An Analysis of the Risks Associated with Cell Phone Use While Driving, and Implications for Regulation

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Cellular telephones are overwhelmingly popular. As of June 2001, there were 116 million cell phone subscribers in the United States (Strayer and Johnston 2001). One reason for this popularity is convenience. Cell phones allow people to communicate with each other from virtually anywhere—easily and instantly. While they may be the ultimate communications convenience, however, cell phones have a significant drawback: a seemingly innocent call made while driving a car can endanger lives. That the risk of an accident is elevated when using a cell phone is convincingly established by the combination of epidemiologic and experimental research done on the issue. Considering the ethical and public safety concerns involved, this evidence is sufficient to justify legislation regulating cell phone use. The risk to life and limb outweighs whatever amount of convenience is associated with being able to make a call while driving. As no technology currently exists that can adequately reduce this risk or eliminate it altogether, a total legislative ban on cell phone use while driving appears to be the only satisfactory course of action.

Two complementary types of studies have been done to investigate the possibility that cell phone use while driving increases the risk of having an accident: epidemiologic analyses and controlled experiments. Epidemiologic analyses of past car crashes have documented the extent to which accidents are correlated with cell phone use. Although the studies confirm such an association, they are not able to demonstrate that cell phone usage caused the crashes to occur. Controlled experiments, on the other hand, have determined that subjects engaged in phone conversations generally perform worse in simulated driving exercises than those not so engaged. While neither type of study alone is definitive, due to their different methodological limitations, taken together they provide a strong case that a driver using a cell phone is at increased risk of having an accident. Moreover, this conclusion has not diminished over the years, as more recent research has confirmed essentially the same result as earlier studies on this subject.

Epidemiologic Evidence

Consider, first, the epidemiologic evidence. Three separate studies (Redelmeier and Tibshirani, 1997; the National Highway Transportation Safety Administration (NHTSA), 1997; and Violanti, 1998) all show that drivers who used cell phones had accidents at higher rates than those who did not.

Redelmeier and Tibshirani (1997), for example, analyzed 699 collisions in which drivers had cell phones. They compared time-of-collision data (based on police reports, drivers’ statements, and emergency calls made after the collision) with drivers’ cell phone records, and observed that the risk of having an accident quadrupled when drivers were using their phones (relative risk 4.3; 95 percent confidence interval, 3.0-6.5).
A broader study conducted by NHTSA (1997) involved collection of data from many different sources, including the Fatal Analysis Reporting System, the National Accident Sampling System, Oklahoma Crash Data, and Minnesota Crash Data. While the NHTSA study did not quantify the extent of risk, its authors also found that cell phone use while driving was associated with an increased risk of a car crash.

Comparing fatal and non-fatal crashes in which cell phones were and were not used, Violanti (1998) found that use of a cell phone while driving increased the risk of a fatality approximately nine-fold (adjusted odds-ratio 9.29; 95 percent confidence interval, 3.7-23.1). The increased risk associated with cell phone use was about three times higher than that associated with alcohol or drug use (adjusted odds-ratio 2.83, 95 percent confidence interval, 1.28-6.17), and about two times higher than that associated with speeding (adjusted odds-ratio 4.90, 95 percent confidence interval, 3.09-4.95).

These studies all conclude that there is an association between cell phone use while driving and risk of a car accident. They are not definitive, however, because of certain methodological limitations. The most important such limitation is that all of the studies are based on relatively small sample sizes. Although the NHTSA report contains data from many different sources, each individual source involved a small number of accidents. Likewise, in the Violanti study, according to Shakil, et al. (2003), “the actual number of subjects who were reportedly using their phones during an accident was very small—only 5 people in this category died.” This explains the large confidence interval associated with the approximate nine-fold increase in risk. What is called into question by the small sample sizes, however, is the extent of the risk, not the fact that cell phone use is associated with an increased risk of having a car accident. The fact that all three studies showed the same general trend (and, in the case of the Violanti study, an association between cell phone use and the risk of having a fatal accident), lends credence to this finding.

Experimental Evidence

Controlled experimental studies performed by Alm and Nilsson (1995), Lamble, et al. (1999), and Strayer and Johnston (2001) not only corroborate the observed epidemiologic association between cell phone use and risk of an accident, but also show that the increased risk is most likely due to impaired reaction times. This is despite differences in methodologies and the time periods in which the studies were conducted. Furthermore, the studies demonstrate that reaction times are negatively affected by both the physical and mental distractions of cell phone use.

In 1995, Alm and Nilsson analyzed the effects of a hands-free phone task on the simulated driving performance of subjects following other cars. Compared to a control group, the experimental group exhibited significant increased average reaction times (0.56 seconds for subjects less than 60 years old, 1.46 seconds for subjects over 60 years old), decreased minimum distances from cars in front (8 meters for younger subjects, 6 meters for elderly subjects), and increased mental demand, time pressure, effort, and frustration. In a previous study, Alm and Nilsson (1995) had also shown that a cell phone task while driving in a simulation in which there were no other cars on the road had a similar negative effect on driving performance. Considering the findings of both studies, “a driver using a cell phone in a car-following situation is closer to the car in front, more distracted, and slower to react than a driver who is not using a mobile phone” (Abravanel, et al., 2003). In this respect, these studies clearly show that cell phone use while driving can increase the risk of having an accident.

In 1999, Lamble, et al. performed a similar experiment that investigated drivers’ ability to react to deceleration of a car in front of them while performing two separate cell phone tasks: the first simulated dialing a cell phone and the second simulated conversing on the phone. Both tasks impaired drivers’ ability to detect and react to decelerating cars in front of them. Reaction speed was impaired by approximately 0.5 seconds by each cell phone task. This translates into approximately a full second less before collision with a lead car occurs. In addition to concluding that cell phone usage negatively affects driving by increasing reaction times, the authors observe that this resulted from both physically handling a phone and actually having a conversation. Therefore, the use of a hands-free device does not sufficiently diminish the increased risk of a collision.

Finally, in 2001, using a different methodology, Strayer and Johnston conducted a study whose basic findings were the same as the earlier studies. In part, the experiment
involved comparing the effect of cell phone conversations with and without the assistance of hands-free devices in a simulated driving situation. The investigators observed no significant difference in results between use and non-use of a hands-free device and found that simply talking on a cell phone leads to slower response to simulated traffic signals.

Reviewers, including Abravanel, et al. (2003), Hsu, et al. (2003), Barton and Berkowitz (2003), Chafkin, et al., and Bye, et al. (2003), identify several problems and limitations of these controlled experiments. Notably, they all consist of simulated driving experiences and simulated cell phone conversations. A more rigorous and realistic controlled experiment would involve giving cell phones to a random group of drivers, asking them to use them while driving, and comparing the number (and severity) of accidents they have as compared to a control group of non-cell phone users. There are obvious ethical problems associated with this type of study, however. While simulation may be the next best alternative, it has the problem of artificiality; simulations, by definition, are not real and can only imitate reality to a certain extent. Reviewers have also called attention to the fact that the artificiality of simulations could have resulted in measured quantities, such as reaction times, being different from what they would have been in real situations. The reviewers differ, however, regarding the extent to which the artificiality affected the data, and its implications with respect to their applicability to real life. The important point is that most suggest that the problems with the studies are not likely to have produced entirely false trends. This is strongly supported by the fact that the various studies show similar trends despite their different methodologies.

Epidemiological and controlled studies, when considered as a group, provide compelling evidence that cell phone use negatively affects driving performance and, therefore, associated with an increased risk of having a collision. They essentially report the same basic results and trends. With the connection established between cell phone use and increased risk of a collision, then, its public policy implications need to be addressed. Is legislation prohibiting cell phone use merited? And, if so, how should such legislation be structured?

Is Legislation Merited?

There are those who argue that, regardless of any connection between cell phone use and the risk of an accident, government should not be involved in regulating cell phone use. Such persons believe that people should have a right to engage in private behavior that is risky if they so choose, and that government should not have the right to control this aspect of their lives and actions. Their argument continues that, if the government were able to ban anything that is at all risky, citizens’ activities would be inappropriately restricted; if anything, therefore, only very risky activities should be limited, and cell phone use is not in that category.

Whether, and to what extent, people should be allowed to risk their own safety or lives is a difficult and complicated ethical question. However, in the case of cell phone use while driving, that question does not need to be fully addressed. This is because using a cell phone while driving not only risks the life and well-being of the driver, but also the welfare of other drivers, passengers, pedestrians, and anyone else on or near a road. While many would agree that government should not ban activities like skydiving, which only affects skydivers, presumably most would agree that it should be illegal to act in a way that endangers the lives of others — as is the case with cell phone use while driving.

Another, somewhat related argument against legislation banning cell phone use while driving, suggested by both Libbon (1999) and Hahn (1999), is that there are other types of distractions in cars — like listening to a radio or reading a map — that may increase the risk of an accident. Government does not regulate these activities, and the argument is that cell phone use should likewise not be regulated. There are several problems with this argument, however. First, the fact that it is not explicitly illegal to read a map in a car while driving, even though it may be distracting, does not mean that it, or other distracting activities, should be legal.\(^1\) Some people

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\(^1\) Case notes on the relevant North Carolina legislation, NCGS 20-154, for example, state that, “It is the duty of the driver of a motor a vehicle not merely to look, but to keep an outlook in the direction of travel.” A driver is held to the duty of seeing what he or she ought to have seen. The rule does not specifically outlaw looking at a map while driving, but does suggest that if a driver gets into an accident because of not looking in the direction of travel he or she could be held responsible.
might even support a law requiring drivers to exit a road if they are lost and need to consult a map.

Second, in addition to showing that cell phones with and without hands-free devices have similar negative effects on response to simulated traffic signals, Strayer and Johnston (2001) also found that “listening to a book on tape [as opposed to performing the cell phone task] did not result in significant impairment on the simulated driving task.” Apparently, the additional cognitive processing required while listening to and, especially, participating in a cell phone conversation makes a significant difference in one’s ability to drive, as compared to listening to the radio.

A final argument against legislation banning cell phone use in cars, again suggested by both Libbon (1999) and Hahn (1999), is that there are benefits to being able to use cell phones while driving. As Libbon points out (1999), in addition to finding that use of a cell phone quadruples the risk of an accident while driving, Redelmeier and Tibshirani (1997) observed that in 39 percent of the 699 accidents they studied, cell phones were used after the collisions to call for help. Hahn (1999) argues that the benefits of cell phones outweigh their risks. He asks, “Would you take the small risk of being one of those few fatalities [due to using a cell phone while driving] if you could summon help on a lonely highway? Or remind your spouse that your daughter’s play starts in 20 minutes? Or tell your boss you’ll be late for the 9 a.m. meeting?” By posing the questions this way, he presumes readers will agree that it is well worth the risk. The issue is not quite that simple, however. As Hahn’s examples suggest, the overwhelming majority of cell phone calls do not involve safety or life-or-death situations. Banning cell phone use while driving would not prevent calling 911 or a tow truck. If drivers have to call for help, they need not be driving their cars. Such calls can generally be made safely from the side of the road. Therefore, banning its use while driving would not negate this most significant benefit of having a cell phone in a car. If, indeed a situation arose in which it were necessary to use a cell phone while driving in order to save a life, this could certainly be considered an exception to the rule. In that case, people should be allowed to use a cell phone while driving. Beyond that, most would not be willing to risk their lives to make a call to their boss saying they are going to be late. Furthermore, even if people were willing to risk their own lives for such purposes, it is entirely inappropriate to risk the lives of others.

While legitimate arguments have been made about the limits of government control over personal behavior and the benefits of having a cell phone that can be used for emergency purposes, they are not persuasive when safety and lives are at stake. As a remedy, therefore, legislation regulating use of cell phones while driving is merited.

How Should Such Legislation be Structured?

Two major types of cell-phone-usage legislation are currently being considered and, in some places, have already been enacted. One totally bans cell phone use while driving; the other requires the use of hands-free devices. The latter requirement now exists in New York and is being contemplated in Washington D.C. Unfortunately, however, requiring drivers to use hands-free devices while driving is a misguided attempt to reduce cell-phone-use risk and is likely to be almost entirely ineffective. Redelmeier and Tibshirani (1997) found that “…units that allowed the hands to be free offered no [significant] safety advantage over hand-held units.” This epidemiologic finding was further confirmed by the controlled experiments of Alm and Nilsson (1995), Lamble et al. (1999), and Strayer and Johnston (2001), which showed that cell phones use is associated with increased risk of a collision both with and without hands-free devices. Hence, it is not the operation of the cell phone but, in fact, the maintenance of a conversation on a cell phone that results in increased reaction times and, consequently, accidents. Use of a hands-free device eliminates the distraction posed by the physical operation of a phone but, obviously, does not alter the distraction effect of maintaining a conversation. Inasmuch as both the epidemiologic and controlled studies show that hands-free devices do not offer any safety advantages over hand-held phones, the appropriate legislative remedy is to totally ban cell phone use while driving.

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Every type of new technology needs to be evaluated for both its benefits and risks.

The use of mobile phones while driving has become immensely popular since their relatively recent introduction into the market. However, as both observational and controlled scientific studies have concluded, making a call while driving increases the risk of an accident. Despite the shortcomings of the studies on this subject and an inability to precisely quantify the extent of that increased risk, it seems clear that the risk is anything but trivial. Using a cell phone while driving heightens the probability of having an accident—enough so as to warrant legislation banning such use. While listening to the radio has been shown not to impair drivers’ performance, cell phone usage inappropriately and intolerably endangers the lives of everyone on the road. If new technology identifies a way to reduce or eliminate this risk, and it can be authenticated by scientific evidence, such advancement should be considered for implementation possibilities. Until then, however, the only reasonable option is to totally ban cell phone use while driving.

Works Cited


