



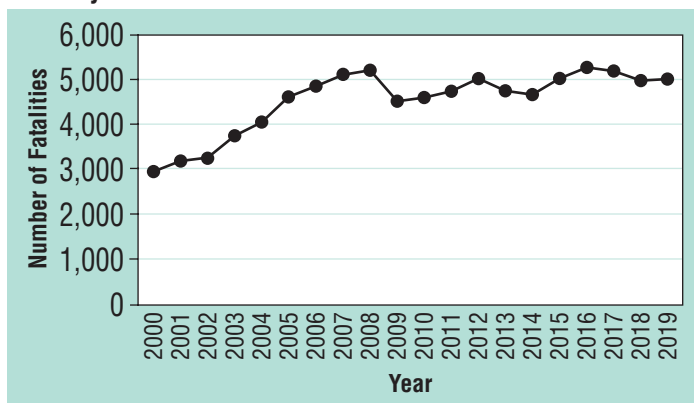
# Countermeasures That Work – Motorcyclists

The National Highway Traffic Safety Administration has published its tenth edition of *Countermeasures That Work*, a basic reference to assist State Highway Safety Offices and other highway safety professionals in selecting effective, evidence-based countermeasures for traffic safety problems. This Traffic Tech highlights the effective countermeasures from Chapter 5, Motorcycle Safety.

## Background

In the past 20 years, motorcycling has become increasingly popular, with motorcycle ownership substantially increasing and total vehicle miles traveled (VMT) on motorcycles nearly doubling since 1998. Along with growth in popularity are increases in motorcyclist crashes and fatalities. From 2000 to 2008, the number of motorcyclists killed in crashes increased by 83% and the number injured increased by 66%. In 2008, motorcyclist fatalities increased for the 11th consecutive year to 5,312, a level not seen since 1980. From 2010 to 2019, motorcyclist fatalities increased by 11% and peaked in 2016. There was a slight decrease in the number of fatalities in 2017 (5,229), 2018 (5,038), and again in 2019 (5,014).

## Motorcyclist Fatalities in Crashes



Source data: FARS query, NCSA (2021)

## Strategies to Improve Motorcycle Safety

A motorcycle is inherently more difficult to operate than a passenger vehicle because it requires more physical skill and strength. Furthermore, a motorcycle offers the rider virtually no protection in a crash. Comparing crash data by vehicle type confirms this observation. For example, the most recent data show that in 2019, motorcyclist fatalities occurred nearly 29 times more frequently per VMT than passenger car occupant fatalities, and motorcyclists were killed at a rate of 25.47

fatalities per 100 million VMT, compared to 0.89 fatalities per 100 million VMT for passenger cars. Thus, behavioral safety strategies to improve motorcycle safety focus on the prevention of motorcycle crashes and the protection of motorcyclists in a crash. The most demonstrably effective strategy is the use of motorcycle helmets compliant with Federal Motor Vehicle Safety Standard (FMVSS) 218. Additional strategies are to reduce alcohol- and drug-impaired motorcycle riding; require motorcyclists to receive training and be licensed; increase awareness among other drivers about motorcycles on the road and educate drivers on what constitutes safe driving behaviors around motorcycles; and encourage motorcyclists to use high-visibility gear.

The following section discusses the behavioral countermeasures for motorcyclists that have been supported by research. Effectiveness is shown via a five-star rating system in which five stars (★★★★★) indicate the countermeasure was found to be effective across various situations by several high-quality evaluations. Four stars (★★★★) indicate the countermeasure has been demonstrated to be effective in certain situations, and three-star (★★★) countermeasures were found to be promising and likely to be effective. As the cost of implementing a countermeasure is an important factor for communities deliberating on countermeasures for traffic safety, *Countermeasures That Work* also provides ratings on cost, with the highest rating (\$\$\$) indicating implementation would make heavy demands on resources; the middle rating (\$\$) indicates that implementation would require some additional resources; and the lowest rating (\$) indicates implementation is possible using current resources.

## Countermeasures That Work

These are the behavioral countermeasures for motorcyclists that have been demonstrated to be effective, or that are promising and likely to be effective.

## Motorcycle Helmets

Countermeasure	Effectiveness	Cost	Use	Time
1.1 Universal Motorcycle Helmet Use Laws	★★★★★	\$	Medium <sup>A</sup>	Short <sup>B</sup>

<sup>A</sup> 18 States, the District of Columbia, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands have universal motorcycle helmet use laws; 29 States and Guam require helmets for some riders; Illinois, Iowa and New Hampshire do not require helmet use for any rider.

<sup>B</sup> Time to implement is estimated as 3 months or less.

Motorcycle helmets meeting the FMVSS 218 standard are highly effective in protecting motorcycle riders' heads in crashes, reducing the risk of fatality and head injury as a crash outcome. In the past, some have expressed concern about the use of a helmet as a factor in neck and facial injuries, but there is either insufficient evidence to determine the effect, or there is no evidence that helmets increase the risk of neck injuries.

**Universal Motorcycle Helmet Use Laws** are highly effective in assuring that virtually all motorcycle riders use helmets, as shown by the National Occupant Protection Use Survey (NOPUS), the only survey that provides nationwide probability-based observed data on motorcycle helmet use in the United States. Findings from the most recent NOPUS in 2019 show that the use of DOT-compliant motorcycle helmets was 89.2% in States with universal helmet laws, whereas it was 56.5% in States without such laws (NCSA, 2020). The challenge of this countermeasure is that these laws are politically difficult to enact and retain. Furthermore, strategies relying only on communications and outreach to promote helmet use appear to be no more successful with motorcycle operators than communications and outreach campaigns for other road users.

## Alcohol Impairment

Countermeasure	Effectiveness	Cost	Use	Time
2.1 Alcohol-Impaired Motorcyclists: Detection, Enforcement, and Sanctions	★★★	Varies	Unknown	Varies

Alcohol impairment is a substantial problem for motorcyclists. (Drivers and motorcycle riders are considered alcohol-impaired when their blood alcohol concentrations [BACs] are .08 grams per deciliter [g/dL] or higher.) In 2018, some 39% of motorcycle riders who died in single-vehicle crashes were alcohol-impaired, and in 2019, some 42% of motorcycle riders who died in single-vehicle crashes were alcohol-impaired. Motorcycle riders involved in fatal crashes that same year had higher percentages of alcohol impairment than drivers of any other types of motor vehicle (29% for motorcycles, 20% for passenger cars, 19% for light trucks, and 2% for large trucks).

## Strategies to Reduce Alcohol-Impaired Motorcycling: Detection, Enforcement, and Sanctions

Strategies are virtually the same for motorcycle operators as they are for drivers of other motor vehicle types, but implementation may differ. These strategies include media cam-

paigns, substance use disorder treatment and prevention, and the enforcement of per se BAC laws and sanctions.

Law enforcement officers on traffic patrol use characteristic driving behaviors or cues to identify drivers who may be impaired by alcohol. The cues for motorcycle operators are part of the Standardized Field Sobriety Tests training given to all law enforcement officers. Some types of sanctions used in passenger vehicles, such as alcohol ignition interlocks, are not widely used on motorcycles. Likewise, some jurisdictions prohibit the use of motorcycle-only sobriety checkpoints.

## Conclusion

The behavior-based countermeasures supported by high-quality evidence are universal helmet use laws and the enforcement of laws restricting alcohol-impaired riding.

For more information on these and other countermeasures, see the full *Countermeasures That Work* report.

## Full Report:

Venkatraman, V., Richard, C. M., Magee, K., & Johnson, K. (2021, July). [Countermeasures that work: A highway safety countermeasure guide for State Highway Safety Offices](#), 10th edition, 2020 (Report No. DOT HS 813 097). National Highway Traffic Safety Administration.

## References

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- National Center for Statistics and Analysis. (2020, November). *Motorcycles: 2018 data* (Traffic Safety Facts. Report No. DOT HS 812 979). National Highway Traffic Safety Administration.
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