

## **Driver Hand-Held Cellular Phone Use in Minnesota, August 2006**

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## INTRODUCTION

Cellular (mobile) phones have become a part of American culture. Although cellular phones provide unprecedented convenience, use of these phones while driving is a growing traffic safety concern. To date, four states (New York, New Jersey, Connecticut, and the District of Columbia) have banned drivers from using cellular phones behind the wheel. In August 2005, Colorado banned teen drivers from using cellular phones while driving, while in 2006, Minnesota enacted a law that prohibits those with a provisional license or a learner's permit (under the age of 18) from talking on a cellular phone while driving. Indeed, use of a cellular phone can distract a person from the primary task of driving.

Evidence obtained from simulated driving (e.g., Alm & Nilsson, 1995; de Waard, Brookhuis, & Hernández-Gress, 2001; McKnight & McKnight, 1993; Serafin, Wen, Paelke, & Green, 1993; Strayer & Johnston, 2001) and on-the-road driving (e.g., Brookhuis, de Vries, & de Waard, 1991; Tijerina, Kiger, Rockwell, & Tornow, 1995a,b) has shown that use of a cellular phone can lead to decrements in tasks required for safe driving. There is general agreement in the literature that the most distracting activities involving cellular phone use are dialing and receiving phone calls (see e.g., Alm & Nilsson, 2001; Brookhuis, de Vries, & de Waard, 1991; Green, 2000; Tijerina, Johnston, Parmer, Winterbottom, & Goodman, 2000; Zwahlen, Adams, & Schwartz, 1988). In addition, use of hand-held phones tend to be associated with greater decrements in driving performance than hands-free phones, but the conversations tend to be equally distracting, especially when the information content is high (see e.g., McKnight & McKnight, 1993; Patten, Kircher, Östlund, & Nilsson, 2004; Strayer & Johnston, 2001).

Evidence is also mounting, although still far from conclusive, that the use of cellular phones increases crash risk. In their analysis of the Crashworthiness Data System (CDS) data, Stutts, Reinfurt, and Rodgman (2001) found that cellular phone use or dialing was implicated in about 1.5 percent of distraction-related crashes. One would expect this percentage to increase as the predicted use of cellular phones increases. More recent work in Virginia has found that about 5 percent of distraction-related crashes involve cellular phones (Glaze & Ellis, 2003). Utilizing self-reported data on cell phone crash involvement, Royal (2003) estimates that there are 292,000 drivers in the US who report cell-phone involvement in a crash in the past 5 years. Results from epidemiological studies in which cellular phone use has been linked with crash records, are beginning to support the hypothesis that use of a cellular phone while driving increases crash risk (Koushki, Ali, & Al-Saleh, 1999; Redelmeier & Tibshirani, 1997; Sagberg, 2001; Violanti & Marshall, 1996).

The magnitude of the potential public health problem posed by cellular phone use in motor vehicles is moderated by the amount of exposure to this risk; that is, how frequently cellular phones are used by the motoring public. There are few solid exposure data available. Surveys in which people self report use either gather only general use information (such as whether or not people use their phone in the car), or the results cannot be generalized to a larger population. Cellular phone use derived from police crash records may not accurately reflect exposure since use is often acquired by self-report from the crash-involved driver.

Drivers may be reluctant to report this potential distraction because of liability issues. A less biased way to obtain frequency of mobile phone use is through direct observation on the roadway, where observers stand at intersections and record use of hand-held cellular phones as vehicles pass by. Past direct observation studies of cellular phone use in Michigan (Eby, Kostyniuk, & Vivoda, 2003; Eby & Vivoda, 2003), North Carolina (Reinfurt, Huang, Feaganes, & Hunter, 2001), Minnesota (Eby & Vivoda, 2004, 2005) and nationwide (National Highway Traffic Safety Administration, NHTSA, 2001) have found that about 3-5 percent of the driving population are conversing on a hand-held cellular phone at any given moment during daylight hours.

The purpose of the present study was to continue tracking the statewide hand held cellular phone use rate of drivers in Minnesota in order to better understand the exposure to this distracting activity. The present study also marks the first during which Minnesota law prohibits those with provisional licenses or learner's permits (under the age of 18) from conversing on cellular phones while driving. While this study lacks sufficient observations to assess cellular phone use by age group, it will be of interest to see if this new law has an effect on the overall cellular phone use rate.

## **METHODS**

The study utilized a direct observation survey to collect hand-held cellular phone use. As described in detail elsewhere (Eby, Vivoda, & Cavanagh 2004), the sample design was a stratified probability sample of 240 freeway exit ramps and intersections in Minnesota. The sample design allowed for data to be weighted so that it represented the behaviors of Minnesota vehicle occupants traveling in passenger cars, sport utility vehicles, pickup trucks, and vans/minivans. Hand held cellular phone use data were collected at the same time as safety belt use and vehicle occupant demographics.

Driver cellular phone use rates by vehicle miles of travel (VMT) were calculated by weighting the data for each site by a factor based on the number of vehicles observed and an estimate of traffic volume. Weighted rates and variances for hand-held cellular phone use were calculated using the equations in a previous report (Eby, Vivoda, & Cavanagh 2004), except that cell phone use was substituted for safety belt use.

## **RESULTS**

A total of 11,269 drivers were observed. Of those, 604 were using hand-held cellular phones. When weighted by VMT, the study found that  $4.68 \pm 1.7$  percent of drivers in Minnesota were using a hand-held cellular phone at any given moment during daylight hours. This rate is about one percentage point higher than last year's rate of  $3.67 \pm 1.4$  percent. These rates, however, are not statistically different.

Driver hand-held cellular phone use for intersections ( $4.02 \pm 2.1$  percent) was lower than the rate of use at exit ramps ( $6.29 \pm 2.7$  percent). Table 1 shows hand-held cellular phone use rates by the eight strata utilized in the sampling design. Note that because of the small

number of cell phone users, these rates have high variances and should be interpreted with caution.

Table 1: Driver Hand-Held Cellular Phone Use by Stratum in Minnesota.		
Stratum	Counties	Driver Hand Held Cellular Phone Use (unweighted N)
<i>High Belt Use</i> Stratum 1: intersections Stratum 5: exit ramps	Carver, Dakota, Olmsted, Ramsey, Wright	4.0 ± 2.4% (67) 6.9 ± 5.5% (80)
<i>Hennepin</i> Stratum 2: intersections Stratum 6: exit ramps	Hennepin	7.2 ± 3.7% (190) 5.9 ± 5.4% (96)
<i>Medium Belt Use</i> Stratum 3: intersections Stratum 7: exit ramps	Beltrami, Blue Earth, Clay, Crow Wing, Freeborn, Goodhue, Kandiyohi, Nicollet, Rice, Scott, Sherburne, St. Louis, Steele, Washington	3.0 ± 3.3% (23) 6.9 ± 5.4% (63)
<i>Low Belt Use</i> Stratum 4: intersections Stratum 8: exit ramps	Anoka, Becker, Benton, Brown, Carlton, Cass, Chisago, Douglas, Isanti, Itasca, McLeod, Morrison, Mower, Otter Tail, Polk, Stearns, Winona	4.5 ± 3.7% (51) 5.7 ± 4.6% (34)

The current survey marks the third statewide survey in which driver hand-held cellular phone use was measured. Figure 1 shows the statewide use rates over the past three years and the best fitting trend line.

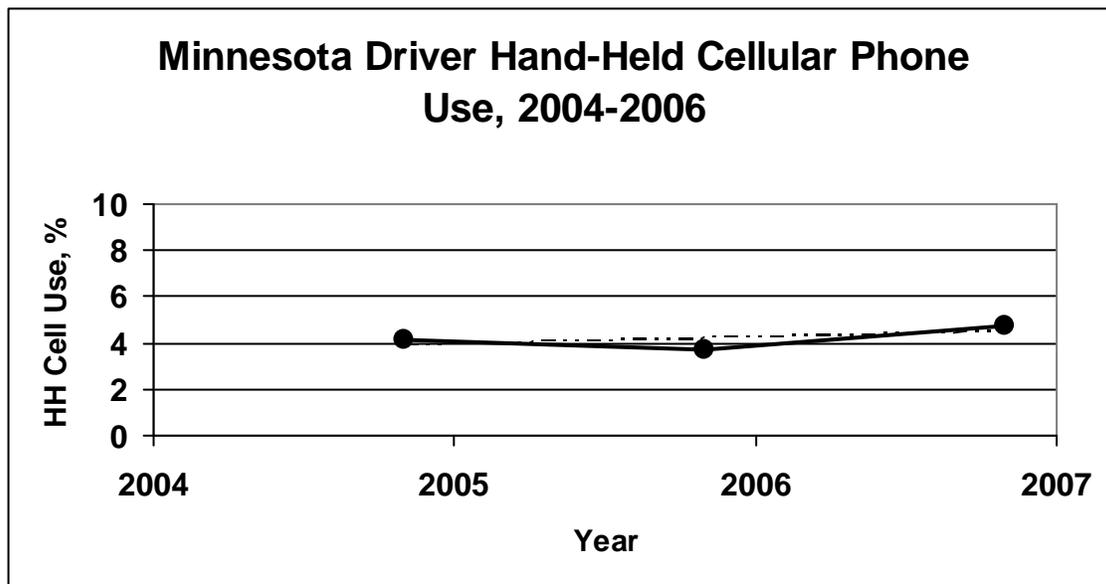


Figure 1: Driver Hand-Held Cellular Phone Use in Minnesota from 2004-2006.

## DISCUSSION

This study measured hand-held cellular phone use for drivers in Minnesota by VMT. We found that at any given daylight time in Minnesota, 4.7 percent of drivers are engaged in a conversation over a hand-held cellular phone. This number represents an increase of about one percentage point over last year's rate. As such, the new legislation restricting cellular phone use by young drivers does not seem to have had an effect on overall cellular phone use. However, it is important to note that this survey does not assess the use rates of those specifically targeted by this legislation, therefore it is not possible to draw conclusions about the effectiveness of the law.

There are approximately 4.5 million registered passenger cars, sport utility vehicles, vans/minivans and pickup trucks in Minnesota (Federal Highway Administration, FHWA, 2004) using the most recent data available. Following NHTSA's (2001) reasoning, if we assume that these vehicles are being used for an average of one hour during daylight times, then there would be about 375,000 vehicles on the road in Minnesota at any given daylight hour. If 4.7 percent of these vehicles are being driven by people using hand-held cellular phones, there would be approximately 17,625 drivers in Minnesota conversing on cellular phone at any given hour.

While this number is small compared to the total number of drivers in Minnesota, it is important to keep in mind two facts related to cellular phone use. First, cellular phone use may begin increasing dramatically in Minnesota. Michigan estimates show that hand-held cellular phone use has increased at a rate of nearly one percentage point per year over the last five years (Eby, Vivoda, & St. Louis, 2006). Second, studies have shown that cellular phone use is linked to a lack of safety belt use (Eby, Kostyniuk, & Vivoda, 2003; Eby & Vivoda, 2003). Whether this finding results from cellular phone users tending to engage in risky driving behaviors more often than nonusers, or whether the use of a cellular phone interferes with the use of a belt is unknown. What is known is that not only are those who are conversing on cellular phones potentially more likely to be in a motor vehicle crash, due to the lower safety belt use of this population they are also more likely to sustain greater injury should a crash occur.

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