

Traffic Safety Facts

Research Note

DOT HS 811 254

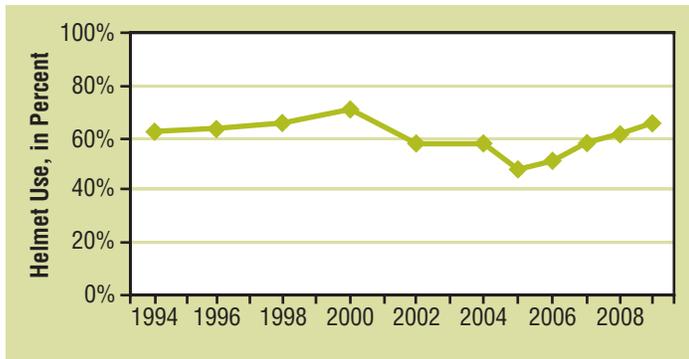
December 2009

Motorcycle Helmet Use in 2009—Overall Results

Use of DOT-compliant motorcycle helmets in 2009 stood at 67 percent, a gain from 63 percent in 2008. This result is from the National Occupant Protection Use Survey (NOPUS), which is the only survey that provides the nationwide probability-based observed data on helmet use¹ in the United States. The NOPUS is conducted by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration.

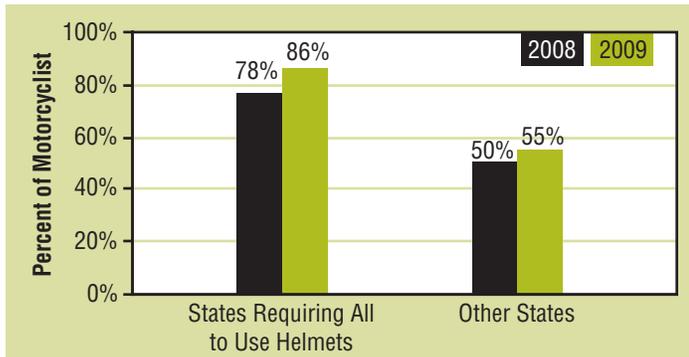
In the past five years, motorcycle helmet use has been increasing slowly but steadily – increased from 48 percent in 2005 to 67 percent in 2009 (Figure 1). Figure 2 compares the overall picture of motorcycle helmet use and nonuse in 2008 and 2009.

Figure 1
Motorcycle Helmet Use, 1994 - 2009



Source: NOPUS, NHTSA's National Center for Statistics and Analysis (1994-2009)

Figure 3
Motorcycle Helmet Use, by State Law

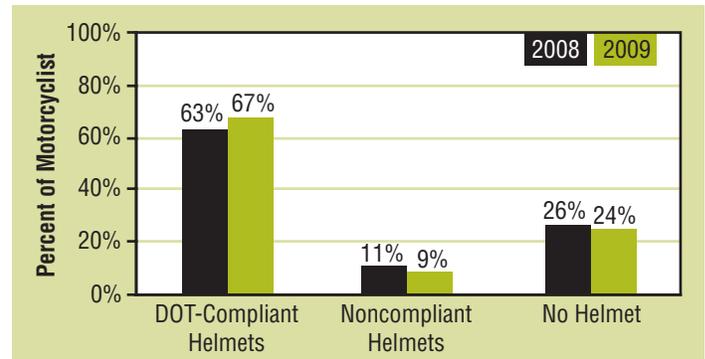


Source: NOPUS, NHTSA's National Center for Statistics and Analysis (2008-2009)

The 2009 survey also found the following:

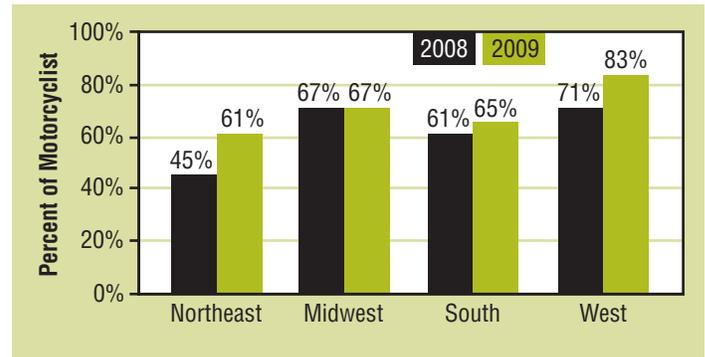
- Helmet use in States that require all motorcyclists to wear helmets significantly increased from 78 percent in 2008 to 86 percent in 2009. The helmet use in these States continued to be higher than in those States without universal helmet use law (Figure 3).
- Helmet use in the Northeast increased by 16 percentage points to 61 percent in 2009, which is a statistically significant increase (Figure 4).
- In 2009, helmet use in rural areas continued to increase to 75 percent while urban areas saw a 15-percentage-point drop to 57 percent.

Figure 2
Overall Motorcycle Helmet Use



Source: NOPUS, NHTSA's National Center for Statistics and Analysis (2008-2009)

Figure 4
Motorcycle Helmet Use, by Region



Source: NOPUS, NHTSA's National Center for Statistics and Analysis (2008-2009)

¹ Throughout this Research Note, the term helmet use refers to the use of DOT-compliant motorcycle helmets unless otherwise stated.

Table 1

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

Motorcyclist Group	2008		2009		2008-2009 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	63%		67%		4	66%
Riders	64%	99%	69%	99%	5	73%
Passengers	54%	99%	55%	99%	1	15%
Motorcyclists in States Where ⁴						
Use Is Required for All Motorcyclists	78%	100%	86%	100%	8	91%
Other States	50%	100%	55%	100%	5	64%
Motorcyclists on						
Expressways	75%	99%	75%	95%	0	5%
Surface Streets	58%	99%	64%	95%	6	68%
Motorcyclists Traveling in						
Fast Traffic	72%	97%	74%	100%	2	32%
Medium-Speed Traffic	57%	83%	66%	59%	9	66%
Slow Traffic	53%	89%	56%	93%	3	13%
Motorcyclists Traveling in						
Heavy Traffic	NA	NA	NA	NA	NA	NA
Moderately Dense Traffic	86%	99%	83%	90%	-3	19%
Light Traffic	62%	100%	67%	92%	5	71%
Motorcyclists in						
Light Precipitation	84%	99%	59%	74%	-25	95%
Light Fog	NA	NA	NA	NA	NA	NA
Clear Weather Conditions	61%	99%	67%	68%	6	77%
Motorcycle Riders When						
They Are the Sole Motorcyclist	67%	98%	72%	99%	5	75%
They Have a Passenger	53%	98%	58%	99%	5	44%
Motorcyclists in the						
Northeast	45%	100%	61%	87%	16	97%
Midwest	67%	76%	67%	52%	0	7%
South	61%	65%	65%	66%	4	59%
West	71%	76%	83%	100%	12	64%
Motorcyclists in						
Urban Areas	72%	95%	57%	89%	-15	90%
Suburban Areas	59%	76%	61%	98%	2	19%
Rural Areas	64%	59%	75%	100%	11	90%
Motorcyclists Traveling During						
Weekdays	71%	99%	69%	76%	-2	29%
Weekday Rush Hours	71%	54%	71%	70%	0	10%
Weekday Non-Rush Hours	71%	54%	69%	70%	-2	34%
Weekends	54%	99%	65%	76%	11	83%
Motorcycle Riders Who						
Are Riding Alone	67%	98%	72%	99%	5	75%
Have a Passenger Using a DOT-Compliant Helmet	82%	100%	89%	100%	7	70%
Have a Passenger Using a Noncompliant Helmet	34%	94%	NA	NA	NA	NA
Have an Unhelmeted Passenger	9%	100%	5%	100%	-4	47%
Passengers on Motorcycles on Which						
The Rider Is Using a DOT-Compliant Helmet	84%	100%	84%	100%	0	6%
The Rider Is Using a Noncompliant Helmet	NA	NA	NA	NA	NA	NA
The Rider Is Unhelmeted	22%	100%	12%	100%	-10	76%

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 (operators) 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., 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 2009 use rate is different from the 2008 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 Highway Traffic Safety Administration, National Center for Statistics and Analysis

Table 2
Use of Noncompliant Helmets by Major Motorcyclist Characteristics

Motorcyclist Group	2008		2009		2008-2009 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	11%		9%		-2	53%
Riders	9%	98%	8%	90%	-1	53%
Passengers	18%	98%	16%	90%	-2	25%
Motorcyclists in States Where ⁴						
Use Is Required for All Motorcyclists	19%	100%	11%	83%	-8	90%
Other States	4%	100%	8%	83%	4	86%
Motorcyclists on						
Expressways	11%	52%	10%	70%	-1	8%
Surface Streets	11%	52%	8%	70%	-3	60%
Motorcyclists Traveling in						
Fast Traffic	12%	79%	8%	67%	-4	74%
Medium-Speed Traffic	9%	88%	11%	76%	2	36%
Slow Traffic	11%	53%	8%	67%	-3	49%
Motorcyclists Traveling in						
Heavy Traffic	NA	NA	NA	NA	NA	NA
Moderately Dense Traffic	6%	84%	NA	NA	NA	NA
Light Traffic	11%	97%	9%	57%	-2	56%
Motorcyclists in						
Light Precipitation	12%	62%	22%	79%	10	42%
Light Fog	NA	NA	NA	NA	NA	NA
Clear Weather Conditions	11%	62%	8%	78%	-3	66%
Motorcycle Riders When						
They Are the Sole Motorcyclist	9%	69%	8%	57%	-1	39%
They Have a Passenger	10%	69%	7%	57%	-3	54%
Motorcyclists in the						
Northeast	8%	69%	15%	96%	7	76%
Midwest	16%	89%	8%	67%	-8	90%
South	14%	77%	6%	83%	-8	83%
West	5%	96%	4%	99%	-1	12%
Motorcyclists in						
Urban Areas	5%	99%	8%	55%	3	72%
Suburban Areas	11%	53%	10%	71%	-1	19%
Rural Areas	12%	75%	8%	71%	-4	70%
Motorcyclists Traveling During						
Weekdays	8%	96%	10%	75%	2	50%
Weekday Rush Hours	9%	74%	7%	90%	-2	70%
Weekday Non-Rush Hours	8%	74%	11%	90%	3	68%
Weekends	14%	96%	8%	75%	-6	83%
Motorcycle Riders Who						
Are Riding Alone	9%	69%	8%	57%	-1	39%
Have a Passenger Using a DOT-Compliant Helmet	NA	NA	4%	97%	NA	NA
Have a Passenger Using a Noncompliant Helmet	49%	97%	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	12%	91%	13%	67%	1	13%
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 operators 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., 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 2009 use rate is different from the 2008 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 Highway Traffic Safety Administration, National Center for Statistics and Analysis

Survey Methodology

The NOPUS is the only survey that provides the 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 2009 NOPUS data was collected between June 1 and June 20, 2009, while the 2008 data was collected between June 2 and June 22, 2008.

Sites, Motorcycles, and Motorcyclists Observed

Numbers of	2008	2009
Sites Observed	1,865	1,823
Motorcycles Observed	1,450	947
Motorcyclists Observed	1,698	1,132

The NOPUS uses a complex multistage probability sample, statistical data editing, imputation of unknown values, and complex estimation and variance estimation procedures. The 2009 NOPUS continued the transition to the newly designed sample of observation sites, which was implemented in 2006. The 2009 results reflect the partial incorporation of a set of observation sites from the new design (about 65%) and a set of the observation sites from the old design (about 35%). Data in 2005 and prior years was obtained from the old observation sites only.

Because the NOPUS sites are selected probabilistically, we can analyze the statistical significance of its results. Statistically significant increases in helmet use between 2008 and 2009 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 week-

days 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

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 June 30, 2009

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.

A DOT-compliant helmet is marked with an identifying sticker on the back of the helmet. 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.

"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 to 9:30 a.m. and 3:30 to 6 p.m.

A roadway is defined to have "fast traffic" if during the observation period the average speed of passenger vehicles that passed the observer(s) exceeded 50 mph, with "medium-speed traffic" defined as 31 to 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 exceeded 45, with "moderately dense traffic" defined as 26 to 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 regions 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

At the time the 2009 survey was conducted, 20 States and the District of Columbia required all motorcyclists to be helmeted. Other States either required only a subset of riders (operators) or motorcycle passengers to use helmets (such as those under age 18), or had no helmet requirement.

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, a mathematical

statistician employed by URC Enterprises, Inc., 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/CMSWeb/index.aspx> in 2009.

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 1,829 motorcyclists in 2008. (Traffic Safety Facts: 2008 Data, NHTSA, DOT HS 811159). 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 2009—Overall Results,” for the latest data on these topics.



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**National Highway
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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.