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Evaluating the impact of legislation prohibiting hand-held cell phone use while driving

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ABSTRACT

As of November 2008, the number of cell phone subscribers in the US exceeded 267 million, nearly three times more than the 97 million subscribers in June 2000. This rapid growth in cell phone use has led to concerns regarding their impact on driver performance and road safety. Numerous legislative efforts are under way to restrict hand-held cell phone use while driving. Since 1999, every state has considered such legislation, but few have passed primary enforcement laws. As of 2008, six states, the District of Columbia (DC), and the Virgin Islands have laws banning the use of hand-held cell phones while driving. A review of the literature suggests that in laboratory settings, hand-held cell phone use impairs driver performance by increasing tension, delaying reaction time, and decreasing awareness. However, there exists insufficient evidence to prove that hand-held cell phone use increases automobile-accident-risk. In contrast to other research in this area that uses questionnaires, tests, and simulators, this study analyzes the impact of hand-held cell phone use on driving safety based on historical automobile-accident-risk-related data and statistics, which would be of interest to transportation policy-makers. To this end, a pre-law and post-law comparison of automobile accident rate measures provides one way to assess the effect of hand-held cell phone bans on driving safety; this paper provides such an analysis using public domain data sources. A discussion of what additional data are required to build convincing arguments in support of or against legislation is also provided.

1. Introduction

As of 2008, the Cellular Telecommunications and Internet Association (CTIA) reported that the number of cell phone subscribers in the US exceeded 267 million. The latest data available from the National Highway Traffic Safety Administration (NHTSA) estimated that in 2007, about 11% of the population used a phone while driving at some point during the day, as reported in *USA Today* (O'Donnell, 2009). Earlier studies revealed that approximately one-half of interviewed drivers reported using cell phones while driving, either to make outgoing calls or take incoming calls, spending an average of 4.5 min per call (Royal, 2003). Hand-held cell phones are believed to be an important factor in driver distraction (Williams, 2007). Driver distraction is thought to be the cause of nearly 80% of automobile accidents and 65% of near-accidents (Klauer et al., 2006), resulting in approximately 2600 deaths, 330,000 moderate to critical injuries, and 1.5 million instances of property damage annually in the US (Cohen and Graham, 2003). Nonetheless, car cell phones have been marketed for nearly half a century and continue to be viewed by many as a high-profile product, as evidenced by a recent article in *New York Times*

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(Richtel, 2009). Indeed, these facts are drawing a significant amount of public attention to the issue of hand-held cell phone use while driving.

Hand-held cell phone use while driving imposes no less than three tasks upon drivers: locating/glancing at the phone, which draws the eyes away from the road; reaching for the phone and dialing, which impairs control of the vehicle; and conversing via the phone, which distracts attention from driving (Klauer et al., 2006). Dialing a hand-held cell phone is a particularly dangerous task that forces a driver to take their eyes off the road, and thereby, increases the risk of accidents and near-accidents. The CTIA safe driving tips include never dialing a telephone or taking notes while driving (CTIA, 2008a). Cell phone use while driving has been considered and studied as a primary factor in automobile accidents, due to the high frequency of this activity (NHTSA, 1997).

Numerous investigations have been undertaken to determine whether hand-held cell phone use impairs driver performance. Such efforts are typically based on simulators, tests, questionnaires, telephone surveys, and observations. Redelemeier and Tibshirani (1997) associate hand-held cell phone use with automobile accidents by analyzing questionnaire responses of 699 drivers as well as phone and police records. They suggest that automobile-accident-risk is equivalent to impairment resulting from legal intoxication. Caird et al. (2008) and Horrey and Wickens (2006) show that the costs associated with cell phone use while driving are seen in reaction time tasks, with smaller costs in performance on lane keeping and tracking tasks. Strayer and Drews (2004) report that hand-held cell phone use while driving increases braking times by 18%, increases following distances by 12%, and increases the time for speed resumption after braking by 17%. The NHTSA used a driver simulator to investigate the effects of hand-held cell phone use while performing four tasks: car following, lead-vehicle braking, lead-vehicle cut in, and merging. They observed that hand-held cell phone use while driving impairs driver performance, increases the response to lead-vehicle speed changes during car following, and degrades automobile control (Ranney, 2005).

The growing use of cell phones and the associated research on how they impact driver performance have led many, including some state legislators, to question their safety while driving. Royal (2003) claims that 71% of drivers support restrictions on hand-held cell phones and 57% approve a ban on hand-held cell phone use while driving, although most drivers that do use cell phones oppose such outright bans or traffic fines on hands-free cell phones. Acknowledging a potential negative impact of hand-held cell phone use while driving, a number of legislative initiatives have passed that ban hand-held cell phone use while driving. In fact, since 1999, every state has considered such legislation (Sundeen, 2004). In 2001, New York became the first state to enact such a law. Since that time, similar bans have taken effect in New Jersey, DC, Connecticut, Utah, California, Washington, and the Virgin Islands, with all primary enforcement laws (except Utah where the law is primary only in regards to text messaging), which allows law enforcement officers to ticket drivers for using a hand-held cell phone while driving without any other traffic violation (Governors Highway Safety Association, 2008). A number of states (e.g., Illinois) restrict hand-held cell phone use by requiring sound to travel unimpaired to at least one ear or to have at least one hand on the steering wheel at all times (Sundeen, 2001). In addition to state statutes, local ordinances have been passed that prohibit hand-held cell phone use while driving in certain counties, cities, towns, and municipalities. For example, Chicago, Illinois, implemented such a policy in 2005. There are a total of 28 jurisdictions that enforced such local ordinances in Florida, Illinois, Massachusetts, Michigan, New Jersey, New Mexico, New York, Ohio, Pennsylvania, and Utah (Cellular News, 2008). However, no state or local ordinance completely bans all types of cell phones (hand-held and hands-free) while driving, though many prohibit cell phone use by certain segments of the population (Glassbrenner and Ye, 2007). For example, California enforces an all-type cell phone ban for school bus drivers and drivers under 18 years of age (AAA Auto Insurance, 2008).

While proponents believe that laws banning hand-held cell phone use while driving may reduce driver distraction and improve driver performance, opponents of such laws believe that it is premature to act. Although research suggests that multi-tasking impairs driver performance, there is still insufficient evidence to definitively prove that hand-held cell phone use increases automobile-accident-risk (McCartt et al., 2006; Williams, 2007; Olson, 2003). Note that in this domain, definitive proofs are practically impossible to obtain, given the inability of researchers to conduct controlled experiments where the dependent variables are accidents, property damage, personal injuries and even death. A study on distracted driving, released by the NHTSA and the Virginia Tech Transportation Institute (Dingus et al., 2006; Klauer et al., 2006), suggests that drivers talking or listening to a wireless device are no more likely to be involved in an accident or near-accident, than those not involved in such activities. Of course, the safety and highway travel benefits provided by cell phones, especially for public health and safety considerations, cannot be overlooked (Lissy et al., 2000). For example, cell phones can reduce emergency response time to automobile accidents (Savage et al., 2000). Moreover, given that legislation narrowly aimed toward cell phone use does not adequately address the larger issue of driver distraction, the CTIA believes that education is a more effective approach to enhance drivers' awareness and responsibility (CTIA, 2008b). A number of safety and elected officials agree with this sentiment, including the Chairman of the Governors Highway Safety Administration (CTIA, 2008b). To prove this point, in 2008, CTIA along with Sprint Nextel, Cingular Wireless, Dobson Cellular Systems, and other wireless companies, developed programs and sponsored public service announcement campaigns designed to educate drivers on distraction while operating vehicles.

In addition to education, the cell phone industry has focused on enhancing driving safety beyond the issue of hands-free operation, by eliminating in-hand manipulation and reducing distractions while driving (Goodman et al., 1997). Recent research and technological advances in this area are providing innovative solutions to the problem of distracted drivers, such as hands-free car kits and the "Polite Phone" prototype, using ground-breaking Bluetooth technology to provide a voice-command interface between a car and a cell phone and enable hands-free voice dialing, answering, and hanging up (Auto News, 2006; Funponsel Network, 2005). However, early reports failed to observe a significant risk reduction due to the use of this new technology (Strayer et al., 2003; McEvoy et al., 2005).