

Analysis of Hand-Held versus Hands-Free Cell Phone Use while Driving

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1. Summary

Research shows that using the cell phone while driving is a distraction and can lead to an increased risk of being in an automobile crash. The increased crash risk factor associated with cell phones involves actually dialing the number. Hence, hands-free cell phones that require the same tasks for dialing as hand-held cell phones are just as distracting. Surveys show that 32% of drivers say they used a cell phone during the last trip and about one in ten drivers were observed using a cell phone while driving at any time during day-time hours on Louisiana roads. While using the cell phone when driving is a distraction and may lead to a crash, there are many other distracting factors that can occur inside the vehicle as crash data shows. Despite the three-fold increase in cell-phone usage over the past decade, the total number of crashes over the same time period has declined slightly. Thus, while hand-held and most hands-free cell phone usage while driving is a distraction, it seems that it has not led to a significant increase in crashes in Louisiana over the past decade.

2. Overview

Over the past decade, cellular phones have become increasingly popular in the United States. Cellular phones are now owned by both adults and kids who use it for a wide range of purposes, such as to stay in contact with family and friends, to conduct business, and to make emergency phone calls. For instance, in 1998 there were 69,209,321 cell phone subscribers in the United States. This number grew to 262,700,000 in 2008 (“Cell Phone Subscribers in the US”). Thus from 1998 to 2008 there was more than a three-fold increase in the number of cell phone subscriptions. A Louisiana attitudinal survey from November of 2009 shows that 81.4% of drivers interviewed had access to a hand-held phone in their car while 29.9% had access to a hands-free cell phone (Applied Technology Research Corporation). Of those who had access to a hand-held cell phone while driving, 39.6% used it during their last trip and about the same percentage, namely 38.4%; of those who had access to a hands-free cell phone used it during their last trip. Hence, an estimated 32% of the drivers interviewed said that they used their cell phone during their last trip. An observational survey taken on Louisiana roads in the fall in 2009 shows that at any time during daylight hours 9.2% of drivers use a cell phone (Applied Technology Research Corporation).

There is considerable evidence that cell phone use while driving is distracting. The question of whether cell phone use while driving should be banned has been the topic of much discussion among safety professionals in the states. Six states plus Washington D.C. and the Virgin Islands have passed laws to ban hand-held cell phones while driving. No state so far has banned hands-free cell phones while driving. The current state cell phone

driving laws in the 50 states, District of Columbia and the Virgin Islands are summarized below (State Cell Phone Driving Laws):

1. **Hand-held Cell Phone Bans for All Drivers:** 6 states (California, Connecticut, New Jersey, New York, Oregon and Washington), the District of Columbia and the Virgin Islands prohibit **all drivers** from talking on hand-held cell phones while driving.
 - o With the exception of Washington State, these laws are all **primary enforcement**—an officer may ticket a driver for using a hand-held cell phone while driving without any other traffic offense taking place.
2. **All Cell Phone Bans:** No state completely bans all types of cell phone use (hand-held and hands-free) for all drivers, but many prohibit cell phone use by certain segments of the population.
 - o **Novice Drivers:** 21 states and the District of Columbia ban all cell use by novice drivers.
 - o **School Bus Drivers:** In 17 states and the District of Columbia, school bus drivers are prohibited from all cell phone use when passengers are present.
3. **Text Messaging:** 19 states, including the District of Columbia and Guam now ban text messaging for all drivers. Fifteen states, D.C., and Guam have primary enforcement. In the other four states, all driver texting bans are secondarily enforced. Some states have limited texting bans.
 - o **Novice Drivers:** 9 states prohibit text messaging by novice drivers.
 - o **School Bus Drivers:** 1 state restricts school bus drivers from texting while driving.
4. **Local Laws:** While this chart addresses only statewide laws, many local jurisdictions have enacted cell phone and/or texting-while-driving bans. However, 8 states have preemption laws that prohibit local jurisdictions from enacting such restrictions.
5. Some states, such as Maine, New Hampshire, and Utah treat cell phone use as a larger distracted driving issue.
6. Utah considers speaking on a cell phone to be an offense *only* if a driver is also committing some other moving violation (other than speeding).

There are 4 separate Cell Phone / Text Messaging Laws in effect in the State of Louisiana.

1. Novice driver's in Louisiana that hold a Class "E" learner's license are prohibited from making calls on a cell-phone or any wireless telecommunication device while driving unless the communication device is a Hands-Free device.
2. Act No. 666, also known as Senate Bill 159 prohibits minors (17 years old and under) from using any type of wireless communication device while operating a motor vehicle.
3. Act No. 667, also known as Senate Bill 342 prohibits a first time license holder from using a Cell phone for any purpose while operating a motor vehicle. The newly licensed driver cannot use a cell phone while driving for 1 year from the date the license was issued. This new driving law does not apply to the first time State of Louisiana license holder who was legally licensed in another state.
4. Act No. 335 , also known as House Bill 402 prohibits School Bus drivers from engaging in calls on a Cellular phone while driving the School Bus. The new Louisiana Driving Law does provide exceptions for emergency situations.

There are exceptions to the laws in emergency situations and for law enforcement personnel.

The question of whether cell phone use while driving leads to a significant increase in crashes has been investigated by many researchers and there are a considerable number of published articles that deal with the risks associated with cell phone use while driving. Most of the published research focuses on lab experiments measuring driving performance while using a cell phone. There are a few epidemiological studies that examine cell phone usage and their relationship to vehicular crashes. The objective of this report is to assess the safety risks associated with using the cell phones while driving based on the available literature, on Louisiana's attitudinal and observational surveys, and crash statistics. Specifically, the report attempts to answer several questions relating to the safety aspect of cell phone usage while driving. It should be noted that there are significant hurdles researchers face when dealing with the crash risk of cell phone use. The main hurdle is the lack of a reliable measure of exposure to cell phone use for crash data and the lack of reliable data on cell phone usage in crashes. The questions that are of the main interest to guide public policy are:

1. Do conversations on cell phones, whether hand-held or hands-free, influence driving performance?
2. Does the performance differ between hand-held and hands-free cell phones?
3. What is the magnitude of increase in crash risks associated with hand-held and hands-free cell phone usage?

These questions are addressed separately.

1. Do conversations on cell phones, whether hand-held or hands-free, influence driving performance?

The research to date indicates that using a cell phone while driving results in deterioration of driving performance (Caird and Scialfa 2004). Even under the most conservative analyses, small to moderate negative effects on driving performance exist. Although both, responses to critical events and the ability to maintain vehicular control, are hampered, the negative impact of cell phone usage is larger for responses to critical events than for vehicular control. Driving variables including lane position and headway variability showed smaller effects. Thus cell phone usage may not necessarily cause a crash but affect the driver's ability to act in avoidance maneuvers in critical situations. However, studies show cell phone usage is only one of many distractions within an automobile while driving. Other distractions include texting while driving, manipulating GPS devices, CD players, and radios as well as drinking coffee, eating, putting on makeup, talking to a passenger, and daydreaming. Most research has concentrated on cell phone usage while driving, but a few studies are concerned about the relative magnitude of other distractions that are similar in nature to talking on the cell phone such as talking to a passenger. Research shows that passive listening to the radio is less distracting than conversations that include memory, reasoning, or mental taxing tasks (Alm and Nilsson 1995, Briem and Hedman 1995, Harbluk, Noy and Eisenmann 2002, McKnight 1993, and Brown, Tickner and Simmonds 1996).

Although conversations with a passenger may be as distracting as a cell phone conversation, cell phones are more distracting because they involve more than just a conversation. Research suggests that dialing a phone number and answering the phone are the most distracting parts of using a cell phone. To quantify the increase in the crash risks due to cell phone use, a more precise dissection of the tasks involved in cell phone use have to be undertaken. This will be discussed in this report later on.

2. *Does performance differ between hand-held and hands-free cell phones?*

Most available research studies conclude that there is no difference between hand-held and hands-free cell phones (Caird and Scialfa 2004, McEvoy 2005). Nevertheless, no state has banned hands-free phone usage while driving. The attitudinal survey conducted in Louisiana (Applied Technology Research Corporation) shows that while 59.1% of the respondents believe that people can drive safely with hands-free phones, only 29.9% believe this to be true for hand-held phones. Why is there such a difference in perception of risk between what research studies seem to indicate and what people believe? The answer has much to do with the imprecise definition of hands-free cell phones in the published research and the misconception of risk associated with various tasks during cell phone use. Much of the published research does not differentiate between the various tasks involved in a cell phone call. However, only a few articles do point out the various risks involved in each of the tasks. Hands-free cell phones come in a wide range of different technologies. They include a cell phone connected to an earphone through a cable or blue tooth technology or a cell phone plugged in to the speakers in the car. However, newer cars have built-in blue tooth capabilities requiring very little manipulation to answer or place a call. In general, using a cell phone involves distinct phases for making and receiving a call. For receiving a call the phases are a) locating the cell phone in your pocket or hand bag, b) pressing the answer button, c) talking, d) hanging up the phone, and e) putting the phone back in its place. When calling a person the steps are essentially the same except step b) which involves dialing. A report published by the National Highway Safety Administration (2008) points out that hands-free wireless phones most commonly allow only for hands-free conversation; accessing the phone, dialing, and hanging up the phone still involves physical manipulation of the phone as well as directed glances toward it. Since research shows that the most distracting phase is dialing, in which a driver has to take his eyes off the road, it is not surprising that published research that compares hand-held cell phones with generic hands-free cell phones does not find a difference in distraction or crash risk. The few articles that include various hands-free phone technologies find differences in the level of distractions for different technologies. Dialing a number is as distracting as texting, while having a phone conversation is as distracting as talking to a passenger. Some newer cars are equipped with blue tooth technology that

reduces answering a call to simply pressing a button similar to turning on a radio and dialing a phone number stored in the phone book is similar to finding a radio station. Alternatively, hands-free phones that continue to rely on manual dialing are not much less distracting than hand-held cell phones. Unfortunately, very little research has been done with newer hands-free technologies.

3. *What is the magnitude of increase in crash risk associated with cell phone usage?*

Although published research shows that there is considerable evidence that cell phone use during driving is a distraction, there is no consensus on the magnitude of the increase in crash risk. Some studies report that the risk of a collision when using a cellular telephone was four times higher than the risk when a cellular telephone was not being used (Redelmeier 1997, McEvoy 2005). However, this research insufficiently controls for exposure to driving and exposure to cell phone use. There is also a lack of clarity concerning the timing of the cell phone task and a critical driving event and the performance of the cell phone tasks, i.e. little is known about what cell phone task was performed when a crash occurred and if the cell phone usage contributed to the crash.

Some authors claim that the use of a cell phone is associated with driving with a blood alcohol level at the legal limit (Redelmeier 1997, Strayer 2006). However, this claim is misleading because it ignores the exposure to the risk factor. Driving under the influence of alcohol exposes the driver to a higher risk during the entire trip while making a call is relatively short in time and the driver has control over the timing of a call. Hence, a driver can select not to call in dangerous traffic conditions, while an intoxicated driver is not free to change his impairment during varying traffic conditions. Other research shows that drivers who talk on the phone usually slow down rather than speed up which is associated with impaired driving.

Data from Virginia Tech Transportation Institute (Box 2009), shown in Table 1, provides a more detailed and moderate crash risk associated with cell phone usage. The Virginia Tech researchers report that dialing a cell phone is associated with the highest risk (2.8 times as high as non-distracted driving), while talking and listening on a cell phone is associated with a much smaller risk (1.3 times as high as non-distracted driving). Reaching for any electronic device is associated with a similar risk as talking and listening on a cell phone (1.4 times as high as non-distracted driving). These results indicate that the real key to significantly improving safety is keeping the eyes on the road while driving. “In contrast, “cognitively intense” tasks (e.g., emotional conversations, “books-on-tape”, etc.) can have a measurable effect in the laboratory, but the actual driving risks are much lower in comparison.” (Virginia Tech Transportation Institute, Box 2009)

Table 1: Risks Associated with Cell Phone Tasks in Light Vehicle/Cars

CELL PHONE TASK	Risk of Crash or Near Crash event
Dialing Cell Phone	2.8 times as high as non-distracted driving
Talking/Listening to Cell Phone	1.3 times as high as non-distracted driving
Reaching for object (i.e. electronic device and other)	1.4 times as high as non-distracted driving

3. Review of Crash Data and Survey Data

The observational survey data by the Applied Technology Research Corporation shows that at any time during day-time hours in the fall of 2009, 9.2% of drivers on Louisiana roads were using hand-held cell phones. The attitudinal survey conducted by the Applied Technology Research Corporation in fall of 2009 shows that 81.4% of respondents had access to a hand-held cell phone and 29.9% had access to a hands-free cell phone. Of those who had access to a hand-held cell phone, 39.6% said that they were using it on their last trip compared to 38.4% of those who had access to a hands-free cell phone. It is estimated that about 32% of the drivers surveyed used their cell phone on their last trip. Despite the widespread use of cell phones while driving, 81.9% of respondents considered it very dangerous or somewhat dangerous to use a cell phone while driving. A large percentage (57.1%) considered hands-free cell phones safer than hand-held cell phones, and 64.8% would support a law prohibiting hand-held cell phone use while driving, but 60.5% would oppose a law prohibiting the use of hands-free cell phones while driving.

Although published research reports a considerable increase in crash risks due to cell phone use while driving, this increase in risk is not supported by the trend in crash data. While there was more than a three-fold increase in cell phone usage from 1999 to 2008, the number of drivers involved in motor vehicle crashes declined by 1.7% and the risk of a Louisiana licensed driver being involved in a crash decreased from 11% to 10% in the same time span. Assuming a four-fold increase in risk associated with the cell phone use of 9.2% of drivers on the roads, Louisiana should have experienced an increase in drivers involved in crashes of 24% over the past ten years.

The Louisiana crash data, depicted in Table 2, shows that cell phone distractions are only one of many of the distractions that may occur in a motor vehicle. In 2009, 25% of all crashes with distractions inside the vehicle involved cell phones. Although these crash statistics identify cell phone use as a potential contributing factor in crashes, there are other contributing factors that are known to affect the severity of a crash. For instance, of the 16 fatal crashes that involved cell phone use, eight involved alcohol and nine of the 21 occupants (driver and passengers) killed were not wearing a seat belt. The Louisiana crash report does not collect information about hands-free versus hand-held cell phone usage.

Table 2: Crashes Involving Distractions inside the Vehicle

DISTRACTION EVENTS	CELL PHONE				OTHER ELECTRONIC DEVICES (PAGER, PALM PILOT, NAVIGATION DEVICE, ETC.)				OTHER INSIDE THE VEHICLE			
	FAT	INJ	PDO	TOT	FAT	INJ	PDO	TOT	FAT	INJ	PDO	TOT
2009	16	735	1510	2253	1	187	293	481	14	2259	4208	6483
2008	10	818	1456	2284	2	146	281	429	25	2414	4270	6709
2007	10	810	1575	2395	1	179	269	449	24	2513	4400	6937
2006	10	787	1500	2297	2	140	258	400	18	2612	4636	7266
2005	6	792	1335	2133	0	180	255	435	25	2807	4751	7583

4. Conclusions

Clearly better crash data is needed to understand and quantify the magnitude of the driver distraction problem and the relative contributions of different sources of driver distractions. At the moment, information from crash data is limited and the cell phone use in crashes is underreported. For instance, while surveys show that at any time 9.2% of drivers use a cell phone, crash reports show less than 1% of drivers in crashes using a cell phone during the crash. That means that most of the cell phone use in crashes remains unreported. Part of the reporting problem may be due to drivers not admitting cell phone use after crashes and police officers not investigating cell phone use. Over 90% of the reported cell phone usage on crash reports was for the driver at fault, indicating that the officers' report primarily cell phone usage if there was an indication that cell phone use was a contributing factor.

Equally important for a valid assessment of the crash risk associated with the cell phone use while driving is empirical data that would provide better information on how often drivers engage in potentially distracting behaviors and what it is about these behaviors that increase crash risks. To date, these kinds of data are limited and have primarily been collected in laboratory settings, which raise questions of how they can be generalized to actual driving. However, actions such as dialing a phone number that prevent the driver from keeping the eyes on the road while driving are the most distracting activities. Thus "headset" cell phone use is not substantially safer than "hand-held" use because the primary risk is associated with tasks that require your eyes to be off the road such as dialing and answering calls. In contrast, "true hands-free" phone use, such as voice activated systems, or

built in systems in cars are less risky if they are designed well enough so the driver does not have to take his/her eyes off the road often or for long periods of time.

Although there is consensus among safety researchers that cell phone use while driving is distracting, it is difficult to quantify the risk associated with this distraction. Louisiana crash data indicate that cell phone use is only part of the overall distraction within a car and the data do not indicate that cell phone usage alone has considerably increased the number of crashes over the past decade.

5. Appendix: State Laws Regarding Driving and Cell Phone Use in Louisiana

There are 4 separate Cell Phone / Text Messaging Laws in effect in the State of Louisiana. The 4 new driving laws are outlined below.

Act No. 665, also known as Senate Bill 137 is Louisiana's new Text Messaging and Cell-Phone law. The new driving laws Prohibits Text Messaging by all Drivers and limits the use of [Cell Phones](#) by novice drivers.

Novice driver's in Louisiana that hold a Class "E" learner's license are prohibited from making calls on a cell-phone or any wireless telecommunication device while driving unless the communication device is a Hands-Free device. If you are ticketed for a violation of these new cell phone laws you will receive a fine up to \$175 for your first offense and up to a \$500 fine for your second and subsequent offenses. If you are involved in a traffic accident and the law enforcement official determines you were in violation of this law when the accident occurred, the fine will be doubled.

One of the other new laws is Act No. 666, also known as Senate Bill 159. This new Louisiana Cell Phone law prohibits minors (17 years old and under) from using any type of wireless communication device while operating a motor vehicle. This includes text-messaging and [cell-phone](#) use. Devices not included in the new driving law are Push-to-Talk devices, Commercial Two-Way Radios and Citizen Band Radios. If you are ticketed for a violation of these new cell phone laws you will receive a fine up to \$100 for your first offense and up to a \$250 fine for your second and subsequent offenses. If you are involved in a traffic accident and the law enforcement official determines you were in violation of this law when the accident occurred, the fine will be doubled.

Louisiana Cell Phone Law for the First Time License Holder: Act No. 667, also known as Senate Bill 342 prohibits a first time license holder from using a Cell phone for any purpose while operating a motor vehicle. The newly licensed driver cannot use a cell phone while driving for 1 year from the date the license was issued. This new driving law does not apply to the first time State of Louisiana license holder who was legally licensed in another state. If you are ticketed for a violation of these new [cell phone](#) laws you will receive a fine up to \$100 or be sentenced to sixteen hours of community service or both for your first offense and up to a \$250 fine for your second or subsequent offenses. If you are involved in a traffic accident and the law enforcement official determines you were in violation of this law when the accident occurred, the fine will be doubled. This new Louisiana driving law is a secondary offense, meaning that you will only be ticketed if you have been pulled over for a primary offense such as speeding or running a red light.

The Louisiana School Bus Driver Cell Phone Law: Act No. 335 , also known as House Bill 402 prohibits School Bus drivers from engaging in calls on a Cellular phone while driving the School Bus. The new Louisiana Driving Law does provide exceptions for emergency situations.

There are exceptions to the laws in emergency situations and for law enforcement personnel.

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