



Driver Electronic Device Use Observation Protocol

Background

Distracted driving as a traffic safety issue has received increased attention in recent months. In particular, cellular phone use has come under increased scrutiny. The National Highway Traffic Safety Administration's (NHTSA) primary method of estimating cell phone use is the National Occupant Protection Use Survey (NOPUS). The purpose of this document is to provide information about NOPUS and how it observes and reports on driver cell phone use.

Introduction

NOPUS is the only nationwide probability-based survey of seat belt use (for adult occupants in both front and rear seats), motorcycle helmet use, child restraint use (for children younger than 8 years old), and driver electronic device use in the United States. It is conducted annually by NHTSA's National Center for Statistics and Analysis. NOPUS is comprised of two sub-surveys: Moving Traffic (MT) survey and Controlled Intersection (CI) survey. In the MT survey, data are collected by observing vehicle occupants either at the roadside or, in the case of expressways, while riding in vehicles in traffic. NOPUS estimates of front seat belt use and motorcycle helmet use are based on the MT survey. The CI survey data are collected at intersections controlled by stop signs or stoplights, where vehicle occupants are observed from the roadside. Only stopped vehicles are observed to permit time to collect the variety of information required by the survey. NOPUS estimates of rear seat belt use, demographic characteristics of front seat belt use, child restraint use, and driver electronic device use are derived from the CI survey.

Data Collection for the NOPUS CI Survey

In the NOPUS CI survey, data collectors observe cell phone use and restraint use of drivers and other occupants of passenger vehicles having no commercial or government markings that have stopped at a stop sign or stoplight during daylight hours between 7 a.m. and 6 p.m. Observations are made both on surface streets and at the ends of expressway exit ramps (when there are controlled intersections). The CI survey is always con-

ducted following the MT survey and is scheduled for all surface streets and limited access highway ramps, where NOPUS data from previous years indicate that a controlled intersection existed. If the data collectors arrive at an assigned surface street site and determine that the site is not controlled, they are then instructed to search for a controlled intersection by driving five minutes in either direction from the assigned site and along the same observed road. For a limited-access highway, data collectors are instructed to begin their search for a suitable controlled intersection from an identified access ramp (referred to as Ramp 1). If Ramp 1 does not have any control devices then they need to proceed to the next identified access ramp (referred to as Ramp 2) to search again for another suitable controlled intersection from which to collect observations. Information on the alternate CI location or the fact that no controlled intersection exists is recorded in the Personal Digital Assistant. The data collectors begin recording observations on vehicle and occupant characteristics proceeding away from the controlled intersection toward the facing vehicles. Once the traffic light turns green or they finish observing all vehicles, the data collectors return to the intersection to wait for the next traffic light cycle or next vehicle. They observe vehicles in the lane closest to their observational position, even if the closest lane is an exclusive turn lane (which is often the case at the controlled intersections). When possible and if visibility allows, the data collectors also observe other lanes of traffic. The data collectors are instructed to record the first behavior of the driver they observe. For example, if a driver is not using a cell phone at the start of observation and then begins to use one, the data collectors are instructed to record that "no cell phone is being used."

Observation Protocol and Definitions

NOPUS observes three types of driver electronic device use:

1. Drivers holding phones to their ears
2. Drivers speaking with visible headsets on
3. Drivers visibly manipulating hand-held devices

These categories are described in more detail below:

Drivers holding phones to their ears: Drivers are classified into this category if the data collectors see them holding cell phones to their ears. This includes speaking, listening to messages, or conducting voice-activated dialing while holding phones to their ears.

Drivers speaking with visible headsets on: Drivers are classified into this category if they appear to be speaking and wearing headsets with microphones. This includes engaging in conversation or conducting voice-activated dialing via a wireless earpiece on the driver's right ear or via an ear bud connected by wire to a cell phone. Talking via a visible Bluetooth headset (usually on the driver's right ear) is also included in this category. However, it does not include drivers using headsets that do not involve cell phones (such as iPods), since these headsets do not involve microphones. Note that the wireless earpieces that are obscured by hair or clothing or are on the driver's left ear would not be included because they would not be visible to the roadside observer. In addition, some wireless ear buds would not be included as they are too small to be observed from the roadside. The drivers with headsets who are not speaking at the time of observation are not included because they might have recently completed a call or be waiting for an expected call. Each driver in the survey is observed for about 10 seconds before the data collector decides whether or not the driver is speaking. Note also that the drivers counted as speaking through visible headsets might have been talking to a passenger or using voice-activated computer software rather than using a phone.

Drivers visibly manipulating hand-held devices: Drivers are classified into this category if they appear to be manipulating some type of electronic device such as a cell phone, a smart phone, PDA, video game, or some other device. This includes text messaging; using a Web-capable smart phone (such as an iPhone) or a PDA (such as a BlackBerry phone) to view travel directions, check e-mails or calendar appointments, or surf the Internet; manual dialing; playing hand-held games; and holding phones in front of their face to converse or check messages via speakerphone or use voice-activated dialing. Manipulation of the non-hand-held devices (adjusting volume on stereos, pressing buttons on a dashboard GPS unit, etc.) is not included in this category. Also, note that a driver characterized by the survey as "manipulating hand-held devices" may or may not have been speaking. There are means by which the drivers can use cell phones that would neither be recorded as "holding phones to their ears" nor as "speaking with visible headsets on" or as "visibly manipulating hand-held devices" in NOPUS. These include but are not limited to: (1) a driver using a cell phone headset but not speaking during the approximately 10 seconds when he/she is being observed, and (2) a driver using technologies that cannot be observed from the roadside. Such technologies would include: a wireless earpiece obscured by hair or clothing or on the left ear, a speakerphone with the phone on the passenger seat or in a cell phone holder on the vehicle dashboard, a phone that is built into the vehicle (such as OnStar), and a cell phone that is used hands-free via a Bluetooth car kit or via a Bluetooth system that is built into the vehicle (such as Sync). It is possible that at some point in the future, NOPUS may be able to capture such behaviors by directing a device that can detect active cell phone use in passing vehicles.

Table 1
Three Categories of Driver Electronic Device Use

Drivers	What Is Actually Being Observed by Data Collectors?	Driver Speaking (During the 10s Observation Window)?
Holding phones to their ears	Cell phones in drivers' hands	May or may not be speaking
Speaking with visible headsets on	Headsets with microphones or Bluetooth headsets; cell phones may not be in sight	Speaking
Visibly manipulating hand-held devices	Cell phones, PDAs, video games, MP3 players, and other hand-held devices	May or may not be speaking

NOPUS Background on cell phone observation

NOPUS first observed cell phone use in 2000. The data collectors classified drivers as “using a hand-held phone” if drivers were holding to their ears what appeared to the data collector as a phone. In 2004, NOPUS added the driver headset use category. The drivers were counted as “using headsets” if they appeared to have on their heads devices that had microphones and they appeared to be speaking. To better capture the variety of electronic device use by drivers on the roads, the 2005 NOPUS included one more category: driver manipulating hand-held devices. The drivers were counted as “manipulating a hand-held device” if they appeared to be manipulating some type of electronic device, whether a cell phone, video game, or other device.

NOPUS Sample Design Information

Currently, NOPUS is phasing in to a redesigned sample of observational sites. Since the initial implementation of the redesign in 2006, NOPUS has had an increasing number of sites from the redesigned sample and a decreasing number of sites from the old sample every year. Data from 2005 and prior years were obtained from the old observational sites only. The old sample design was a multi-stage, stratified sample design in which 50 PSUs were selected at the first stage and the strata were created using Census region, Metropolitan Statistical Area (MSA) or non-MSA status, and the State’s seat belt use rate (high = 70% and over, medium = 55 to 69% and low = under 55%). In the second stage, roads were classified into two secondary strata prior to sampling, namely major roads (including limited access highways, U.S. roads, and State routes), and local roads (including county roads, residential roads, and rural roads). For the 2009 NOPUS, 17 PSUs and 641 sites were selected from the old design. The redesigned NOPUS sample was selected using a two-stage design with stratified Probability Proportional to Size (PPS) sampling at each stage. The sampling frame of Primary Sampling Units (PSUs) for the 2006 redesigned sample included all counties in the United States but excluded Puerto Rico and the U.S. territories. In the redesigned sample, only one PSU was designated as a certainty sampling unit due to its large VMT. In order to decrease the variances associated with the survey estimates, the remaining PSUs were stratified according to their predicted rates of restraint use based on a regression model that used VMT, percentage of college graduates, and several other relevant variables as predictors. The non-certainty PSUs were selected by systematic PPS sampling

from these primary strata using VMT as the measure of size. The Secondary Sampling Units (SSUs) consisted of road segments that lie at least partly inside the selected PSUs. To define road segments, the selected PSUs were divided into grids, usually of one acre in size. For the 2009 NOPUS, 38 PSUs and 1,182 sites were selected from the redesigned sample.

Most Recent Observation and Estimate

The NHTSA publication Driver Electronic Device Use in 2008 (DOT HS 811 184) reported that the proportion of drivers visibly manipulating hand-held devices was 1 percent, while hand-held cell phone use by drivers stood at 6 percent in 2008.

Notes on Limitations

Two limitations of the NOPUS data are worth noting. First, NOPUS estimates reflect daytime cell phone use only; cell phone use might be different at night. Second, NOPUS observes only passenger vehicles that stop at a stop sign or stoplight. Therefore, it is conceivable that driver cell phone use rates may be different for such intersections where a driver is more likely to make a short phone call during the red light as compared to the moving traffic. It is also possible that drivers might use hand-held phones more frequently on roads that have controlled intersections than other roadways because they expect to periodically stop at lights or stop signs. Therefore, the number of drivers holding phones to their ears during the typical daylight moment estimated by NOPUS may be an overestimate or underestimate.

The definitions for the three types of electronic device use are chosen because they are simple (hence leading to fewer observational errors) and can be implemented in the context of observing traffic from the roadside. Consequently, some cell phone use by drivers (e.g., conversing on cell phones with Bluetooth headsets on the drivers’ left ears) is NOT counted while some non-cell-phone-use (e.g., manipulating hand-held video games) is included in the NOPUS data. Due to the rapid development of telecommunication technologies and the increasing public awareness of the threats from distracted driving, NOPUS will keep updating and refining the definitions and the observation protocol as needed in the future. Despite all these limitations, NOPUS provides the best data available on driver cell phone use during the typical daylight moment in the United States.

References

Pickrell, Timothy and Ye, Tony: "Driver Electronic Device Use in 2008", NHTSA Research Note, DOT HS 811 184, September 2009.

Pickrell, Timothy and Ye, Tony: "Seat Belt Use in 2009—Overall Results", NHTSA Research Note, DOT HS 811 100, September 2009.

For More Information

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