# Driver Hand-Held Cellular Phone Use in Minnesota, August 2005

**David W. Eby, Ph.D.**
**Jonathon M. Vivoda, B.A.**

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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 Distract of Columbia) have banned drivers from using cellular phone behind the wheel. In August 2005, Colorado banned teen drivers from using 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, deVries, & de Waard, 1991; Tijerina et al, 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 et al., 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 & Vivoda, 2003; Eby, Kostyniuk, & Vivoda, 2003), North Carolina (Reinfurt et al., 2001), Minnesota (Eby & Vivoda, 2004) and nationwide (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.

## 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 rather than safety belt use was substituted.

## RESULTS

A total of 10,389 drivers were observed. Of those, 494 were using hand-held cellular phones. When weighted by VMT, the study found that 3.67 ± 1.4 percent of drivers in Minnesota were using a hand-held cellular phone at any given moment during daylight hours. This rate is consistent with results reported previously and roughly one-half percentage points lower (4.07 ± 2.0 %) than the same time last year in Minnesota. However, when this year's and last year's rates are compared statistically, no difference is found between rates.

Driver hand-held cellular phone use for intersections (3.02 ± 1.8%) was lower than the rate of use at exit ramps (4.81 ± 1.7%). 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)** |
| ***High Belt Use*** | Carver, Dakota, Olmsted, Ramsey, Wright | |
| **Stratum 1: intersections** | | 3.6 ± 1.1% (44) |
| **Stratum 5: exit ramps** | | 5.2 ± 2.1% (71) |
| ***Hennepin*** | Hennepin | |
| **Stratum 2: intersections** | | 4.3 ± 2.3% (120) |
| **Stratum 6: exit ramps** | | 4.7 ± 1.5% (91) |
| ***Medium Belt Use*** | Beltrami, Blue Earth, Clay, Crow Wing, Freeborn, | |
| **Stratum 3: intersections** | Goodhue, Kandiyohi, Nicollet, Rice, Scott, | 2.7 ± 6.7% (18) |
| **Stratum 7: exit ramps** | Sherburne, St. Louis, Steele, Washington | 4.7 ± 1.1% (63) |
| ***Low Belt Use*** | Anoka, Becker, Benton, Brown, Carlton, Cass, | |
| **Stratum 4: intersections** | Chisago, Douglas, Isanti, Itasca, McLeod, Morrison, | 3.3 ± 5.2% (42) |
| **Stratum 8: exit ramps** | Mower, Otter Tail, Polk, Stearns, Winona | 4.6 ± 6.8% (45) |

## 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, 3.7 percent of drivers are engaged in a conversation over a hand-held cellular phone. 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 3.7 percent of these vehicles are being driven by people using hand-held cellular phones, there would be approximately 13,875 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 is increasing dramatically. Unpublished estimates show that hand-held cellular phone use has increased at a rate of about one percentage point per year over the last five years in Michigan. Thus, the number of actual users is likely to increase in Minnesota at a similar rate. Second, studies have shown that cellular phone use is linked to a lack of safety belt use (Eby & Vivoda, 2003; Eby, Kostyniuk, & 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, they are also more likely to sustain greater injury should a crash occur.

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