Lives and Costs Saved by Motorcycle Helmets, 2016

Findings

In 2016, the use of motorcycle helmets saved an estimated 1,859 lives. An additional 802 lives could have been saved in 2016 if all motorcyclists had worn helmets. Nearly $3.4 billion in economic costs and $21 billion in comprehensive costs were saved in 2016 by the use of motorcycle helmets. If all motorcyclists had worn helmets in 2016, an additional $1.5 billion in economic costs and $9.2 billion in comprehensive costs could have been saved. Economic costs include lost productivity, medical costs, legal and court costs, emergency medical service (EMS) costs, insurance administration costs, congestion costs, property damage, and workplace losses. Comprehensive costs include these economic costs plus the valuation for lost quality of life.

Methodology

This Crash*Stat contains information on fatal motor vehicle crashes and fatalities, based on data from the Fatality Analysis Reporting System (FARS). FARS is a census of fatal crashes in the 50 States, and the District of Columbia. Crash and injury statistics are based on data from the National Automotive Sampling System (NASS) General Estimates System (GES). The NASS GES is a probability-based sample of police-reported traffic crashes, from 60 locations across the country, from which estimates of national totals for injury and property-damage-only crashes are derived.

NASS GES was discontinued in 2016 and replaced with a new system called the Crash Report Sampling System (CRSS). The 2016 data year is the first data collection year of CRSS. The 2016 CRSS data was released the last week of March 2018. Thus, injury and property-damage-only crash estimates for 2016 will not be presented in this publication. For more information, read Crash Report Sampling System (CRSS) Replaces the National Automotive Sampling System (NASS) General Estimates System (GES) at the end of this publication.

NHTSA's National Center for Statistics and Analysis (NCSA) provides annual estimates of lives saved by motorcycle helmets, as well as the costs saved by injuries and fatalities that were prevented by the use of motorcycle helmets. The estimates are obtained using the effectiveness of motorcycle helmets in preventing death (37% for operators and 41% for passengers) and injuries (8% for minor and 13% for serious injury). Information on the methodology of estimating the lives and costs saved estimates, as well as injury details, is available in the NHTSA documents listed in the references.

The estimated number of lives saved is based on the number of helmeted motorcyclist fatalities, while the estimate of additional lives that could have been saved is based on the number of unhelmeted motorcyclist fatalities. Therefore, in years when there are fewer applicable motorcyclist fatalities, the corresponding estimates are lower.

NHTSA does not have State-level data on motorcyclists that have been injured. We estimate them from National and State totals of motorcyclist fatalities (from FARS) and national estimates of motorcyclists injured (through 2015, from the NASS GES). The number of injured motorcyclists in a State is estimated by using the national ratio of motorcyclists injured to motorcyclists killed. The average ratio over the most recent 5 years is used to account for annual sample variance. Because the number and types of injuries motorcyclists experience depend greatly on use of helmets, injury counts are estimated separately by helmet use status. Table 1 shows the national fatality and injured counts, and the ratios derived from them, for each of the most recent 6 years of available data, along with the 5-year-average ratio values for helmeted and unhelmeted motorcyclists for 2011 through 2015.

Table 1: National Annual Motorcyclists Killed and Injured, Known Helmet Use, and Injury-to-Fatality Ratios, 2011–2016

Year	Fatalities		Injured		Injury-to-Fatality Ratio	
	Known Helmeted	Known Unhelmeted	Known Helmeted	Known Unhelmeted	Helmeted	Unhelmeted
2011	2,677	1,852	50,860	24,868	19.00	13.43
2012	2,789	2,036	58,365	29,324	20.93	14.40
2013	2,679	1,861	53,934	27,482	20.13	14.77
2014	2,733	1,717	53,597	32,434	19.61	18.89
2015	2,972	1,946	55,160	26,104	18.56	13.41
2016	3,054	2,089	N/A	N/A	N/A	N/A
Average 2011–2015					**19.65**	**14.98**

Source: FARS 2011–2015 Final Files; 2016 Annual Report File (ARF). GES 2011–2015.

Since there is no available injury data for 2016, the average ratio for 2011 through 2015 will be used. These ratios vary somewhat each time a new year of data replaces the oldest year. However, as Table 2 shows, there is relatively little variability when an average is taken over 5 years of data.

Table 2: Five-Year Average of Injury-to-Fatality Ratios, by Helmet Use

Years	5 Year Average, Injury-to-Fatality Ratio	
	Helmeted	Unhelmeted
2007–2011	20.07	13.73
2008–2012	20.11	14.04
2009–2013	20.51	14.48
2010–2014	19.96	15.10
2011–2015	19.65	14.98

Costs are adjusted using the Department of Labor's Consumer Price Index (CPI). Blincoe et al. (2015) provides cost data for 2010. These costs are multiplied by the CPI ratio of the current data year (in this case, 2016) to the base year (2010). These values, taken from the Bureau of Labor Statistics website http://data.bls.gov/cgi-bin/surveymost?cu, are 218.056 for 2010, and 240.007 for 2016. So the dollar values are multiplied by 240.007/218.056, or 1.101, to get current year dollars.

Table 3 provides, for 2016, and for each State as well as the Nation, the number of motorcyclist fatalities (total and by helmet use), the helmet use rate in fatal crashes, the estimated number of lives saved by motorcycle helmets, and the estimated number of additional lives that could have been saved at 100-percent helmet use.

Table 4 provides the economic and comprehensive costs saved due to the lives saved and injuries prevented by the use of motorcycle helmets, as well as how much could have been saved if all motorcyclists had worn helmets, nationally and in each State in 2016.

Crash Report Sampling System (CRSS) Replaces the National Automotive Sampling System (NASS) General Estimates System (GES)

NHTSA's National Center for Statistics and Analysis (NCSA) redesigned the nationally representative sample of police reported traffic crashes, which estimates the number of police-reported injury and property-damage-only crashes in the United States. The new system, called CRSS, replaced NASS GES in 2016. The 2016 CRSS data was released the last week of March 2018. For more information, see the Additional Resources section of the CRSS web page at: www.nhtsa.gov/national-center-statistics-and-analysis-ncsa/crash-report-sampling-system-crss.

References

Blincoe, L. J., Miller, T. R., Zaloshnja, E., & Lawrence, B. A. (2015). *The economic and societal impact of motor vehicle crashes, 2010 (Revised)* (Report No. DOT HS 812 013). Washington, DC: National Highway Traffic Safety Administration. Available at https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812013.

NCSA. (2011). *Determining estimates of lives and costs saved by motorcycle helmets* (Report No. DOT HS 811 433). Washington, DC: National Highway Traffic Safety Administration. Available at https://crashstats.nhtsa.dot.gov/Api/Public/Publication/811433.

NCSA. (2015). *Estimating lives and costs saved by motorcycle helmets with updated economic cost information* (Report No. DOT HS 812 206). Washington, DC: National Highway Traffic Safety Administration. Available at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812206.

U.S. Department of Transportation

National Highway Traffic Safety Administration

For questions regarding the information presented in this document, please contact NCSARequests@dot.gov. Internet users may access this Crash•Stats and other general information on traffic safety at https://www.nhtsa.gov/research-data. To report a safety-related problem or to inquire about motor vehicle safety information, contact the Vehicle Safety Hotline at 888-327-4236.

Table 3: Motorcyclist Fatalities by Helmet Use, Helmet Use Rates, Lives Saved, and Additional Lives Savable at 100-Percent Helmet Use, by State, 2016

State	Motorcyclists Fatalities				Helmet Use Rate in Fatal Crashes (Known)	Number of Lives Saved	Additional Lives Savable at 100% Helmet Use
	Total Motorcyclist Fatalities	Helmet Used	Helmet Not Used	Helmet Use Unknown			
Alabama	103	93	10	0	90.3%	55	4
Alaska	6	4	2	0	66.7%	2	0
Arizona	146	53	86	7	38.1%	33	34
Arkansas	80	23	57	0	28.8%	14	21
California	548	511	25	12	95.3%	309	10
Colorado	125	42	82	1	33.9%	25	31
Connecticut	52	14	36	2	28.0%	8	13
Delaware	14	9	4	1	69.2%	5	2
District of Columbia	6	5	0	1	100.0%	4	0
Florida	586	288	283	15	50.4%	175	108
Georgia	172	154	9	9	94.5%	96	4
Hawaii	24	9	15	0	37.5%	5	6
Idaho	22	7	14	1	33.3%	4	5
Illinois	155	38	116	1	24.7%	23	44
Indiana	101	24	72	5	25.0%	15	28
Iowa	60	13	47	0	21.7%	8	18
Kansas	52	21	30	1	41.2%	13	11
Kentucky	111	35	76	0	31.5%	21	27
Louisiana	94	80	11	3	87.9%	49	4
Maine	18	6	12	0	33.3%	4	4
Maryland	75	63	11	1	85.1%	38	4
Massachusetts	42	38	2	2	95.0%	24	1
Michigan	152	63	78	11	44.7%	40	31
Minnesota	56	17	36	3	32.1%	11	14
Mississippi	50	39	7	4	84.8%	25	3
Missouri	127	108	15	4	87.8%	66	6
Montana	17	5	12	0	29.4%	3	4
Nebraska	20	9	3	8	75.0%	8	2
Nevada	74	59	12	3	83.1%	36	5
New Hampshire	19	11	8	0	57.9%	6	3
New Jersey	71	63	3	5	95.5%	40	1
New Mexico	47	25	22	0	53.2%	15	8
New York	134	119	9	6	93.0%	74	3
North Carolina	185	168	14	3	92.3%	101	5
North Dakota	12	2	10	0	16.7%	1	4
Ohio	199	53	145	1	26.8%	32	55
Oklahoma	88	24	64	0	27.3%	14	24
Oregon	54	46	3	5	93.9%	30	1
Pennsylvania	191	87	97	7	47.3%	54	38
Rhode Island	4	0	4	0	0.0%	0	1
South Carolina	185	52	133	0	28.1%	31	50
South Dakota	22	6	15	1	28.6%	4	6
Tennessee	147	133	13	1	91.1%	80	5
Texas	490	213	265	12	44.6%	129	102
Utah	41	18	21	2	46.2%	11	8
Vermont	11	9	2	0	81.8%	5	1
Virginia	79	75	4	0	94.9%	44	1
Washington	81	76	3	2	96.2%	46	1
West Virginia	29	19	10	0	65.5%	11	4
Wisconsin	85	17	65	3	20.7%	10	25
Wyoming	24	8	16	0	33.3%	5	6
National	**5,286**	**3,054**	**2,089**	**143**	**59.4%**	**1,859**	**802**

Source: FARS 2016 Annual Report File.
Shaded States are those with laws requiring helmet use for all motorcyclists, at the time of publication.

Table 4: Economic and Comprehensive Costs Saved by Helmet Use and Savable by 100-Percent Helmet Use, by State, 2016

State	*Economic Costs Saved	*Additional Economic Costs Savable at 100% Use	**Comprehensive Costs Saved	**Additional Comprehensive Costs Savable at 100% Use
Alabama	$85,433,642	$5,911,687	$518,938,244	$36,002,510
Alaska	$4,836,539	$1,643,970	$29,205,382	$10,001,048
Arizona	$53,132,917	$56,416,893	$321,459,053	$342,669,036
Arkansas	$20,706,464	$33,419,799	$125,744,162	$203,675,730
California	$611,195,792	$19,456,716	$3,699,565,890	$118,200,485
Colorado	$48,952,487	$61,182,082	$298,486,455	$373,812,309
Connecticut	$20,807,613	$33,770,552	$127,111,596	$206,935,061
Delaware	$10,495,355	$3,014,163	$63,812,851	$18,367,223
District of Columbia	$10,840,324	$0	$66,568,275	$0
Florida	$310,124,711	$198,460,380	$1,886,055,670	$1,211,335,704
Georgia	$155,498,286	$5,897,415	$944,050,507	$35,917,498
Hawaii	$10,294,756	$11,220,775	$61,684,535	$67,542,438
Idaho	$6,451,751	$8,430,660	$39,002,161	$51,187,025
Illinois	$43,749,574	$86,929,206	$266,983,331	$532,267,082
Indiana	$23,761,904	$46,811,614	$144,256,537	$285,303,779
Iowa	$13,346,924	$31,239,172	$81,298,474	$190,851,127
Kansas	$22,702,836	$20,906,623	$138,551,377	$127,913,362
Kentucky	$31,327,129	$41,949,296	$190,036,254	$255,386,918
Louisiana	$85,120,952	$7,546,860	$518,241,016	$46,061,960
Maine	$6,111,903	$7,969,775	$36,918,609	$48,330,078
Maryland	$82,873,117	$9,322,142	$505,363,930	$56,988,918
Massachusetts	$54,410,246	$1,845,913	$332,426,224	$11,303,087
Michigan	$65,270,201	$52,328,684	$396,804,412	$319,103,022
Minnesota	$20,609,658	$28,330,576	$125,569,082	$173,247,245
Mississippi	$36,095,466	$4,216,254	$218,334,526	$25,593,362
Missouri	$110,740,486	$10,111,217	$673,765,383	$61,742,945
Montana	$4,787,381	$6,861,217	$28,981,168	$41,691,414
Nebraska	$15,556,400	$3,497,658	$94,955,641	$21,400,433
Nevada	$61,519,707	$8,133,392	$372,931,291	$49,474,755
New Hampshire	$12,927,117	$6,248,490	$78,546,939	$38,162,305
New Jersey	$90,993,740	$2,764,886	$554,367,972	$16,894,176
New Mexico	$23,387,885	$13,277,031	$141,691,469	$80,670,540
New York	$165,013,357	$8,091,298	$999,401,622	$49,158,730
North Carolina	$165,545,029	$8,865,220	$1,003,914,495	$53,922,277
North Dakota	$2,147,078	$6,978,186	$13,073,055	$42,629,353
Ohio	$52,583,069	$92,846,029	$319,887,020	$566,400,050
Oklahoma	$23,259,512	$40,719,555	$141,449,063	$248,655,682
Oregon	$51,796,034	$2,183,283	$313,068,464	$13,270,130
Pennsylvania	$99,535,826	$71,870,757	$606,097,596	$438,993,044
Rhode Island	$0	$2,985,217	$0	$18,151,854
South Carolina	$47,499,558	$78,939,319	$287,418,218	$479,359,049
South Dakota	$6,524,491	$10,635,149	$39,649,015	$64,880,969
Tennessee	$127,290,496	$8,161,462	$774,129,291	$49,841,798
Texas	$228,293,623	$185,157,750	$1,392,151,541	$1,132,981,365
Utah	$16,837,036	$12,751,626	$101,966,597	$77,488,371
Vermont	$9,954,625	$1,417,612	$60,330,072	$8,611,590
Virginia	$87,913,643	$3,037,972	$537,006,565	$18,611,409
Washington	$90,841,161	$2,320,496	$552,835,697	$14,163,026
West Virginia	$16,803,394	$5,910,303	$101,677,232	$35,973,560
Wisconsin	$18,286,468	$45,361,789	$111,148,715	$276,626,195
Wyoming	$10,110,672	$13,013,874	$61,947,885	$79,921,328
National	**$3,397,915,704**	**$1,511,716,712**	**$20,691,183,517**	**$9,236,411,919**

*Economic costs include lost productivity, medical costs, legal and court costs, emergency service costs (EMS), insurance administration costs, congestion costs, property damage, and workplace losses.
**Comprehensive costs include economic costs plus valuation for lost quality of life.
Cost data from *The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised)*; DOT HS 812 013, May 2015.
State costs are adjusted for relative per-capita income; dollar amounts for the Nation will not equal the sum of the States.
Sources: FARS 2016 Annual Report File; Bureau of Labor Statistics; Blincoe et al., 2015.
Shaded States are those with laws requiring helmet use for all motorcyclists, at the time of publication.