



Motorcycle Helmet Use in 2011—Overall Results

Use of DOT-compliant motorcycle helmets¹ increased significantly to 66 percent in 2011, up from 54 percent in 2010, based on the National Occupant Protection Use Survey (NOPUS). The NOPUS is the only survey that provides nationwide probability-based observed data on helmet use in the United States and is conducted annually by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration.

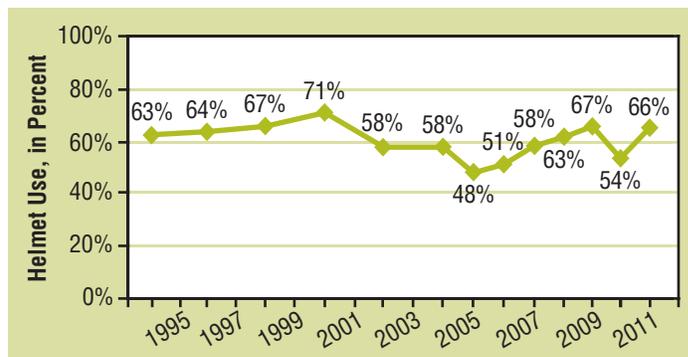
The trend of motorcycle helmet use since 1994 is shown in Figure 1. Figure 2 shows the percentages of motorcyclists who were using DOT-compliant helmets, non-compliant helmets, and no helmet in 2010 and 2011. It shows that the DOT-compliant helmet use increased in 2011 while the percentages of motorcyclists who were wearing non-compliant helmets or who were not wearing any helmet decreased.

The 2011 survey also found the following:

- The increases in helmet use in 2011 occurred in many motorcyclist groups, including motorcycle riders, in States without universal helmet laws, on surface streets, in rural areas, and during weekends (Table 1).
- Helmet use in the Northeast increased significantly to 66 percent in 2011 from 54 percent in 2010 (Figure 3).

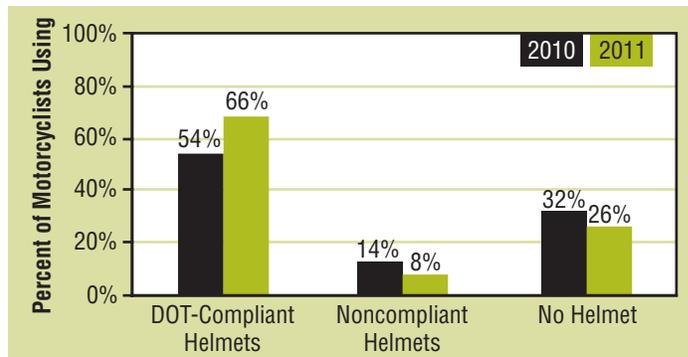
¹ DOT-compliant motorcycle helmets are those helmets meeting the safety requirements of Federal Motor Vehicle Safety Standard 218. Throughout this Research Note, the term helmet use refers to the use of DOT-compliant motorcycle helmets unless otherwise stated.

Figure 1
Motorcycle Helmet Use, 1994–2011



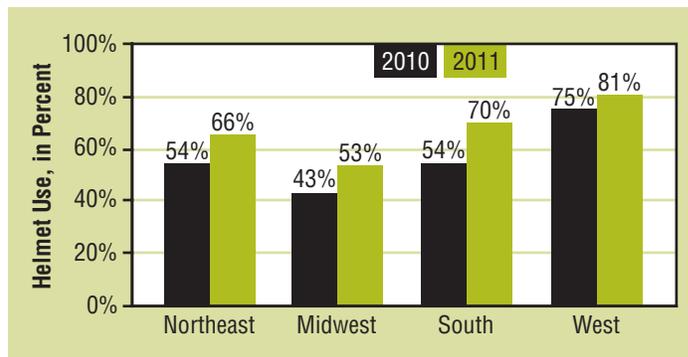
Data Source: NOPUS

Figure 2
Motorcyclists, by Helmet Type



Data Source: NOPUS

Figure 3
Motorcycle Helmet Use, by Region



Data Source: NOPUS

Table 1

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

| Motorcyclist Group | 2010 | | 2011 | | 2010–2011 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 | 54% | | 66% | | 12 | 98% |
| Riders | 55% | 71% | 67% | 70% | 12 | 98% |
| Passengers | 51% | 71% | 64% | 70% | 13 | 77% |
| Motorcyclists in States Where ⁴ | | | | | | |
| Use Is Required for All Motorcyclists | 76% | 100% | 84% | 100% | 8 | 85% |
| Other States | 40% | 100% | 50% | 100% | 10 | 93% |
| Motorcyclists on | | | | | | |
| Expressways | 74% | 100% | 77% | 97% | 3 | 33% |
| Surface Streets | 49% | 100% | 63% | 97% | 14 | 99% |
| Motorcyclists Traveling in | | | | | | |
| Fast Traffic | 64% | 100% | 67% | 59% | 3 | 37% |
| Medium-Speed Traffic | 51% | 76% | 61% | 94% | 10 | 81% |
| Slow Traffic | 37% | 97% | 73% | 80% | 36 | 98% |
| Motorcyclists Traveling in ⁵ | | | | | | |
| Heavy Traffic | NA | NA | 65% | 68% | NA | NA |
| Moderately Dense Traffic | 83% | 100% | 71% | 89% | -12 | 75% |
| Light Traffic | 54% | 100% | 60% | 81% | 6 | 53% |
| Motorcyclists in | | | | | | |
| Light Precipitation | NA | NA | NA | NA | NA | NA |
| Light Fog | NA | NA | NA | NA | NA | NA |
| Clear Weather Conditions | 54% | 100% | 66% | 96% | 12 | 98% |
| Motorcycle Riders When | | | | | | |
| They Are the Sole Motorcyclist | 55% | 56% | 67% | 53% | 12 | 97% |
| They Have a Passenger | 54% | 56% | 67% | 53% | 14 | 78% |
| Motorcyclists in the | | | | | | |
| Northeast | 54% | 50% | 66% | 52% | 12 | 90% |
| Midwest | 43% | 98% | 53% | 99% | 10 | 86% |
| South | 54% | 50% | 70% | 65% | 16 | 73% |
| West | 75% | 100% | 81% | 100% | 6 | 68% |
| Motorcyclists in | | | | | | |
| Urban Areas | 64% | 93% | 61% | 79% | -4 | 29% |
| Suburban Areas | 59% | 86% | 67% | 61% | 8 | 72% |
| Rural Areas | 47% | 95% | 67% | 51% | 19 | 99% |
| Motorcyclists Traveling During | | | | | | |
| Weekdays | 59% | 94% | 63% | 91% | 4 | 50% |
| Weekday Rush Hours | 68% | 99% | 57% | 93% | -11 | 90% |
| Weekday Non-Rush Hours | 54% | 99% | 66% | 93% | 13 | 94% |
| Weekends | 48% | 94% | 72% | 91% | 24 | 99% |
| Motorcycle Riders Who | | | | | | |
| Are Riding Alone | 55% | 56% | 67% | 53% | 12 | 97% |
| Have a Passenger Using a DOT-Compliant Helmet | 88% | 100% | 88% | 100% | 0 | 2% |
| Have a Passenger Using a Noncompliant Helmet | NA | NA | NA | NA | NA | NA |
| Have an Unhelmeted Passenger | 4% | 100% | 21% | 100% | 17 | 92% |
| Passengers on Motorcycles on Which | | | | | | |
| The Rider Is Using a DOT-Compliant Helmet | 83% | 100% | 83% | 100% | 0 | 4% |
| 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 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 2011 use rate is different from the 2010 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.

⁵ To better capture the traffic patterns, the traffic density breakdown has been revised in the 2011 NOPUS. This definition revision might have some effects on the 2010–2011 changes.

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 | 2010 | | 2011 | | 2010-2011 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 | 14% | | 8% | | -6 | 87% |
| Riders | 13% | 70% | 9% | 75% | -4 | 76% |
| Passengers | 16% | 70% | 7% | 75% | -9 | 95% |
| Motorcyclists in States Where ⁴ | | | | | | |
| Use Is Required for All Motorcyclists | 22% | 100% | 12% | 98% | -10 | 94% |
| Other States | 8% | 100% | 5% | 98% | -3 | 64% |
| Motorcyclists on | | | | | | |
| Expressways | 11% | 78% | 9% | 63% | -2 | 36% |
| Surface Streets | 15% | 78% | 8% | 63% | -7 | 84% |
| Motorcyclists Traveling in | | | | | | |
| Fast Traffic | 16% | 83% | 7% | 75% | -9 | 92% |
| Medium-Speed Traffic | 14% | 55% | 10% | 83% | -4 | 53% |
| Slow Traffic | 7% | 96% | 8% | 60% | 1 | 4% |
| Motorcyclists Traveling in ⁵ | | | | | | |
| Heavy Traffic | NA | NA | 9% | 69% | NA | NA |
| Moderately Dense Traffic | NA | NA | 10% | 85% | NA | NA |
| Light Traffic | 14% | 57% | 3% | 100% | -11 | 100% |
| Motorcyclists in | | | | | | |
| Light Precipitation | NA | NA | NA | NA | NA | NA |
| Light Fog | NA | NA | NA | NA | NA | NA |
| Clear Weather Conditions | 14% | 55% | 9% | 100% | -5 | 84% |
| Motorcycle Riders When | | | | | | |
| They Are the Sole Motorcyclist | 14% | 70% | 9% | 58% | -5 | 73% |
| They Have a Passenger | 11% | 70% | 8% | 58% | -3 | 40% |
| Motorcyclists in the | | | | | | |
| Northeast | 22% | 86% | 12% | 91% | -10 | 74% |
| Midwest | 12% | 62% | 6% | 87% | -6 | 53% |
| South | 9% | 88% | 6% | 85% | -3 | 60% |
| West | 15% | 63% | 11% | 84% | -4 | 75% |
| Motorcyclists in | | | | | | |
| Urban Areas | 8% | 94% | 7% | 66% | -1 | 13% |
| Suburban Areas | 11% | 83% | 9% | 73% | -2 | 45% |
| Rural Areas | 18% | 89% | 8% | 63% | -10 | 86% |
| Motorcyclists Traveling During | | | | | | |
| Weekdays | 14% | 58% | 10% | 95% | -4 | 79% |
| Weekday Rush Hours | 14% | 56% | 10% | 56% | -4 | 72% |
| Weekday Non-Rush Hours | 15% | 56% | 10% | 56% | -5 | 68% |
| Weekends | 13% | 58% | 6% | 95% | -7 | 80% |
| Motorcycle Riders Who | | | | | | |
| Are Riding Alone | 14% | 70% | 9% | 58% | -5 | 73% |
| Have a Passenger Using a DOT-Compliant Helmet | 9% | 68% | NA | NA | NA | NA |
| 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 | 14% | 64% | 7% | 58% | -7 | 88% |
| 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.

⁵ To better capture the traffic patterns, the traffic density breakdown has been revised in the 2011 NOPUS. This definition revision might have some effects on the 2010–2011 changes. 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 traffic. In order to capture the true behavior of motorcyclists, NOPUS observers do not stop motorcycles or interview motorcyclists. The 2011 NOPUS data was collected between June 6 and June 17, 2011, while the 2010 data was collected between June 7 and June 26, 2010.

The NOPUS uses a complex multistage probability sample, statistical data editing, imputation of unknown values, and complex estimation procedures. The sample sites for the 2011 NOPUS were entirely from the 2006 NOPUS sample redesign without incorporating any sites from the old design. During the transitional years between 2006 and 2010, sample sites were chosen both from the new design and the old design. Prior to 2006, sample sites were from the old design only. Table 3 shows the observed sample sizes of the 2011 NOPUS Moving Traffic Survey. A total of 916 motorcyclists were observed on the 787 motorcycles at the 1,700 data collection sites.

Table 3
Sites, Motorcycles, and Motorcyclists Observed

| Numbers of | 2010 | 2011 | Percentage Change |
|------------------------|-------|-------|-------------------|
| Sites Observed | 1,783 | 1,700 | -5% |
| Motorcycles Observed | 946 | 787 | -17%* |
| Motorcyclists Observed | 1,083 | 916 | -15%* |

*This change could be attributed in part to some site location changes from more densely populated observation sites in the old sample design to less densely populated observation sites in the new sample design.

Because the NOPUS sites are selected probabilistically, we can analyze the statistical significance of its results. Statistically significant increases in helmet use between 2010 and 2011 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 motorcyclist 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 2011 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

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, 2011

States either required only a subset of riders or motorcycle 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 on the roadway during the observation period is greater than 5 per lane per mile, with “moderately dense traffic” defined as greater than 1 but less than or equal to 5 vehicles per lane per mile, and “light traffic” as less than or equal to 1 vehicle per lane per mile. Please note that this traffic density breakdown has been revised in the 2011 NOPUS to better reflect traffic patterns.

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 employed by Bowhead Systems Management, Inc., working with 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> in 2012.

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 2011—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