HVE campaign requires two activities. The public's perceptions are assessed before (Pre) and after (Post) the campaign regarding 1) how strictly laws are enforced, 2) awareness of media messages and 3) awareness of campaign slogans. Increases in awareness provide one form of evidence of the effectiveness and strength of the media campaign. Observation and documentation of driver behavior related to a law Pre/Post campaign is used to determine whether the program resulted in changing the targeted driving behavior(s).

Pre-existing research provides strong evidence that primary laws and HVE efforts are effective at quickly increasing seat belt use (Shults et al., 2004) while recent research indicates that HVE programs targeted specifically at handheld cell phone use can reduce observed usage rates. One of the first large-scale campaigns attempting to address the problem of cell phone use while driving found dramatic reductions in distracted driving in Syracuse, New York and Hartford, Connecticut (Chaudhary, Casanova-Powell, Cosgrove, Reagan & Williams, 2012). NHTSA-sponsored HVE campaigns were conducted four times over the course of a year during this particular project.

Observational surveys and public awareness surveying before and after each of four waves in Syracuse revealed that public awareness increased and handheld cell phone use and texting behind the wheel declined (3.7% to 2.5%). After an initial increase in use for Hartford

there was a 57 percent drop in handheld use (from 6.8% to 2.9%) and texting behind the wheel dropped by nearly three-quarters.

A similar campaign also funded by NHTSA expanded the HVE method to a much larger implementation level, assessing cell phone use while driving in 13 California counties in the Sacramento area and in the state of Delaware (Chaudhary, Connolly, Tison, Solomon & Elliott, 2015). The Highway Safety Offices in both States coordinated three HVE waves within an 18-month project period. This study found observed handheld cell phone use in California decreased significantly from 4.1 to 2.7 percent Pre to Post campaign, reflecting a drop of 33 percent. Drivers in Delaware showed a similar, significant decrease in observed handheld phone use Pre/Post campaign from 4.5 to 3.0 percent reflecting a 33 percent reduction in use. Increased awareness of police enforcement, media messages and of the campaign slogan occurred in both states over the course of the programs.

The current study sought to estimate the incidence of distracted driving on Maine roadways. Observations were conducted in April 2018 at eighty sites in 12 Maine counties.

A. Method/Design

The State of Maine conducted its inaugural distracted driving survey in April 2018. The design was based on selecting sites from the existing seat belt survey which utilized a probability proportionate to size sampling method designed to observe sites that are representative of the state's traffic flow. Distracted driving observations occurred at 80 of these sites. Observations were conducted using the method developed by Preusser Research Group, Inc. for the most recent NHTSA demonstration project examining the impact of enforcement on driver cell phone use in Delaware and the Sacramento area in California. The methods were a modification of the NOPUS method used for roadside seat belt use data collection. Specifically, whereas NOPUS observes stopped traffic the modified method observes moving traffic. Details for site selection and observations are found below.

B. Site Selection

Eighty observation locations were selected from the 102 non-local road sites used for the annual statewide seat belt survey. The proportion of sites per functional class strata in the seat belt survey was kept constant for this distracted driving survey. This resulted in 11 sites from interstates, 23 from principle arterials, 21 from other arterials and 25 from collectors. Only sites that had at least 20 vehicles observed during the 2017 seat belt survey were eligible for inclusion. A random number was used to select from available sites.

The selection resulted in a range of 9 to 5 sites in each county (see Table 1). Counties without any seat belt sites were excluded. Table 2 shows the individual sites selected and their N observed during the statewide study.

C. Observations

Appendix A shows the instructions provided to the observers (who also underwent in-depth classroom training and field training). Driver use of hand-held cell phones while driving was observed for 60 minutes at each of the 80 sites. All data were recorded on paper forms (see **Appendix B**). Three types of cell phone use were recorded: hand-held phone, in-ear device, or manipulating a device. Hand-held were coded when a cell phone was held in the general proximity of the driver's ear. Ear devices were coded when the visible ear contained an "ear bud" (e.g., wired headset or wireless/Bluetooth). Manipulating was coded when the device was held in the drivers' hand but not in the general vicinity of the head. Manipulating could include texting, dialing, checking e-mail, using a mobile GPS application or other activities. No attempt was made to distinguish between these activities.

Categories are not mutually exclusive. Drivers could be observed manipulating with an ear device present or talking on their phone with an ear device in (for example). Observers also coded type of vehicle (car, pickup truck, sport utility, van), driver's sex and estimated age category (<25, 25-59, >59).

A reference point far enough down the road where the vehicle, but not the driver, can be seen driving on the observed roadway was used to select the next vehicle to be observed. Only one vehicle at a time was recorded. Once the data for a vehicle was recorded, the observer looks back to the predetermined reference point to select the next vehicle to be observed. This procedure ensures that the next vehicle to be observed was randomly selected from the traffic stream without knowledge of driver cell phone use. Only passenger vehicles were observed (excluding police, fire, and ambulance). Only vehicles traveling in the nearest lane were coded as device use that is below the steering wheel cannot be seen as vehicles get further away from the observer due to the change in visual angle.

Table 1. Sites Selected by County

County Code	County	N Selected
1	**Androscoggin**	7
3	**Aroostook**	5
5	**Cumberland**	8
7	Franklin	0
9	**Hancock**	9
11	**Kennebec**	8
13	Knox	0
15	**Lincoln**	5
17	**Oxford**	7
19	**Penobscot**	6
21	Piscataquis	0
23	Sagadahoc	0
25	**Somerset**	5
27	**Waldo**	6
29	**Washington**	6
31	**York**	8

Results

There was a total of 13,568 drivers observed. The tables below show how those observations were distributed across various categories. Data coded as Unsure/Unknown are excluded from these tables.

Table 2. N and Distribution of Observations by Category

		N	Percent
Vehicle Type	**Car**	5,130	38%
	Truck	3,113	23%
	SUV	4,488	33%
	Van	836	6%
Age Category	**Under 25**	1,107	8%
	25 to 59	10,475	77%
	60+	1,969	15%
Road Type	**Interstate/Freeways**	1,460	11%
	Principal Arterials	4,537	33%
	Other Arterials	4,425	33%
	Collectors	3,146	23%
Day of Week	**Weekday**	9,816	72%
	Weekend	3,752	28%
Sex	**Male**	7,903	58%
	Female	5,623	42%

Table 3. N and Distribution of Observations by County

County	N	Percent
Androscoggin	1,113	8%
Aroostook	699	5%
Cumberland	1,124	8%
Hancock	1,450	11%
Kennebec	1,122	8%
Lincoln	1,356	10%
Oxford	854	6%
Penobscot	1,578	12%
Somerset	485	4%
Waldo	1,482	11%
Washington	515	4%
York	1,790	13%

Different types of "use" were calculated. *Hand-held* refers to a cell phone held to one's ear. *Ear Device* examines whether the observer was able to identify an ear bud, Bluetooth device (etc.) in an ear. *Manipulating* describes if an individual was actively holding a phone but not to their ear (e.g. texting, dialing, reading). *Any Use* examines whether an individual was manipulating or had a phone to her or his ear (it does not include the presence of a device in the ear). The tables below provide use rates by category for each of the use rates. The focus, however, is on *Any Use*. Chi Square analyses were conducted to explore differences in Any Use between levels of a category. It should be reiterated that the "Hand-held" and "Manipulating" categories are not mutually exclusive. In instances when a driver is holding a phone close to their lips and talking (presumably using the speaker phone on the device) both hand-held and manipulating were selected. Thus, the "Any Use" classification will not necessarily be the sum of hand-held and manipulating.

Observations indicated that 3.7 percent of Maine drivers had a phone to the ear (i.e. Hand-held use). A very small percentage of drivers were coded as driving with an in-ear device (0.7%). Manipulation of a phone was coded as occurring 3.1 percent of the time. "Any Use" (Hand-held or Manipulating) was seen among 6.3 percent of the drivers.

Table 4 shows that use was highest in Somerset County (8.9%) and lowest in Hancock County (4.0%). Overall county differences were significant ($\chi^2 = 53.026$, $p < .001$). Table 5 shows that there was also a significant difference in measured use on weekdays (7.0%) compared to weekend days (4.4%) ($\chi^2 = 31.206$, $p < .001$).

Table 4. Phone Use Category by County

	% Use			
County	**Hand Held**	**Ear Device**	**Manipulating**	**Any Use**
Androscoggin	4.5%	0.1%	2.8%	**6.5%**
Aroostook	3.6%	0.9%	3.6%	**6.3%**
Cumberland	3.0%	0.2%	2.3%	**5.2%**
Hancock	2.3%	1.0%	1.9%	**4.0%**
Kennebec	3.7%	0.1%	1.3%	**4.8%**
Lincoln	4.9%	1.5%	4.1%	**8.3%**
Oxford	4.9%	0.1%	3.4%	**8.3%**
Penobscot	3.9%	1.3%	4.2%	**7.4%**
Somerset	4.5%	0.2%	5.2%	**8.9%**
Waldo	3.4%	1.6%	4.5%	**7.2%**
Washington	3.5%	0.0%	1.4%	**4.1%**
York	3.2%	0.2%	2.5%	**5.3%**

Table 5. Phone Use by Type of Day

	% Use			
Type of Day	**Hand Held**	**Ear Device**	**Manipulating**	**Any Use**
Weekday	4.1%	0.8%	3.5%	**7.0%**
Weekend	2.6%	0.3%	2.1%	**4.4%**

Use rates between roadway types (e.g. Interstate, Arterials) were not significantly different ($\chi^2 = 1.302$, $p > .05$). There was a small difference from the highest use rate class (Principal Arterial: 6.5%) and the lowest (Interstates: 5.7%). There was also no significant difference between use among drivers in different types of vehicles ($\chi^2 = 6.763$, $p > .05$). There was a relatively large use rate difference observed between SUV operators (5.8%) and Van drivers (8.1%) but given the relatively small number of van drivers observed, the difference was not significant.

Table 6. Phone Use by Road Type

	% Use			
Road Type	**Hand Held**	**Ear Device**	**Manipulating**	**Any Use**
Interstate/Freeways	3.9%	0.4%	2.2%	**5.7%**
Principal Arterials	3.8%	0.6%	3.2%	**6.5%**
Other Arterials	3.5%	0.8%	3.2%	**6.2%**
Collectors	3.7%	0.9%	3.2%	**6.3%**

Table 7. Phone Use by Vehicle Type

	% Use			
Vehicle Type	**Hand Held**	**Ear Device**	**Manipulating**	**Any Use**
Car	3.3%	0.7%	3.4%	**6.3%**
Truck	4.1%	0.8%	3.1%	**6.5%**
SUV	3.6%	0.6%	2.6%	**5.8%**
Van	4.8%	0.7%	3.7%	**8.1%**

Observers estimated the age of drivers (see Table 8). Cell phone use rates were highest among those deemed to be under 25 years-old (7.9%) and lowest among those judged to be 60 years-old or older (2.3%) with those judged to be between 25 and 59 years-old landing in the middle (6.8%). This difference in ages was indeed significant (($\chi^2 = 62.954$, $p < .001$). Observers also coded whether the driver was male or female (Table 9). Results indicated that female drivers had significantly higher use rates than male drivers (Female: 6.9%; Male: 5.9%) (($\chi^2 = 5.218$, $p < .05$).

Table 8. Phone Use by Age

	% Use			
	Hand Held	**Ear Device**	**Manipulating**	**Any Use**
Under 25	3.5%	0.5%	4.9%	**7.9%**
25 to 59	4.1%	0.8%	3.3%	**6.8%**
60+	1.6%	0.3%	0.9%	**2.3%**

Table 9. Phone Use by Sex

	% Use			
	Hand Held	**Ear Device**	**Manipulating**	**Any Use**
Male	3.3%	0.8%	3.1%	**5.9%**
Female	4.3%	0.6%	3.1%	**6.9%**

Discussion

The overall use rate, across all counties and categories for any use was 6.3 percent. The National Occupant Protection Use Survey (Pickrell & Li, 2017) conducted in 2016 indicates that approximately 5.4 percent of the Nation were either talking on a hand-held phone (3.3%) or manipulating a phone (2.1%). Maine's rate may be lower than in at least one New England State that conducted a study. Use in Connecticut, prior to enforcement waves, has been measured at around 8 percent using identical data collection methods (Chaudhary & Raboin, 2018). However, the Connecticut observations tend to be in more highly populated locations. That said, Maine's highest use counties (Lincoln, Oxford and Somerset) are not counties with high population density.

Recent data collection in Louisiana indicates a much higher use rate with about 7 percent of drivers manipulating a phone and 6 percent holding a phone to their ear. California drivers were shown to either manipulate a phone (1.5%) or talk while holding a phone to their ear (2.4%) a total of 3.6 percent of the time in 2017. It should be noted that the 2017 rate was very different from the 2016 study which showed "Any Phone Use" at 7.6 percent.

As with other studies (Chaudhary & Raboin, 2018) use among the youngest drivers was highest and older drivers had relatively low use. The most recent data in Connecticut (unpublished data) indicate that the age disparity is even greater there. The difference shown between male and female drivers in Maine is somewhat inconsistent with other studies. Some studies have shown female drivers engaging in significantly higher use. A recent observation study in Louisiana (Tison et al., in review) showed significantly higher use among female drivers

than male drivers (mostly from phone manipulation). Another study, (Kidd et al., 2016) showed that female drivers had higher overall engagement of secondary behavior, but did not show a difference specifically related to phone use. Recent data collected using the same methods used in Maine did not show any difference between male and female drivers and showed male driver use as being slightly higher than female driver use. There is a possibility that sex of driver and age of driver combined influence use. When examining the Maine data, the incidence of any use in the youngest age group showed higher use among male drivers (8.2%) compared to the youngest female drivers (7.8%) and the reverse was true for the middle age group drivers (Male: 6.5%; Female: 7.4%). None of these simple differences, nor interactions, were significant. Ironically, the same analysis using Connecticut data shows that while male and female younger drivers do not differ statistically in their use rates (noting young female use was a bit higher than male driver use) the rates among the middle age category drivers was opposite of that measured in Maine; male middle aged drivers in CT had significantly higher use than female drivers in the same age category.

Maine results also indicate a bigger distracted driving problem during weekday traveling versus driving on Saturday and Sunday. Other research indicates that driving with passengers results in lower use (Tison et al, under review; Kidd et al., 2016) than when driving alone. This may be due to weekend driving involves more social outings while weekday trips include more commutes to work.

Of some interest is that the pattern of risk associated with distracted driving does not always follow the risk pattern associated with driving while unbelted. The data reported here show no difference in cell phone use while driving between roadway type and vehicle type. Numerous studies, include data collected in Maine, indicate that seat belt use is higher on higher volume roads and lowest among pickup truck drivers.

Summary

The State of Maine conducted its first distracted driving roadside survey in April 2018. Eighty observation locations were selected from the 102 non-local road sites used for the statewide annual seat belt survey. Observers from both Preusser Research Group, Inc. (PRG) and the University of Southern Maine (Muskie School of Public Service) were trained and collected all observation data. PRG conducted all training and provided all data collection materials (forms, observer schedules, instructions, maps, law enforcement letters, etc.).

A total of 13,568 drivers were observed. The overall “Any Use” rate, across all counties and categories, was 6.3 percent. Female drivers had significantly higher use rates than male drivers. Cell phone use rates were highest among those deemed to be under 25 years-old and lowest among those judged to be 60 years-old or older. Differences in use rates between varying roadway and vehicle types were not statistically significant. Driver cell phone use was highest in Somerset County and lowest in Hancock County. Results also indicate a bigger distracted driving problem during weekdays as opposed to weekend travel.

References

Chaudhary, N. K., Casanova-Powell, T. D., Cosgrove, L., Reagan, I., & Williams, A. (2012, August). Evaluation of NHTSA distracted driving demonstration projects in Connecticut and New York. (Report No. DOT HS 811 635). Washington, DC: National Highway Traffic Safety Administration.

Chaudhary, N. K., Connolly, J., Tison, J., Solomon, M., & Elliott, K. (2015, January). Evaluation of the NHTSA distracted driving high-visibility enforcement demonstration projects in California and Delaware. (Report No. DOT HS 812 108). Washington, DC: National Highway Traffic Safety Administration.

Chaudhary N, Raboin K. Distracted Driving Enforcement in Connecticut. (2018) In Process.

Cooper, J.F., Ragland, D.R., Ewald, K., Wasserman, L. & Murphy, C.J. (2015). Observational study of cell phone and texting use among California drivers 2015 and comparison to 2011-2014 data: Methodological and analysis report. The Safe Transportation Research and Education Center, University of California, Berkeley.

Kidd, D.G., Tison, J., Chaudhary, N.K., McCartt, A.T., & Casanova-Powell, T.D. (2016). The influence of roadway situation, other contextual factors, and driver characteristics on the prevalence of driver secondary behaviors. *Transportation Research Part F, 41*, 1-9.

National Center for Statistics and Analysis. (2018, April). Distracted driving 2016. (Traffic Safety Facts Research Note. Report No. DOT HS 812 517). Washington, DC: National Highway Traffic Safety Administration.

Pickrell, T. M., & Li, H., (2017, June). Driver electronic device use in 2016 (Traffic Safety Facts Research Note. Report No. DOT HS 812 426). Washington,

Shults, R. A., Nichols, J. L., Dinh-Zarr, T. B., Sleet, D. A., & Elder, R. W. (2004). Effectiveness of primary enforcement safety belt laws and enhanced enforcement of safety belt laws: A summary of the guide to community preventive services systematic reviews. Journal of Safety Research, 35(2), 189–196.

State Farm. Distracted Driving (2015).

Tison J, Chaudhary N, Cosgrove L. National phone survey on distracted driving attitudes and behaviors. (Report No. DOT HS 811 555). Washington (DC): NHTSA; 2011. Available from: URL: http://www.nhtsa.gov/staticfiles/nti/pdf/811555.pdf. [Cited Feb 18, 2016].

Tison J, Chaffe R, Solomon M. Prevalence of Driver Behaviors Secondary to Driving: 2018 Louisiana Observational Survey. Under Review.

Wenners, K., Knodler, M., Kennedy, J. & Fitzpatrick, C. (2013). Large-scale observational study of drivers' cell phone use. Transportation Research Record: Journal of the Transportation Research Board No 2365 (-1), 49-57.

APPENDIX A

2018 MAINE DISTRACTED DRIVING/CELL PHONE USE:
ROADSIDE OBSERVATION PROTOCOL

See Google Maps link below for pinned site locations:
https://www.google.com/maps/@45.2205518,-70.3631188,7z/data=!3m1!4b1!4m2!6m1!1s1MOnBLkQEqQ-In64Jk93trRFW7nIXjTK4

For each site, choose one direction of traffic to observe for the whole observation period and indicate this info on the data collection form (the direction you choose for the Pre will determine which direction will be observed during future observations at the same sites).

Include a quick sketch of where you stood & observed on the back of observation forms for each site. Note any helpful landmarks or parking suggestions for future reference.

Please see "Observer Schedule" document for details on dates, day of week, data collection times, and site location information.

DD Observation Instructions

- Each observation period will last for one hour (60 minutes).
- Fill out the top of each observation form completely. Staple multiple pages.
- Observe all vehicles except emergency vehicles (police, fire, ambulance), mid-size, box, and heavy trucks (defined as six or more tires), and/or buses.
- Choose a spot on the designated roadway and observe traffic in the lane *closest to you* (i.e., observe the traffic coming toward you, not cars on the opposite side of the road).
- Select a "reference point" far enough down the road so you can't see the driver. Each vehicle that crosses this point is yours. Use the reference point to randomly select the next vehicle you will observe. Record one vehicle at a time. The goal is not to record every vehicle that passes, but to collect data on a consistently random selection of drivers in that particular area during a specific timeframe.
- Do not observe turn lanes. If your observation area has one, move further down the street to a spot before the turn lane begins.
- Record the following information: type of vehicle (car, pickup truck, sport utility, van,), driver's age category (<25, 25-59, >60), gender, and type of use.
- Check off the type of phone use you observe: Handheld Use, Bluetooth Use, and/or Manipulating. "Yes" will be recorded as **X**. Note: a Bluetooth may be worn while also manipulating the phone; in this scenario, both columns should be marked. Another example: if someone is holding their phone in front of their face and speaking (on speakerphone) this should also have two checks – one for Manipulation and one for Handheld Use.

- Do not observe in a steady rainfall, snow, sleet, or heavy fog. If it begins to rain (or snow or sleet) steadily during an observation, stop collecting data and wait 15 minutes for the precipitation to subside. If it stops, resume observations and extend the observation period to make up for the missed time. If the bad weather continues, notify Katie or Neil that the site will need to be made up and proceed to your next scheduled observation. Do not start your next site earlier than scheduled. If observations are interrupted due to inclement weather, complete the sheet you are using, noting the end time. If you resume observations, begin a new sheet, with a new start time.
- If an intersection is seriously compromised due to construction, a crash, etc., call PRG for further instructions. Your site will either be rescheduled or an alternate site may be selected on the spot.

APPENDIX B

Sample ME Distracted Driving Cell Phone Observation Data Collection Form

SITE ID NUMBER: _____ OBSERVER: _____CITY: _____

LOCATION:_____
(Street) ***(Cross Street or other landmark)***

DATE: ___ - ___ - ___ DAY OF WEEK: _____ DIRECTION _____

WEATHER CONDITION: 1 Clear / Sunny 2 Light Rain 3 Cloudy 4 Fog 5 Clear/Wet

START TIME:_____ (Observation period will last exactly 60 minutes)

	Vehicle Type C = Car T= Pick Up S = SUV V = Van	**Age** 1 = < 25 2= 25-59 3= > 60 4= Unsure	**Sex** M=male F=female U=unsure	**Handheld Use**	**Bluetooth Use**	**Manipulating**		**Vehicle Type** C = Car T= Pick Up S = SUV V = Van	**Age** 1 = < 25 2= 25-59 3= > 60 4= Unsure	**Sex** M=male F=female U=unsure	**Handheld Use**	**Bluetooth Use**	**Manipulating**
1							20						
2							21						
3							22						
4							23						
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