



Motorcycle Helmet Use in 2010—Overall Results

Use of DOT-compliant motorcycle helmets¹ decreased significantly to 54 percent in 2010 from 67 percent in 2009. This result is from the National Occupant Protection Use Survey (NOPUS), which is the only survey that provides nationwide probability-based observed data on helmet use in the United States. The NOPUS is conducted by the National Center for Statistics and Analysis, National Highway Traffic Safety Administration.

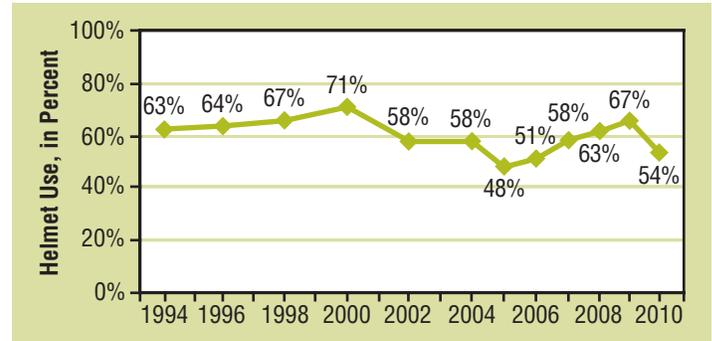
The trend of motorcycle helmet use since 1994 is shown in Figure 1. Figure 2 shows the percentages of motorcyclists who were using DOT-compliant helmets, non-compliant helmets, and no helmets in 2009 and 2010. It shows that as DOT-compliant helmet use decreased in 2010, the percentage of motorcyclists who were not wearing any helmets increased from 24 percent in 2009 to 32 percent in 2010.

The 2010 survey also found the following:

- The decline in helmet use in 2010 occurred in many groups of motorcyclists, including motorcycle riders, passengers, in States with and without universal helmet laws, on surface streets, in the Midwest, in rural areas, and during weekdays and weekends. (Table 1)
- Helmet use in the Midwest decreased by 24 percentage points to 43 percent in 2010. (Figure 3)
- Use of non-compliant helmets increased significantly in the West and during weekday rush hours. (Table 2)

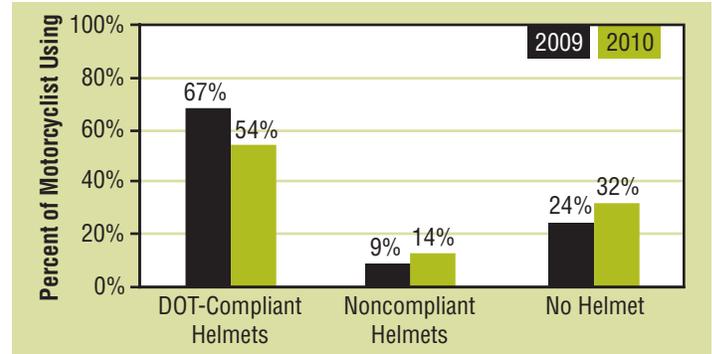
¹ DOT-compliant motorcycle helmets refer to those helmets meeting the safety requirements of Federal Motor Vehicle Safety Standard 218. Throughout this Research Note, the term *helmet use* refers to the use of DOT-compliant motorcycle helmets unless otherwise stated.

Figure 1
Motorcycle Helmet Use, 1994–2010



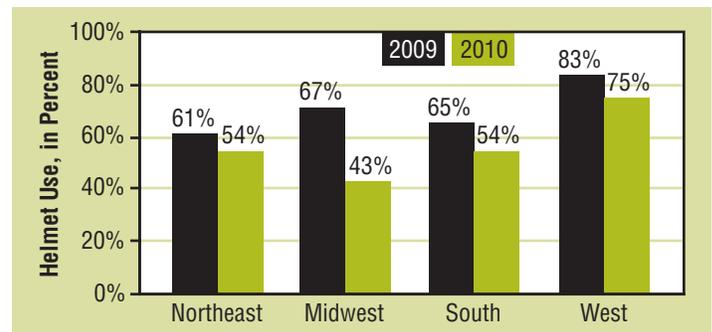
Data Source: National Occupant Protection Use Survey, NHTSA's National Center for Statistics and Analysis

Figure 2
Motorcyclists, by Helmet Type



Data Source: National Occupant Protection Use Survey, NHTSA's National Center for Statistics and Analysis

Figure 3
Motorcycle Helmet Use, by Region



Data Source: National Occupant Protection Use Survey, NHTSA's National Center for Statistics and Analysis

Table 1
Use of Helmets Compliant With Federal Safety Regulations by Major Motorcyclist Characteristics

| Motorcyclist Group | 2009 | | 2010 | | 2009-2010 Change | |
|---|-------------------------|--|-------------------------|--|-----------------------------|--|
| | Helmet Use ¹ | Confidence That Use Is High or Low in Group ² | Helmet Use ¹ | Confidence That Use Is High or Low in Group ² | Change in Percentage Points | Confidence in a Change in Use ³ |
| All Motorcyclists | 67% | | 54% | | -13 | 99% |
| Riders | 69% | 99% | 55% | 71% | -14 | 100% |
| Passengers | 55% | 99% | 51% | 71% | -4 | 39% |
| Motorcyclists in States Where ⁴ | | | | | | |
| Use Is Required for All Motorcyclists | 86% | 100% | 76% | 100% | -10 | 96% |
| Other States | 55% | 100% | 40% | 100% | -15 | 97% |
| Motorcyclists on | | | | | | |
| Expressways | 75% | 95% | 74% | 100% | -1 | 12% |
| Surface Streets | 64% | 95% | 49% | 100% | -15 | 100% |
| Motorcyclists Traveling in | | | | | | |
| Fast Traffic | 74% | 100% | 64% | 100% | -10 | 93% |
| Medium-Speed Traffic | 66% | 59% | 51% | 76% | -15 | 95% |
| Slow Traffic | 56% | 93% | 37% | 97% | -19 | 85% |
| Motorcyclists Traveling in | | | | | | |
| Heavy Traffic | NA | NA | NA | NA | NA | NA |
| Moderately Dense Traffic | 83% | 90% | 83% | 100% | 0 | 2% |
| Light Traffic | 67% | 92% | 54% | 100% | -13 | 99% |
| Motorcyclists in | | | | | | |
| Light Precipitation | 59% | 74% | 78% | 100% | 19 | 80% |
| Light Fog | NA | NA | NA | NA | NA | NA |
| Clear Weather Conditions | 67% | 68% | 54% | 100% | -13 | 100% |
| Motorcycle Riders When | | | | | | |
| They Are the Sole Motorcyclist | 72% | 99% | 55% | 56% | -17 | 100% |
| They Have a Passenger | 58% | 99% | 54% | 56% | -4 | 42% |
| Motorcyclists in the | | | | | | |
| Northeast | 61% | 87% | 54% | 50% | -7 | 55% |
| Midwest | 67% | 52% | 43% | 98% | -24 | 100% |
| South | 65% | 66% | 54% | 50% | -11 | 66% |
| West | 83% | 100% | 75% | 100% | -8 | 74% |
| Motorcyclists in | | | | | | |
| Urban Areas | 57% | 89% | 64% | 93% | 7 | 57% |
| Suburban Areas | 61% | 98% | 59% | 86% | -2 | 15% |
| Rural Areas | 75% | 100% | 47% | 95% | -28 | 100% |
| Motorcyclists Traveling During | | | | | | |
| Weekdays | 69% | 76% | 59% | 94% | -10 | 92% |
| Weekday Rush Hours | 71% | 70% | 68% | 99% | -3 | 48% |
| Weekday Non-Rush Hours | 69% | 70% | 54% | 99% | -15 | 96% |
| Weekends | 65% | 76% | 48% | 94% | -17 | 98% |
| Motorcycle Riders Who | | | | | | |
| Are Riding Alone | 72% | 99% | 55% | 56% | -17 | 100% |
| Have a Passenger Using a DOT-Compliant Helmet | 89% | 100% | 88% | 100% | -1 | 12% |
| Have a Passenger Using a Noncompliant Helmet | NA | NA | NA | NA | NA | NA |
| Have an Unhelmeted Passenger | 5% | 100% | 4% | 100% | -1 | 22% |
| Passengers on Motorcycles on Which | | | | | | |
| The Rider Is Using a DOT-Compliant Helmet | 84% | 100% | 83% | 100% | -1 | 11% |
| The Rider Is Using a Noncompliant Helmet | NA | NA | NA | NA | NA | NA |
| The Rider Is Unhelmeted | 12% | 100% | NA | NA | NA | NA |

¹ Use of helmets meeting the safety requirements of Federal Motor Vehicle Safety Standard 218, observed between 7 a.m. and 6 p.m. among motorcycle riders and passengers.

² The statistical confidence that use in the motorcyclist group (e.g., motorcyclists in urban areas) is higher or lower than use in the corresponding complementary motorcyclist group (e.g., combined motorcyclists in suburban and rural areas). Confidences that meet or exceed 90% are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as "100%" are between 99.5% and 100.0%.

³ The degree of statistical confidence that the 2010 use rate is different from the 2009 rate. Confidences that meet or exceed 90% are formatted in boldface type.

⁴ Use rates reflect the laws in effect at the time data was collected.

NA: Data not sufficient to produce a reliable estimate.

Source: National Occupant Protection Use Survey, National Center for Statistics and Analysis, National Highway Traffic Safety Administration

Table 2
Use of Noncompliant Helmets by Major Motorcyclist Characteristics

| Motorcyclist Group | 2009 | | 2010 | | 2009-2010 Change | |
|---|-------------------------|--|-------------------------|--|-----------------------------|--|
| | Helmet Use ¹ | Confidence That Use Is High or Low in Group ² | Helmet Use ¹ | Confidence That Use Is High or Low in Group ² | Change in Percentage Points | Confidence in a Change in Use ³ |
| All Motorcyclists | 9% | | 14% | | 5 | 83% |
| Riders | 8% | 90% | 13% | 70% | 5 | 86% |
| Passengers | 16% | 90% | 16% | 70% | 0 | 5% |
| Motorcyclists in States Where ⁴ | | | | | | |
| Use Is Required for All Motorcyclists | 11% | 83% | 22% | 100% | 11 | 97% |
| Other States | 8% | 83% | 8% | 100% | 0 | 12% |
| Motorcyclists on | | | | | | |
| Expressways | 10% | 70% | 11% | 78% | 1 | 7% |
| Surface Streets | 8% | 70% | 15% | 78% | 7 | 84% |
| Motorcyclists Traveling in | | | | | | |
| Fast Traffic | 8% | 67% | 16% | 83% | 8 | 90% |
| Medium-Speed Traffic | 11% | 76% | 14% | 55% | 3 | 47% |
| Slow Traffic | 8% | 67% | 7% | 96% | -1 | 13% |
| Motorcyclists Traveling in | | | | | | |
| Heavy Traffic | NA | NA | NA | NA | NA | NA |
| Moderately Dense Traffic | NA | NA | NA | NA | NA | NA |
| Light Traffic | 9% | 57% | 14% | 57% | 5 | 83% |
| Motorcyclists in | | | | | | |
| Light Precipitation | 22% | 79% | NA | NA | NA | NA |
| Light Fog | NA | NA | NA | NA | NA | NA |
| Clear Weather Conditions | 8% | 78% | 14% | 55% | 6 | 88% |
| Motorcycle Riders When | | | | | | |
| They Are the Sole Motorcyclist | 8% | 57% | 14% | 70% | 6 | 83% |
| They Have a Passenger | 7% | 57% | 11% | 70% | 4 | 59% |
| Motorcyclists in the | | | | | | |
| Northeast | 15% | 96% | 22% | 86% | 7 | 59% |
| Midwest | 8% | 67% | 12% | 62% | 4 | 44% |
| South | 6% | 83% | 9% | 88% | 3 | 48% |
| West | 4% | 99% | 15% | 63% | 11 | 100% |
| Motorcyclists in | | | | | | |
| Urban Areas | 8% | 55% | 8% | 94% | 0 | 17% |
| Suburban Areas | 10% | 71% | 11% | 83% | 1 | 20% |
| Rural Areas | 8% | 71% | 18% | 89% | 10 | 87% |
| Motorcyclists Traveling During | | | | | | |
| Weekdays | 10% | 75% | 14% | 58% | 4 | 72% |
| Weekday Rush Hours | 7% | 90% | 14% | 56% | 7 | 99% |
| Weekday Non-Rush Hours | 11% | 90% | 15% | 56% | 4 | 44% |
| Weekends | 8% | 75% | 13% | 58% | 5 | 61% |
| Motorcycle Riders Who | | | | | | |
| Are Riding Alone | 8% | 57% | 14% | 70% | 6 | 83% |
| Have a Passenger Using a DOT-Compliant Helmet | 4% | 97% | 9% | 68% | 5 | 78% |
| Have a Passenger Using a Noncompliant Helmet | NA | NA | NA | NA | NA | NA |
| Have an Unhelmeted Passenger | NA | NA | NA | NA | NA | NA |
| Passengers on Motorcycles on Which | | | | | | |
| The Rider Is Using a DOT-Compliant Helmet | 13% | 67% | 14% | 64% | 1 | 11% |
| The Rider Is Using a Noncompliant Helmet | NA | NA | NA | NA | NA | NA |
| The Rider Is Unhelmeted | NA | NA | NA | NA | NA | NA |

¹ Use of helmets that do NOT meet the requirements of Federal Motor Vehicle Safety Standard 218, observed between 7 a.m. and 6 p.m. among motorcycle riders and passengers.

² The statistical confidence that use in the motorcyclist group (e.g., motorcyclists in urban areas) is higher or lower than use in the corresponding complementary motorcyclist group (e.g., combined motorcyclists in suburban and rural areas). Confidences that meet or exceed 90% are formatted in boldface type. Confidences are rounded to the nearest percentage point, and so confidences reported as "100%" are between 99.5% and 100.0%.

³ The degree of statistical confidence that the 2010 use rate is different from the 2009 rate. Confidences that meet or exceed 90% are formatted in boldface type.

⁴ Use rates reflect the laws in effect at the time data was collected.

NA: Data not sufficient to produce a reliable estimate.

Source: National Occupant Protection Use Survey, National Center for Statistics and Analysis, National Highway Traffic Safety Administration

Survey Methodology

The NOPUS is the only survey that provides nationwide probability-based observed data on motorcycle helmet use in the United States. The survey observes helmet use as it actually occurs at randomly selected roadway sites, and thus provides the best tracking of helmet use in this country.

The survey data is collected by sending observers to probabilistically sampled roadways, who observe motorcyclists between the hours of 7 a.m. and 6 p.m. Observations are made either while standing at the roadside or, in the case of expressways, while riding in a vehicle in the traffic. In order to capture the true behavior of motorcyclists, NOPUS observers do not stop motorcycles or interview motorcyclists. The 2010 NOPUS data was collected between June 7 and June 26, 2010, while the 2009 data was collected between June 1 and June 20, 2009.

The NOPUS uses a complex multistage probability sample, statistical data editing, imputation of unknown values, and complex estimation procedures. The 2010 NOPUS continued the transition to the newly designed sample of observation sites, which was implemented in 2006. The 2010 results reflect the partial incorporation of a set of observation sites from the new design (about 75%) and a set of the observation sites from the old design (about 25%). Data from 2005 and prior years were obtained from the old observation sites only. Table 3 shows the observed sample sizes of the 2010 NOPUS Moving Traffic Survey. A total of 1,083 motorcyclists were observed on the 946 motorcycles at the 1,783 data collection sites.

Table 3
Sites, Motorcycles, and Motorcyclists Observed

| Numbers of | 2009 | 2010 | Percentage Change |
|------------------------|-------|-------|-------------------|
| Sites Observed | 1,823 | 1,783 | -2% |
| Motorcycles Observed | 947 | 946 | 0% |
| Motorcyclists Observed | 1,132 | 1,083 | -4% |

Because the NOPUS sites are selected probabilistically, we can analyze the statistical significance of its results. Statistically significant increases in helmet use between 2009 and 2010 are identified in Table 1 and Table 2 by having a result that is 90 percent or greater in column 7 of these tables. Statistical confidences that use in a given motorcyclist group, e.g., motorcyclists in the Midwest, is higher or lower than the complementary motorcy-

clist group, e.g., motorcyclists in the Northeast, South, and West, are provided in columns 3 and 5 of the two tables. Such comparisons are made within categories, such as road type, delineated by changes in row shading in the tables. The exception to this is the grouping "Motorcyclists Traveling During..." in which weekdays are compared to weekends, and weekday rush hour to weekday non-rush hour.

Data collection, estimation, and variance estimation for the NOPUS are conducted by Westat, Inc., under the direction of the National Center for Statistics and Analysis in NHTSA under Federal contract number DTNH22-07-D-00057.

Definitions

NHTSA established standards for motorcycle helmets to ensure a certain degree of protection in a crash in Federal Motor Vehicle Safety Standard 218 (Code of Federal Register, Title 49, Volume 5, Part 571, Section 218, October 2003). *DOT-compliant helmets* are helmets that meet this safety standard, while *noncompliant helmets* are helmets that do not.

DOT-compliant helmets are marked with an identifying sticker on the back of the helmets. However because of the prevalence of counterfeit stickers, NOPUS data collectors categorize DOT-compliant helmets as helmets that cover the motorcyclists' ears or are at least 1 inch thick.

NHTSA estimates helmet use as the use of DOT-compliant helmets.

At the time the 2010 survey was conducted, 20 States and the District of Columbia required all motorcyclists to be helmeted. Table 4 provides a list of States with laws requiring helmet use for all motorcyclists. Other States either required only a subset of riders or motor-

Table 4
States With Laws¹ Requiring Helmet Use for All Motorcyclists

| | | |
|----------------------|-------------|----------------|
| Alabama | Michigan | North Carolina |
| California | Mississippi | Oregon |
| District of Columbia | Missouri | Tennessee |
| Georgia | Nebraska | Vermont |
| Louisiana | Nevada | Virginia |
| Maryland | New Jersey | Washington |
| Massachusetts | New York | West Virginia |

¹States and the District of Columbia with laws in effect as of May 31, 2010

cycle passengers to use helmets (such as those under age 18), or had no helmet requirement.

“Expressways” are defined to be roadways with limited access, while “surface streets” comprise all other roadways. “Rush hour” is defined to comprise the time periods 7–9:30 a.m. and 3:30–6 p.m.

A roadway is defined to have “fast traffic” if during the observation period the average speed of passenger vehicles that pass the observer(s) exceeds 50 mph, with “medium-speed traffic” defined as 31–50 mph, and “slow traffic” defined as 30 mph or slower.

A roadway is defined to have “heavy traffic” if the average number of vehicles per lane mile on the roadway during the observation period exceeds 45, with “moderately dense traffic” defined as 26 - 45 vehicles per lane mile and “light traffic” having at most 25 vehicles per lane mile.

The survey uses the following definitions of geographic regions, which are defined in terms of the States contained in the region below:

Northeast: CT, MA, ME, NH, NJ, NY, PA, RI, VT
 Midwest: IA, KS, IL, IN, MI, MN, MO, ND, NE, OH, SD, WI
 South: AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV
 West: AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY

For More Information

This Research Note was written by Timothy M. Pickrell, a mathematical statistician in the Mathematical Analysis Division, National Center for Statistics and Analysis, NHTSA, and by Tony Jianqiang Ye, statistician, a contractor working with the Mathematical Analysis Division, National Center for Statistics and Analysis, NHTSA. For questions regarding the information presented in this document, please contact timothy.pickrell@dot.gov.

Additional data and information on the survey design and analysis procedures will be available in upcoming publications to be posted at the Web site <http://www-nrd.nhtsa.dot.gov/cats/index.aspx>.

Helmets are estimated to be 37-percent effective in preventing fatal injuries to motorcycle riders and 41-percent for motorcycle passengers. NHTSA estimates that helmets saved the lives of 1,483 motorcyclists in 2009. For more information on the campaign by NHTSA and the States to raise helmet use, see www.nhtsa.gov.

The NOPUS also observes other types of restraints, such as seat belts and child restraints, and observes driver electronic device use. This publication is part of a series that presents overall results from the survey on these topics. Please see publications in the series, such as “Seat Belt Use in 2010—Overall Results,” for the latest data on these topics.



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This research note and other general information on highway traffic safety may be accessed by Internet users at: www-nrd.nhtsa.dot.gov/CATS/index.aspx