Lives and Costs Saved by Motorcycle Helmets, 2017

Findings

In 2017 the use of motorcycle helmets saved an estimated 1,872 lives. An additional 749 lives could have been saved in 2017 if all motorcyclists had worn helmets. Nearly $3.5 billion in economic costs and $21 billion in comprehensive costs were saved in 2017 by the use of motorcycle helmets. If all motorcyclists had worn helmets in 2017, an additional $1.5 billion in economic costs and $8.9 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). Refer to the end of this publication for more information on FARS. Injury estimates are based on data from the National Automotive Sampling System (NASS) General Estimates System (GES). NASS GES was discontinued in 2016 and replaced with a new system called the Crash Report Sampling System (CRSS). 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.

The National Highway Traffic Safety Administration'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 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 injuries 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 who were injured. We estimate them from national and State totals of motorcyclist fatalities from FARS and national estimates of motorcyclists injured from the NASS GES and CRSS. The number of injured motorcyclists in a State is estimated by using the most recent 5-year average of national ratios of motorcyclists injured to motorcyclists killed. 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 5 years of available data, along with the 5-year-average ratio values for helmeted and unhelmeted motorcyclists for 2013 to 2017. These ratios vary somewhat each time a new year of data replaces the oldest year. Puerto Rico counts are not included in national totals.

Table 1: Motorcyclists Killed and Injured, Known Helmet Use, and Injury-to-Fatality Ratios, 2013-2017

Year	Fatalities		Injured		Injury-to-Fatality Ratio	
	Helmeted	**Unhelmeted**	**Helmeted**	**Unhelmeted**	**Helmeted**	**Unhelmeted**
2013	2,769	1,923	58,578	29,848	21.16	15.52
2014	2,821	1,773	57,075	34,538	20.23	19.49
2015	3,039	1,990	60,016	28,402	19.75	14.28
2016	3,181	2,156	73,090	31,359	22.98	14.54
2017	3,164	2,008	58,902	29,815	18.62	14.85
Average 2013-2017	**2,995**	**1,970**	**61,532**	**30,793**	**20.55**	**15.73**

Source: FARS 2013-2016 Final Files; 2017 Annual Report File (ARF); GES 2013-2015; CRSS 2016-2017.
Note: Unknown helmet use has been distributed proportionally to known categories.
Puerto Rico numbers are not included in Table 1 totals.

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, 2017) to the base year (2010). The CPI values, taken from the Bureau of Labor Statistics website (http://data.bls.gov/cgi-bin/surveymost?cu), are 218.056 for 2010, and

245.120 for 2017. So, the dollar values are multiplied by 1.124 (245.120/218.056), to get current year dollars. Table 2 provides, for 2017, 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 3 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 2017.

Fatality Analysis Reporting System

The FARS contains data on every fatal traffic crash in the 50 States, the District of Columbia, and Puerto Rico. To be included in FARS, a crash must involve a motor vehicle traveling on a public trafficway and must result in the death of a vehicle occupant or a nonoccupant within 30 days of the crash. The Annual Report File (ARF) is the FARS data file associated with the most recent available year, which is subject to change when it is finalized about a year later. The final version of the file is aptly known as the "Final" file. The additional time between the ARF and the Final file provides the opportunity for submission of important variable data requiring outside sources, which may lead to changes in the final counts.

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 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 2: Motorcyclist Fatalities by Helmet Use, Helmet Use Rates, Lives Saved, and Additional Lives Savable at 100-Percent Helmet Use, by State, 2017

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	79	72	6	1	92.3%	43	2
Alaska	6	3	3	0	50.0%	2	1
Arizona	163	66	84	13	44.0%	42	34
Arkansas	65	30	33	2	47.6%	18	13
California	529	476	41	12	92.1%	287	16
Colorado	103	31	72	0	30.1%	18	27
Connecticut	57	22	33	2	40.0%	13	13
Delaware	10	6	4	0	60.0%	4	2
District of Columbia	4	3	0	1	100.0%	2	0
Florida	590	291	289	10	50.2%	174	110
Georgia	139	119	18	2	86.9%	72	6
Hawaii	25	11	14	0	44.0%	6	5
Idaho	25	10	15	0	40.0%	6	6
Illinois	162	49	109	4	31.0%	30	42
Indiana	149	41	105	3	28.1%	25	40
Iowa	48	14	33	1	29.8%	8	13
Kansas	56	21	32	3	39.6%	13	13
Kentucky	90	31	59	0	34.4%	18	22
Louisiana	96	78	13	5	85.7%	48	5
Maine	26	9	17	0	34.6%	5	6
Maryland	86	70	12	4	85.4%	43	5
Massachusetts	51	47	1	3	97.9%	29	0
Michigan	150	74	69	7	51.7%	46	27
Minnesota	55	16	36	3	30.8%	10	15
Mississippi	40	27	7	6	79.4%	19	3
Missouri	121	100	20	1	83.3%	60	8
Montana	23	9	14	0	39.1%	5	5
Nebraska	27	20	0	7	100.0%	16	0
Nevada	54	44	8	2	84.6%	27	3
New Hampshire	15	7	8	0	46.7%	4	3
New Jersey	83	75	3	5	96.2%	47	1
New Mexico	53	14	35	4	28.6%	9	14
New York	145	131	9	5	93.6%	80	4
North Carolina	176	161	14	1	92.0%	97	4
North Dakota	12	3	9	0	25.0%	2	3
Ohio	157	45	109	3	29.2%	27	42
Oklahoma	93	23	68	2	25.3%	14	26
Oregon	57	46	2	9	95.8%	32	1
Pennsylvania	187	96	88	3	52.2%	58	34
Rhode Island	11	6	5	0	54.5%	4	2
South Carolina	145	43	100	2	30.1%	26	38
South Dakota	16	6	10	0	37.5%	4	4
Tennessee	134	123	8	3	93.9%	74	3
Texas	490	234	243	13	49.1%	142	94
Utah	39	13	25	1	34.2%	8	10
Vermont	13	13	0	0	100.0%	8	0
Virginia	117	115	1	1	99.1%	68	0
Washington	80	78	0	2	100.0%	47	0
West Virginia	26	16	10	0	61.5%	9	4
Wisconsin	77	30	43	4	41.1%	19	17
Wyoming	17	4	13	0	23.5%	2	5
National	**5,172**	**3,072**	**1,950**	**150**	**61.2%**	**1,872**	**749**
Puerto Rico	28	13	15	0	46.4%	8	6

Source: FARS 2017 ARF
Shaded States are those with laws requiring helmet use for all motorcyclists, at the time of publication.
*Estimates for States may not add up to national totals due to independent rounding.

Table 3: Economic and Comprehensive Costs Saved by Helmet Use and Savable by 100-Percent Helmet Use, by State, 2017

State	*Economic Costs Saved	*Additional Economic Costs Savable at 100% Use	**Comprehensive Costs Saved	**Additional Comprehensive Costs Savable at 100% Use
Alabama	$67,287,832	$3,783,029	$413,792,678	$23,028,382
Alaska	$3,612,643	$2,665,414	$22,206,505	$16,225,140
Arizona	$68,608,576	$63,094,386	$421,792,050	$384,365,313
Arkansas	$27,995,815	$21,251,307	$172,205,688	$129,441,686
California	$569,682,947	$35,170,643	$3,502,779,513	$214,129,273
Colorado	$35,672,254	$54,984,512	$219,273,301	$334,931,437
Connecticut	$34,097,602	$31,972,114	$209,594,098	$194,702,428
Delaware	$6,478,520	$3,009,204	$39,822,727	$18,349,140
District of Columbia	$7,506,960	$0	$46,144,433	$0
Florida	$314,693,942	$210,245,349	$1,934,948,540	$1,280,786,507
Georgia	$116,446,483	$12,119,726	$715,974,232	$73,804,280
Hawaii	$12,285,605	$12,781,595	$75,518,224	$77,805,228
Idaho	$8,901,052	$9,554,851	$54,771,824	$58,163,115
Illinois	$58,439,703	$83,318,855	$359,298,949	$507,468,639
Indiana	$39,785,624	$70,549,940	$244,693,396	$429,757,487
Iowa	$14,742,404	$23,003,598	$90,619,885	$140,058,381
Kansas	$23,817,857	$23,286,152	$146,476,312	$141,778,613
Kentucky	$27,955,675	$37,086,137	$171,840,367	$225,886,338
Louisiana	$85,225,197	$9,433,074	$523,938,102	$57,421,820
Maine	$9,293,476	$12,742,846	$57,193,191	$77,600,998
Maryland	$96,677,762	$10,767,731	$594,440,786	$65,618,306
Massachusetts	$68,913,152	$924,861	$423,601,336	$5,629,891
Michigan	$75,524,155	$47,622,166	$464,652,029	$290,069,839
Minnesota	$18,797,533	$29,470,173	$115,546,306	$179,521,569
Mississippi	$27,044,086	$5,078,889	$166,293,114	$30,916,650
Missouri	$101,692,401	$13,597,639	$625,554,300	$82,829,477
Montana	$8,636,935	$9,573,586	$53,090,258	$58,277,160
Nebraska	$29,301,985	$0	$180,397,120	$0
Nevada	$45,991,989	$5,846,903	$282,773,998	$35,591,773
New Hampshire	$8,322,507	$6,427,547	$51,157,507	$39,126,318
New Jersey	$109,354,345	$2,805,293	$672,548,865	$17,076,620
New Mexico	$13,942,173	$25,110,710	$85,700,959	$152,884,178
New York	$180,319,354	$8,906,704	$1,109,089,944	$54,262,583
North Carolina	$157,633,563	$9,604,437	$969,467,596	$58,493,731
North Dakota	$3,275,288	$6,439,797	$20,132,824	$39,200,887
Ohio	$45,655,900	$74,691,551	$280,901,671	$455,064,001
Oklahoma	$23,290,319	$46,105,388	$143,228,027	$280,934,969
Oregon	$55,863,031	$1,746,583	$343,651,557	$10,631,948
Pennsylvania	$108,558,767	$66,269,862	$667,725,303	$403,657,844
Rhode Island	$7,080,452	$4,056,849	$43,598,952	$24,695,199
South Carolina	$39,472,260	$66,818,121	$242,691,237	$406,907,991
South Dakota	$6,288,553	$7,068,861	$38,655,023	$43,030,178
Tennessee	$120,357,157	$5,263,503	$740,074,021	$32,040,450
Texas	$256,732,754	$171,879,782	$1,578,834,225	$1,046,851,823
Utah	$11,943,744	$16,389,659	$73,475,414	$99,849,092
Vermont	$14,164,529	$0	$87,067,754	$0
Virginia	$139,962,322	$756,879	$860,729,509	$4,607,336
Washington	$94,246,261	$0	$579,398,965	$0
West Virginia	$14,166,713	$6,348,284	$87,081,176	$38,643,819
Wisconsin	$33,236,374	$32,252,828	$204,437,903	$196,452,064
Wyoming	$5,105,082	$10,165,130	$31,380,362	$61,911,023
National	**$3,472,352,576**	**$1,458,458,383**	**$21,352,564,909**	**$8,883,274,558**
Puerto Rico	$15,612,206	$12,162,843	$95,966,463	$74,173,260

Sources: FARS 2017 ARF; Bureau of Labor Statistics; Blincoe et al., 2015.
*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.
Shaded States are those with laws requiring helmet use for all motorcyclists, at the time of publication.