

## TRAFFIC SAFETY FACTS

# Motorcycle Safety

—Katherine L. Chen, Bor-Wen Tsai, Garrett Fortin, and Jill F. Cooper—

### PROBLEM IDENTIFICATION AND DATA ANALYSIS

Crashes involving motorcycles are a major traffic safety concern in the United States. Since motorcyclists are susceptible to injury during crashes, they comprise a disproportionate share of all injured and killed vehicle occupants. In 2020, motorcyclists comprised 14.4 percent of all traffic deaths in the US.

The primary countermeasures used to address this problem include motorcycle helmet laws and other helmet-oriented programs, rider training and licensing programs, vehicle enhancements, including anti-lock braking technology, rider conspicuity programs, campaigns to increase other road users' awareness of motorcycles, and campaigns to reduce impaired riding. The United States Department of Transportation uses the Safe System Approach to work towards zero roadway fatalities and serious injuries. The Safe System Approach recognizes that people may make unsafe decisions or may have momentary lapses of attention, and designs a roadway system with redundancies in place to protect everyone. The Federal Highway Administration names safe road users, safe vehicles, safe speeds, safe roads, and post-crash care as key elements of a Safe System. These elements together create multiple layers of protection to improve safety.

The 2020 National Occupant Protection Use Survey (NOPUS) reported that DOT-compliant helmet use among all motorcyclists in the US (riders and passengers) decreased to 64.9 percent in 2021, not statistically different at the 0.05 level from 69.0 percent in 2020. In states with a universal helmet law, which requires all motorcyclists to use a helmet, the known helmet use rate increased to 86.1 percent in 2021, not statistically significant from 84.0 percent in 2020.

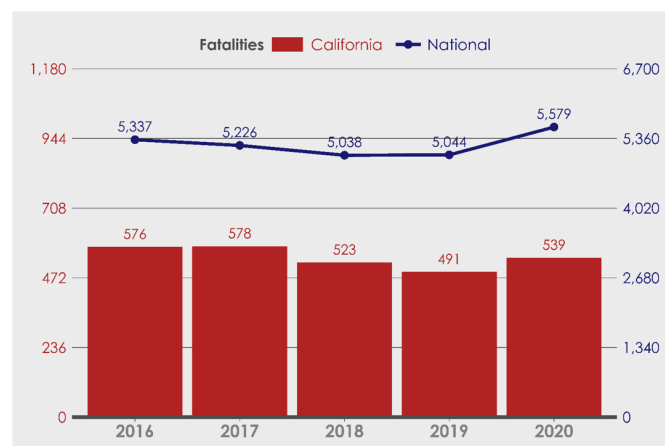
Analyses presented in the motorcycle program area include fatal and serious injuries to drivers and passengers riding two- and three-wheel motorcycles, mopeds, motorized scooters, motorized bicycles, off-road motorcycles, and other motor-driven cycles. Motorcycle crashes are defined as a crash where one or more victims is a motorcycle driver or passenger.

### KEY FINDINGS

#### NATIONAL DATA

- In 2020, there were 5,579 motorcyclist fatalities in the US, an increase of 535 deaths, or 10.6 percent from 2019 (see Figure 1).
- In 2020, drivers of most vehicle types saw increases in the number of alcohol-impaired drivers involved in fatal crashes compared to 2019, including motorcyclists, who saw a 4.4 percent increase.
- In urban areas, motorcyclist deaths increased by 7.8 percent between 2019 and 2020. In rural areas, they increased by 11.0 percent during the same time period. Thirty percent of motorcyclists involved in fatal crashes in 2019 were not properly licensed.

**Figure 1: Motorcycle Fatality Trends, Nationwide and California, 2016-2020**



Source: FARS 2016-2019, FARS ARF 2020

## CALIFORNIA DATA

- From 2019 to 2020, California also saw an increase in motorcycle fatalities. In 2020, there were 539 deaths, up 9.8 percent from 491 in 2019.
- The figures in this section refer to drivers and passengers of motorcycles fatally and seriously injured in a crash in California in 2020. These numbers are the products of UCB SafeTREC analysis.

### Fatal and Serious Injury Motorcycle Crashes by County

- Los Angeles, San Diego, Riverside, San Bernardino, Orange, and Kern counties in Southern California, as well as Sacramento County in Northern California, had the highest number of fatal injuries among motorcyclists. Similarly, the counties of Los Angeles, San Diego, Riverside, San Bernardino, Orange, Kern, and Sacramento, along with Alameda had the highest number of serious injuries among motorcyclists. (See Figure 4.)
- The rural counties of Lassen, Colusa, Amador, Calaveras, Tuolumne, Napa, San Benito, and Kern had the highest rates of fatal injuries per capita by county. The rural counties of Del Norte, Trinity, Sierra, Alpine, Calaveras, Mono, Mariposa, and Inyo had the highest rates of serious injuries per capita by county.
- Kern County experienced both high numbers and rates per capita of motorcyclist fatalities.

### Primary Crash Factors of Motorcycle Fatal and Serious Injury Crashes

- Unsafe speed (30.9 percent), followed by improper turning (22.2 percent), and right-of-way violations by automobiles (16.1 percent), were the most frequent primary crash factors for fatal and serious injury motorcycle crashes (see Figure 2).

### Crash Types for Motorcycle Fatal and Serious Injury Crashes

- Broadside crashes (25.1 percent) and overturned crashes (21.0 percent) were the most frequent crash types for fatal and serious injury motorcycle crashes (see Figure 3).

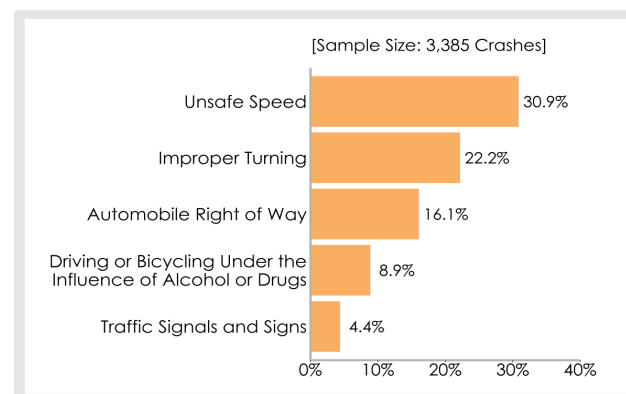
### Time and Day of Motorcycle Crash Fatal and Serious Injuries

- In 2020, the number of fatally and seriously injured motorcyclists was markedly higher between 3pm and 6pm, comprising 21.9 percent of the fatal and 25.5 percent of serious motorcyclist injuries. The time periods noon to 3pm and 6pm to 9pm also had higher numbers with 37.1 percent of fatal and 40.3 percent of serious injuries, respectively.
- Motorcyclist fatalities and serious injuries were elevated during the day on Saturdays and Sundays between 9am and 9pm, accounting for 30.0 percent of fatal and 32.3 percent of serious injuries in 2020.

### Motorcycle Fatal and Serious Injury Crash Victim Demographics

- The vast majority of fatal (93.7 percent) and serious injury (90.5 percent) motorcycle crash victims were males. The age category with the greatest number of victims, men or women, was ages 25 to 34, comprising 26.0 percent of motorcycle fatalities and 28.6 percent of motorcycle serious injury victims.
- Race was not reported for 34.5 percent of the motorcyclist fatalities. Of the 353 fatalities with a known race, 51.2 percent (or 181) were white.

**Figure 2: Top Five Primary Crash Factors for Motorcycle Fatal and Serious Injury Crashes, California, 2020**



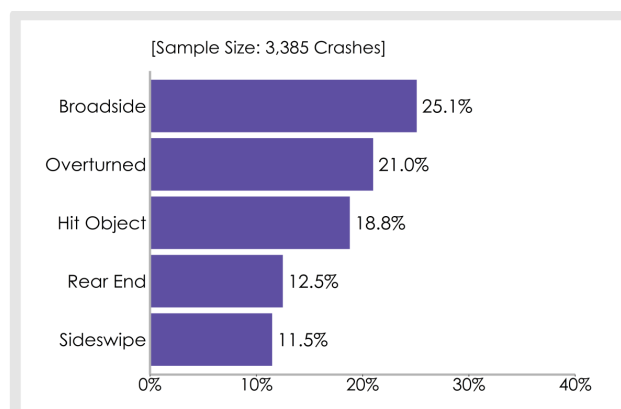
Source: Provisional SWITRS 2020

## CALIFORNIA DATA

### Crash Location for Motorcycle Crash Victims

- Over two-thirds (67.2 percent) of motorcycle crash fatal injuries occurred in urban areas, compared to 32.3 percent on rural roads. Approximately 18.5 percent of travel took place on rural roads in 2020.
- Over one-third (39.0 percent) of all motorcycle crash fatalities occurred on non-interstate principal arterials. The next most common locations for motorcycle crash fatalities were non-interstate minor arterials (26.7 percent) and non-interstate collectors (16.9 percent).

**Figure 3: Top Five Crash Types for Motorcycle Fatal and Serious Injury Victims, California, 2020**



Source: Provisional SWITRS 2020

## REFERENCES

- California Department of Transportation. (2021, December). California Public Road Data 2020.
- National Center for Statistics and Analysis. (2022, March). Motorcycle helmet use in 2021 – Overall results. (Traffic Safety Facts Research Note. Report No. DOT HS 813 270). National Highway Traffic Safety Administration.
- National Center for Statistics and Analysis. (2022, March). Overview of motor vehicle crashes in 2020. (Traffic Safety Facts Research Note. Report No. DOT HS 813 266). National Highway Traffic Safety Administration.
- National Center for Statistics and Analysis. (2021, September). 2019 Data Motorcycles. (Traffic Safety Facts DOT HS 813 112). National Highway Traffic Safety Administration.

## COUNTY TABLE: MOTORCYCLE SAFETY

Figure 4: Motorcycle Fatalities and Serious Injuries, by Number and Rate, 2020

County	Population	Fatalities	Serious Injuries	Fatal & Serious Injuries (FSI)	FSI per 100K Population
Alameda	1,681,700	18	84	102	6.07
Alpine	1,199	0	3	3	250.21
Amador	40,506	4	11	15	37.03
Butte	211,216	7	26	33	15.62
Calaveras	45,277	3	15	18	39.76
Colusa	21,826	2	5	7	32.07
Contra Costa	1,166,669	10	64	74	6.34
Del Norte	27,745	0	11	11	39.65
El Dorado	191,282	6	35	41	21.43
Fresno	1,008,860	17	59	76	7.53
Glenn	28,822	0	4	4	13.88
Humboldt	136,514	3	23	26	19.05
Imperial	178,537	2	8	10	5.60
Inyo	18,977	0	14	14	73.77
Kern	907,021	33	101	134	14.77
Kings	153,085	2	13	15	9.80
Lake	68,099	2	21	23	33.77
Lassen	32,025	2	8	10	31.23
Los Angeles	10,012,474	114	702	816	8.15
Madera	156,519	4	14	18	11.50
Marin	262,410	4	27	31	11.81
Mariposa	17,123	0	17	17	99.28
Mendocino	91,602	2	15	17	18.56
Merced	280,873	5	35	40	14.24
Modoc	8,703	0	1	1	11.49
Mono	13,185	0	7	7	53.09
Monterey	439,008	8	39	47	10.71
Napa	138,433	5	21	26	18.78
Nevada	102,392	3	21	24	23.44
Orange	3,184,513	26	127	153	4.81
Placer	405,308	3	27	30	7.40
Plumas	19,666	0	6	6	30.51
Riverside	2,421,480	47	203	250	10.32
Sacramento	1,585,666	26	140	166	10.47
San Benito	64,110	3	3	6	9.36
San Bernardino	2,181,983	40	178	218	9.99
San Diego	3,303,736	43	219	262	7.93
San Francisco	870,985	8	49	57	6.54
San Joaquin	780,676	10	62	72	9.22
San Luis Obispo	282,996	3	31	34	12.01
San Mateo	763,497	7	37	44	5.76
Santa Barbara	448,659	5	28	33	7.36
Santa Clara	1,933,516	12	70	82	4.24
Santa Cruz	272,360	1	28	29	10.65
Shasta	181,881	3	35	38	20.89
Sierra	3,233	0	10	10	309.31
Siskiyou	44,091	0	9	9	20.41
Solano	453,405	6	24	30	6.62
Sonoma	489,880	7	44	51	10.41
Stanislaus	553,995	7	58	65	11.73
Sutter	100,751	3	10	13	12.90
Tehama	65,643	0	12	12	18.28
Trinity	16,135	0	7	7	43.38
Tulare	473,482	6	30	36	7.60
Tuolumne	55,500	2	14	16	28.83
Ventura	844,545	10	60	70	8.29
Yolo	216,544	3	13	16	7.39
Yuba	81,468	2	15	17	20.87
<b>Total</b>	<b>39,541,786</b>	<b>539</b>	<b>2,953</b>	<b>3,492</b>	<b>8.83</b>

Source: FARS ARF 2020; Provisional SWITRS 2020; California Department of Finance 2021.