U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC SAFETY FACTS
Research Note

NHTSA
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DOT HS 812 351

November 2016

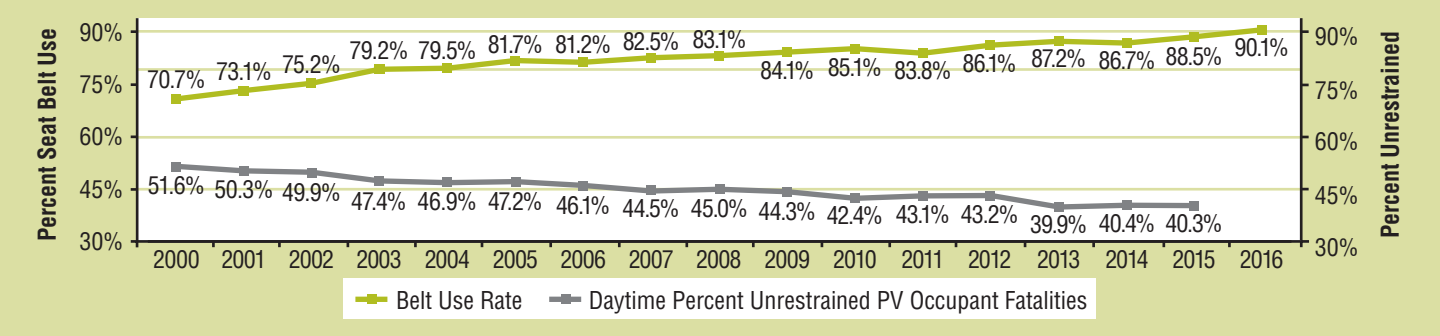
Seat Belt Use in 2016—Overall Results

Seat belt use in 2016 reached 90.1 percent, up from 88.5 percent in 2015; this was a statistically significant increase at the 0.05 level. This result is from the National Occupant Protection Use Survey (NOPUS), the only survey that provides nationwide probability-based observed data on seat belt use in the United States. The NOPUS is conducted annually by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration

Seat belt use has shown an increasing trend since 2000, accompanied by a steady decline in the percentage[1] of unrestrained passenger vehicle (PV) occupants killed during the daytime (Figure 1). The 2016 survey also found the following:

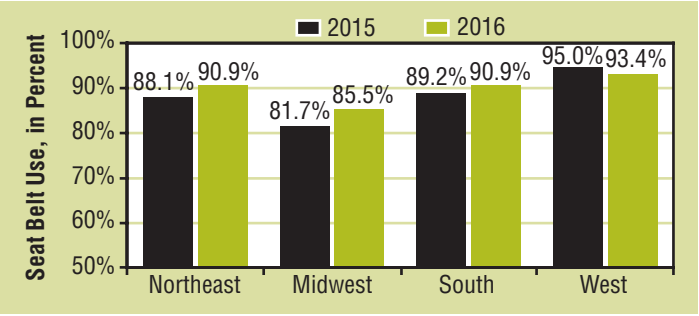
- Seat belt use for occupants in the West is higher than in the other regions, Northeast, Midwest, and South, in 2016 (Figure 2).
- Seat belt use continued to be higher in the States in which vehicle occupants can be pulled over solely for not using seat belts ("primary law States") as compared with the States with weaker enforcement laws ("secondary law States") or without seat belt laws (Figure 3).
- Seat belt use for occupants in rural areas increased significantly from 86.8 percent in 2015 to 89.5 percent in 2016 (Table 1).
- Seat Belt use for occupants of vans and SUVs increased significantly from 90.3 percent in 2015 to 92.3 percent in 2016 (Table 1).

Figure 1
National Seat Belt Use Rate and Daytime Percentage of Unrestrained Passenger Vehicle Occupant Fatalities



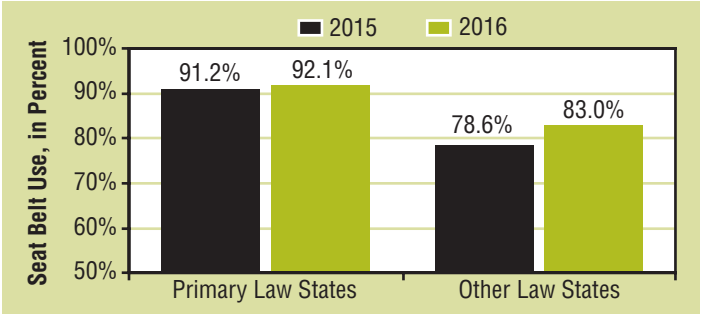
Source: NOPUS and FARS

Figure 2
Seat Belt Use by Region



Source: NOPUS

Figure 3
Seat Belt Use by Law Type



Source: NOPUS

[1]The FARS 2016 data on the percentage of unrestrained passenger vehicle occupant fatalities during daytime will be available in 2017.

Table 1
Seat Belt Use by Major Characteristics

Occupant Group[1]	2015		2016		2015–2016 Change		
	Belt Use[2]	95% Confidence Interval[3]	Belt Use[2]	95% Confidence Interval[3]	Change in Percentage Points	95% Confidence Interval[4]	P-value[5]
All Occupants	**88.5%**	**(86.8, 90.0)**	**90.1%**	**(88.5, 91.5)**	**1.6**	**(0.1, 3.1)**	**0.03**
Drivers	**88.9%**	**(87.3, 90.4)**	**90.5%**	**(88.9, 92.0)**	**1.6**	**(0.1, 3.1)**	**0.04**
Right-Front Passengers	86.8%	(84.7, 88.7)	88.6%	(86.8, 90.2)	1.7	(-0.4, 3.9)	0.11
Occupants in States With[6]							
Primary Enforcement Laws	91.2%	(89.6, 92.6)	92.1%	(90.8, 93.2)	0.8	(-0.7, 2.4)	0.27
Secondary/No Enforcement Laws	**78.6%**	**(72.3, 83.8)**	**83.0%**	**(77.6, 87.3)**	**4.4**	**(0.0, 8.7)**	**0.05**
Occupants Traveling on							
Expressways	91.4%	(89.7, 92.8)	92.7%	(90.5, 94.3)	1.3	(-0.2, 2.8)	0.08
Surface Streets	86.7%	(84.5, 88.6)	88.3%	(86.5, 90.0)	1.6	(-0.2, 3.5)	0.07
Occupants Traveling in							
Fast Traffic	90.6%	(89.0, 92.1)	92.0%	(90.0, 93.7)	1.4	(-0.5, 3.2)	0.14
Medium-Speed Traffic	87.7%	(85.7, 89.6)	88.6%	(86.2, 90.7)	0.9	(-1.4, 3.2)	0.44
Slow Traffic	84.6%	(79.7, 88.5)	87.5%	(84.6, 90.0)	2.9	(-0.7, 6.5)	0.11
Occupants Traveling in							
Heavy Traffic	91.2%	(89.7, 92.5)	92.3%	(90.9, 93.5)	1.1	(-0.3, 2.5)	0.12
Moderately Dense Traffic	**85.9%**	**(83.6, 88.0)**	**88.3%**	**(85.7, 90.5)**	**2.4**	**(0.5, 4.2)**	**0.02**
Light Traffic	79.4%	(76.0, 82.4)	81.5%	(79.1, 83.8)	2.2	(-1.3, 5.6)	0.22
Occupants Traveling Through							
Light Precipitation	87.7%	(84.1, 90.6)	89.3%	(83.2, 93.4)	1.6	(-4.4, 7.7)	0.59
Light Fog	91.4%	(86.3, 94.7)	91.0%	(85.5, 94.6)	-0.4	(-5.2, 4.5)	0.88
Clear Weather Conditions	**88.6%**	**(86.8, 90.1)**	**90.2%**	**(88.5, 91.6)**	**1.6**	**(0.3, 2.9)**	**0.01**
Occupants in							
Passenger Cars	90.3%	(88.7, 91.7)	91.1%	(89.6, 92.4)	0.8	(-0.8, 2.3)	0.32
Vans and SUVs	**90.3%**	**(88.6, 91.8)**	**92.3%**	**(91.0, 93.5)**	**2.0**	**(0.3, 3.7)**	**0.02**
Pickup Trucks	**80.8%**	**(77.8, 83.4)**	**83.2%**	**(79.7, 86.1)**	**2.4**	**(0.1, 4.7)**	**0.04**
Occupants in the							
Northeast	88.1%	(81.7, 92.4)	90.9%	(87.5, 93.4)	2.8	(-1.6, 7.2)	0.21
Midwest	**81.7%**	**(76.6, 86.0)**	**85.5%**	**(79.7, 89.9)**	**3.8**	**(1.3, 6.2)**	**0.00**
South	89.2%	(87.5, 90.6)	90.9%	(89.0, 92.5)	1.7	(-0.9, 4.3)	0.18
West	95.0%	(94.0, 95.8)	93.4%	(89.6, 95.9)	-1.5	(-4.3, 1.2)	0.27
Occupants in							
Urban Areas	89.4%	(87.7, 90.9)	90.5%	(88.9, 91.9)	1.1	(-0.3, 2.5)	0.12
Rural Areas	**86.8%**	**(84.1, 89.1)**	**89.5%**	**(86.9, 91.6)**	**2.6**	**(0.3, 4.9)**	**0.03**
Occupants Traveling During							
Weekdays	**87.9%**	**(86.0, 89.6)**	**90.0%**	**(88.3, 91.5)**	**2.1**	**(0.5, 3.6)**	**0.01**
Weekday Rush Hours	**88.0%**	**(86.1, 89.6)**	**89.9%**	**(88.3, 91.4)**	**1.9**	**(-0.0, 3.9)**	**0.05**
Weekday Non-Rush Hours	**87.9%**	**(85.5, 89.9)**	**90.1%**	**(87.9, 91.9)**	**2.2**	**(0.6, 3.8)**	**0.01**
Weekends	89.7%	(87.9, 91.3)	90.4%	(88.4, 92.1)	0.7	(-1.1, 2.5)	0.42

[1] Drivers and right-front passengers of all observed passenger vehicles
[2] Shoulder belt use observed from 7 a.m. to 6 p.m.
[3] The Wilson Confidence Interval has the form: $\{(2n_{EFF}p + t^2) \pm t\sqrt{(t^2 + 4n_{EFF}pq)}\}/2(n_{EFF} + t^2)$, where p is the estimated percentage of Belt Use, $n_{EFF} = n/DEFF$ is the effective sample size (where n is the sample size and $DEFF$ is the design effect), $t \equiv t_{1-\alpha/2}(df)$, is a multiplier from the t-distribution with df degrees of freedom, and $q = 1 - p$. For percentages these endpoints are multiplied by 100.
[4] The regular symmetric interval was used for the estimated change in percentage point, which is in the form: $p \pm t_{1-\alpha/2}(df)\sqrt{v(p)}$, where p is the estimated change in percentage point, $v(p)$ is its estimated variance, and $t_{1-\alpha/2}(df)$ is a multiplier from the t-distribution with df degrees of freedom.
[5] A p-value of 0.05 or less indicates that there is a statistically significant difference (at the alpha=0.05 level) between the 2015 and 2016 estimates for the group in question, indicated with bold type.
[6] Use rates reflect the laws in effect at the time data were collected.
Data Source: National Occupant Protection Use Survey, National Highway Traffic Safety Administration, National Center Statistics and Analysis.

Survey Methodology

The NOPUS is the only nationwide probability-based observational survey of seat belt use in the United States. The survey observes seat belt use as it actually occurs at randomly selected roadway sites, and thus provides the best tracking of the extent to which passenger vehicle occupants in this country are buckling up.

Table 2
Sites, Vehicles, and Occupants* Observed

Numbers of	2015	2016	Percentage Change
Sites Observed	1,966	1,966	0.00%
Vehicles Observed	98,721	100,776	2.08%
Occupants Observed*	122,376	124,746	1.94%

*Drivers and right-front passengers only.

The survey data is collected by sending trained observers to probabilistically sampled roadways, who observe passenger vehicles between 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 passenger vehicle occupants, the NOPUS observers do not stop vehicles or interview occupants. The 2016 NOPUS data was collected from June 6 to June 25, 2016, while the 2015 data was collected from June 1 to June 27, 2015.

The NOPUS uses a complex, multistage probability sample, statistical data editing, imputation of unknown values, and complex estimation procedures. The sample sites for the 2016 NOPUS were the same as that from the 2015 NOPUS sample sites. Table 2 shows the observed sample sizes of the 2016 NOPUS Moving Traffic Survey. A total of 124,746 occupants were observed in the 100,776 vehicles at the 1,966 data collection sites.

Because the NOPUS sites were selected probabilistically, we can analyze the statistical significance of the results. Statistically significant increases in seat belt use between 2015 and 2016 are identified in Table 1 by a p-value that is 0.05 or less in the table's far-right column.

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 DTNH22-13-D-00284.

Definitions

Under NOPUS observation protocols, a driver or right-front passenger is considered "belted" if a shoulder belt appears to be across the front of the body.

A jurisdiction that can enforce traffic laws, such as a State or the District of Columbia, has a "primary enforcement law" if occupants can be ticketed simply for not using their seat belts. Under "secondary enforcement laws" occupants must be stopped for another violation, such as an expired license tag, before being cited for seat belt nonuse. As of May 31, 2016, primary laws were in effect in 34 States and the District of Columbia, 15 States had secondary laws, and 1 State (New Hampshire) effectively has no seat belt laws. (In New Hampshire, it is legal for occupants over age 18 to ride unbelted.). Table 3 provides a list of the States with "primary enforcement" laws.

Table 3
States With Primary Enforcement Seat Belt Laws*

Alabama	Hawaii	Michigan	Rhode Island
Alaska	Illinois	Minnesota	South Carolina
Arkansas	Indiana	Mississippi	Tennessee
California	Iowa	New Jersey	Texas
Connecticut	Kansas	New Mexico	Utah
Delaware	Kentucky	New York	Washington
District of Columbia	Louisiana	North Carolina	West Virginia
Florida	Maine	Oklahoma	Wisconsin
Georgia	Maryland	Oregon	

*States with laws in effect as of May 31, 2016.

"Expressways" are defined to be roadways with limited access, while "surface streets" comprise all other roadways. "Rush hours" are 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 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 capture the 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

Seat belt use rates reflect the state laws in effect at the time of data collection.

For More Information

This Research Note was written by Timothy M. Pickrell and Hongying (Ruby) Li, mathematical statisticians in 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 https://crashstats.nhtsa.dot.gov/#/.

Research has found that lap/shoulder seat belts, when used, reduce the risk of fatal injury to front-seat passenger car occupants by 45 percent and the risk of moderate-to-critical injury by 50 percent. In 2014 alone, seat belts saved an estimated 12,802 lives (NCSA, 2016). For more information on the campaign by NHTSA and the States to increase seat belt use, see www.nhtsa.gov/CIOT.

The NOPUS also observes other types of restraints, such as child restraints and motorcycle helmets, and observes driver electronic device use. This publication is part of a series that presents overall results from the survey on these topics. Please refer to the upcoming research notes and technical reports in the series, such as Motorcycle Helmet Use in 2016–Overall Results, for the latest data on these topics.

Reference

National Center for Statistics and Analysis. (2016, April). *Occupant protection in passenger vehicles: 2014 data* (Traffic Safety Facts. Report No. DOT HS 812 262). Washington, DC: National Highway Traffic Safety Administration. Available at https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812262

Suggested APA format citation for this report:

Pickrell, T. M., & Li, R. (2016, November). *Seat Belt Use in 2016—Overall Results* (Traffic Safety Facts Research Note. Report No. DOT HS 812 351). Washington, DC: National Highway Traffic Safety Administration.

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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