Countermeasures That Work:

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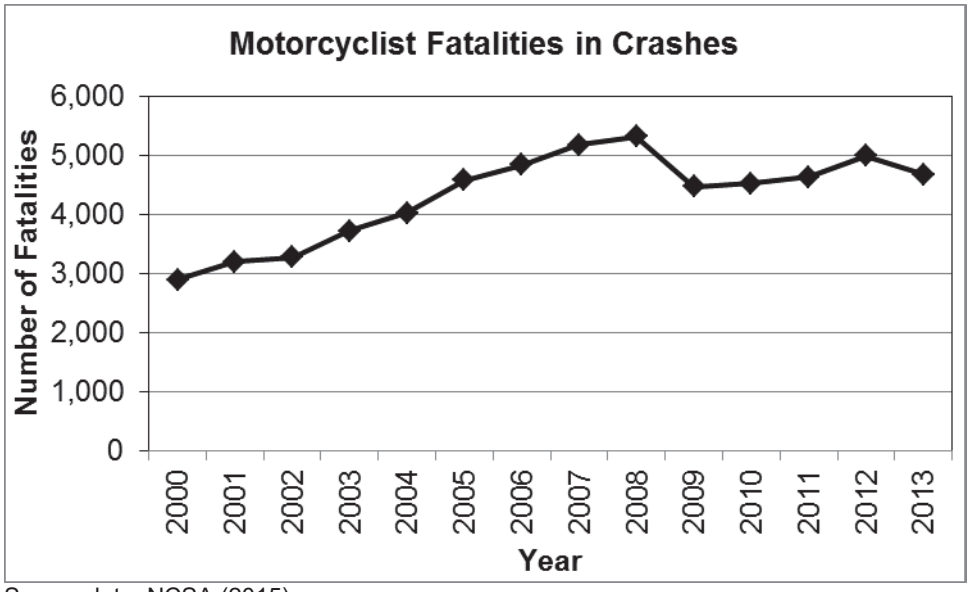
5. Motorcycle Safety

Overview

A motorcycle is inherently more difficult to operate than a passenger vehicle because it requires more physical skill. The relationship of speed and balance is also a critical consideration when riding a motorcycle, as the stability of a motorcycle is relative to speed. A motorcycle becomes more stable as speed increases, although it becomes less maneuverable. At very low speeds, the motorcycle rider must balance the motorcycle.

A motorcycle offers the rider little protection in a crash. Crash data confirm this observation. NHTSA estimates that per vehicle mile traveled, motorcyclists are about 26 times more likely than passenger car occupants to die in traffic crashes. Motorcyclists are killed at a rate of 22.92 per 100 million vehicle miles traveled (VMT) as compared to 0.86 fatalities per 100 million VMT for passenger cars (NCSA, 2015).

Trends. Motorcycling has become increasingly popular over the last 10 years even as total vehicle miles traveled has declined. Not surprisingly, there has been a corresponding increase in crashes and fatalities involving motorcyclists. From 2000 to 2008, the crash data shows that number of motorcyclists killed in crashes increased by 83% and the number of motorcyclists injured increased by 92%. In 2008, motorcyclist fatalities increased for the 11th consecutive year to a level not seen since 1980 (NHTSA, 2009). Motorcyclist fatalities decreased in 2009, but then began rising again. In 2013, there were 4,668 fatalities, a decrease of 6% from 2012 (NCSA, 2015). Motorcyclists accounted for 14% of total motor vehicle related fatalities during 2013 (NCSA, 2015).



Source data: NCSA (2015)

In the 10-year period from 2004 to 2013, over half of motorcyclists injured in crashes were injured in single-vehicle crashes (FARS data). Approximately two-thirds (65%) of motorcyclist injuries during this time period occurred during daylight hours, more than two-thirds occurred during the months from April to September, and almost two-thirds (63%) occurred on weekdays. On average, about 85% of those injured were male and about 15% female. And about 9% of those injured were passengers. These trends have remained relatively consistent over this 10-year period, although there are year-to-year fluctuations.

One trend that is changing is an increase in fatalities and injuries among older motorcyclists. In 2013, 73% of the motorcyclists killed in crashes were 30 or older and 55% were 40 or older. The change in only 10 years is striking: in 2004, 68% were 30 or older and 46% were 40 or older (NHTSA, 2015). Similarly, while the number of motorcyclists involved in injury crashes has increased among all age groups, injuries among motorcyclists 50 and older have increased at the fastest rate. Motorcyclists 50 and older were estimated to account for 28% to 30% of motorcyclists injured nationally during 2012 and 2013, compared with 19% during 1998 and 1999 (FARS data).

Speeding is more prevalent in fatal crashes involving motorcycle operators than among other types of motor vehicle operators. Thirty-four percent of all motorcyclists involved in fatal crashes in 2013 were speeding, compared to 21% of passenger car drivers (NHTSA, 2015). Motorcyclists involved in fatal crashes had worse prior driving records than other passenger vehicle drivers, including more DWI convictions, speeding convictions, and suspensions or revocations (NHTSA, 2015). In 2013, 28% of the motorcyclists killed in crashes had BACs of .08 g/dL or higher (NHTSA, 2015). Forty-one percent of fatally injured motorcyclists were not wearing helmets (NHTSA, 2015), although the percentage varies considerably from State to State. Additionally, 25% of the motorcyclists involved in crashes in 2012 did not have valid motorcycle operator licenses (NHTSA, 2015).

Other trends in motorcycle safety relate to the types of motorcycles being produced and purchased. While registrations of all types of motorcycles have increased from 2000 to 2005, registrations for supersport type motorcycles, which are built on racing bike frames and reach speeds of nearly 190 mph, have climbed even faster. Whereas combined registrations for all motorcycle styles were 51% higher in 2005 than in 2000, supersport registrations were 83% higher (IIHS, 2007). Fatalities are three to four times higher among registered supersport owners as well, but these rates do not control for other possible risk factors (IIHS, 2007; Teoh & Campbell, 2010). The more recent IIHS analysis by Teoh and Campbell of 6 years of data also found that fatally injured supersport-style motorcycle riders were about twice as likely as standard/cruiser riders to have been speeding and half as likely to have been alcohol-impaired, after accounting for rider age and gender. These results suggest that the types of risks taken may vary in association with the style of bike chosen (Teoh & Campbell, 2010). Supersport riders also tend to be younger. In 2005, the average age was 27 among those fatally injured while riding these bikes, compared to an average age of 44 for cruiser and standard motorcycles (IIHS, 2007).

Another emerging trend is the increased use of low-powered cycles such as mopeds and scooters. State laws defining and regulating these vehicles vary significantly by State, making it difficult to track trends. While these are different vehicles in terms of their speed and power capabilities (most States classify these vehicles based on a maximum speed, generally 25 to 30 mph), most of the countermeasures aimed at motorcycles would also apply to low-powered cycles.

Strategies to Improve Motorcycle Safety

There are various existing strategies to improve motorcycle safety that have been extensively reviewed in published research. Motorcycle riders should be properly trained and licensed. They should be alert and aware of the risks they face while riding; in particular, they should not be impaired by alcohol. All motorcycle riders should wear motorcycle helmets that meet Federal Motor Vehicle Safety Standard (FMVSS) 218 and clothing that provides both protection and visibility. These and other strategies are discussed in the National Agenda for Motorcycle Safety (NAMS), a comprehensive, collaborative, and multidisciplinary blueprint for motorcycle safety (NHTSA, 2000a). The recommendations of the NAMS were prioritized in 2013 (NHTSA, 2013). See also the NAMS Implementation Guide (NHTSA, 2006a), NHTSA's Motorcycle Safety Program Plan (NHTSA, 2006b), the U.S. DOT Action Plan to Reduce Motorcycle Fatalities (U.S. DOT, 2007), the Centers for Disease Control and Prevention's Motorcycle Safety Guide (CDC, 2011). In addition, a review of State Motorcycle Safety Program Technical Assessments summarizes program recommendations, implementations, and barriers to implementation from 9 State motorcycle safety program technical assessments conducted by NHTSA (Baer & Skemer, 2009).

The most important demonstrable objectives for improving motorcycle safety are to increase helmet use, reduce alcohol-impaired motorcycle riding, increase proper licensing, and promote lifelong learning through the completion of rider training courses. These objectives are all difficult to accomplish. Universal helmet laws are extremely effective in assuring that virtually all motorcycle riders use helmets, but they also are politically difficult to enact and retain. Strategies using only communications and outreach to promote helmet use, reduce impaired motorcycling, and increase licensing appear to have been no more successful with motorcycle riders than with other drivers.

Another objective is to increase other motorists' awareness of motorcyclists by increasing the visibility of motorcyclists and by educating other drivers on the importance of sharing the road with motorcycles. Daytime running lights for motorcycles improve motorcycle conspicuity. Most motorcycles on the road have headlights that turn on automatically when the engines are started (NCHRP, 2008, Strategy 11.1 D2). In addition, 23 States require daytime headlight use for all motorcycles manufactured since 1980 (and Pennsylvania requires daytime headlight use for motorcycles manufactured since 1986; MSF, 2014). Modulating headlights, which cause the headlight to move from high- to low beam rapidly, also increase motorcycle visibility (Olson, Halstead-Nussloch, & Sivak, 1979), but integration of these devices into the motorcycle fleet has been slow. Vehicle technologies such as antilock brakes also have the potential to enhance motorcycle safety (Bayly, Regan, & Hosking, 2006). For example, two studies by IIHS found

that motorcycles with antilock brakes had a lower fatal crash involvement than motorcycles without antilock brakes (Teoh, 2011, 2013).

Resources

Many environmental factors can also affect motorcycle safety. Slippery roadway surfaces and markings, surface irregularities and debris, unpaved shoulders, and unforgiving roadway barriers all can be dangerous. These issues are not included in this guide because State Highway Safety Offices have little or no authority or responsibility for them. Also, this guide does not include administrative or management countermeasures such as traffic safety data systems and analyses, program planning and assessments, State and community task forces, or comprehensive multi-pronged community traffic safety strategies. See National Cooperative Highway Safety Research Report 500, Volume 22 Guide for Addressing Collisions Involving Motorcycles, for a thorough discussion of environmental and other strategies: www.trb.org/Publications/Public/Blurbs/A_Guide_for_Addressing_Collisions_Involving_Motorc_160626.aspx

For a broad set of resources for State safety agencies and on-going research efforts:

- Government Accountability Office's Report to Congressional Committees – www.gao.gov/assets/660/650037.pdf
- Guide to Community Preventive Services Community Guide: Use of Motorcycle Helmets – www.thecommunityguide.org/mvoi/motorcyclehelmets/index.html

NHTSA's web pages:

- Motorcycles - www.nhtsa.gov/Safety/Motorcycles
- Research and Evaluation - www.nhtsa.gov/Research/Behavioral+Research
- Behavioral Safety Research Reports - http://ntlsearch.bts.gov/repository/ntlc/nhtsa/index.shtm

Countermeasures That Work

Countermeasures to improve motorcycle safety are listed below and discussed individually in this chapter. The table is intended to give a rough estimate of each countermeasure's effectiveness, use, cost, and time required for implementation. The symbols and terms used are described below. Effectiveness, cost, and time to implement can vary substantially from State to State and community to community. Costs for many countermeasures are difficult to measure, so the summary terms are very approximate. See each countermeasure discussion for more information.

1. Motorcycle Helmets

Countermeasure	Effectiveness	Cost	Use	Time
1.1 Universal coverage State motorcycle helmet use laws	★★★★★	$	Medium	Short
1.2 Helmet use promotion programs	★	Varies	Unknown	Varies
1.3 Helmet law enforcement; noncompliant helmets	★	$	Unknown	Medium

2. Alcohol Impairment

Countermeasure	Effectiveness	Cost	Use	Time
2.1 Alcohol impairment: detection, enforcement, and sanctions	★★★	Varies	Unknown	Varies
2.2 Alcohol impairment: communications	★	$$	Medium	Medium

3. Motorcycle Rider Licensing and Training

Countermeasure	Effectiveness	Cost	Use	Time
3.1 Motorcycle rider licensing	★	$	High	Medium
3.2 Motorcycle rider training	★	$$	High	Varies

4. Communications and Outreach

Countermeasure	Effectiveness	Cost	Use	Time
4.1 Conspicuity and protective clothing	★	Varies	High	Medium
4.2 Other driver awareness of motorcyclists	★	Varies	High	Medium

Effectiveness:

★★★★★- Demonstrated to be effective by several high-quality evaluations with consistent results

★★★★- Demonstrated to be effective in certain situations

★★★- Likely to be effective based on balance of evidence from high-quality evaluations or other sources

★★- Effectiveness still undetermined; different methods of implementing this countermeasure produce different results

★- Limited or no high-quality evaluation evidence

Effectiveness is measured by reductions in crashes or injuries unless noted otherwise. See individual countermeasure descriptions for information on effectiveness size and how effectiveness is measured.

Cost to implement:

$$$: requires extensive new facilities, staff, equipment, or publicity, or makes heavy demands on current resources

$$: requires some additional staff time, equipment, facilities, and/or publicity

$: can be implemented with current staff, perhaps with training; limited costs for equipment or facilities

These estimates do not include the costs of enacting legislation or establishing policies.

Use:

High: more than two-thirds of the States, or a substantial majority of communities

Medium: between one-third and two-thirds of States or communities

Low: fewer than one-third of the States or communities

Unknown: data not available

Time to implement:

Long: more than one year

Medium: more than three months but less than one year

Short: three months or less

These estimates do not include the time required to enact legislation or establish policies.

1. Motorcycle Helmets

1.1 Universal Coverage State Motorcycle Helmet Use Laws

Effectiveness: ★★★★★	Cost: $	Use: Medium	Time: Short

Motorcycle helmets are highly effective in protecting motorcycle riders' heads in a crash. Research indicates that helmets reduce motorcycle rider fatalities by 22 to 42% and brain injuries by 41 to 69% (Coben, Steiner, & Miller, 2007; Cummings, Rivara, Olson, & Smith, 2006; Deuterman, 2004; Liu, Ivers, Norton, Blows, & Lo, 2008; NHTSA, 2003; NHTSA, 2006a). A Cochrane Collaboration review of 61 studies concluded that risk reductions were on the high end of the ranges mentioned above, with higher quality studies indicating that the protective effect of helmets was about a 42% reduction in risk of fatality in a crash and 69% for risk of a head injury in a crash. This review found that there was insufficient evidence to determine the effect on neck or facial injuries, or the effects of various types of FMVSS 218 compliant helmets on injury outcomes (Liu et al., 2008). Others have found no evidence that helmets increase the risk of neck injuries (Brewer et al., 2013; NCHRP, 2008, Strategy E1; NHTSA, 2000a; Philip et al., 2013; Ulmer & Preusser, 2003).

State universal coverage helmet-use laws are effective at increasing helmet use. In 2013, observed compliant helmet use was 89% across States with universal helmet laws that cover all riders, and 48% across States with no law or laws covering only young riders (Pickrell & Choi, 2015). A systematic review of U.S. motorcycle helmet laws found that States with universal coverage laws: (1) had motorcycle helmet use rates 53 percentage points higher than States with partial coverage or no law; (2) had 29% fewer deaths; and (3) had lower fatality rates per registered motorcycle and per vehicle mile traveled (Guide to Community Preventive Services, 2013).

Nationally in 2013, DOT-compliant helmet use increased to 64%, and use of noncompliant helmets decreased from 7% in 2013 to 5% in 2014 (Pickrell & Choi, 2015). Additionally, helmet non-use decreased slightly from 33% in 2013 to 31% in 2014 (Pickrell & Choi, 2015).

The first universal helmet law was enacted in 1966. Universal laws were in effect in 47 States and the District of Columbia by 1975. After Federal penalties were eliminated in 1975 for States failing to have a universal law, about half the States repealed their laws. Several States have enacted or repealed helmet laws since then. The IIHS (2014) summarizes the helmet law history in each State.

Use: As of June 2015, 19 States, the District of Columbia, Puerto Rico, and the U.S. Virgin and Northern Mariana Islands had helmet laws covering all riders. Three States (Illinois, Iowa, and New Hampshire) did not have motorcycle helmet laws (GHSA, 2015; IIHS, 2015). Guam and most other States had laws covering only riders under a specified age, typically 18 or 21 (GHSA, 2015; IIHS, 2015). The motorcycle helmet laws of 23 States also apply to all low-powered cycles. Twenty-five States and the District of Columbia have motorcycle helmet laws that cover some low-powered cycles, typically those with engine displacements under 50cc (IIHS, 2015).

Effectiveness: Studies of helmet use among motorcyclists indicate that universal helmet use laws are effective in increasing helmet use, which reduces injuries, decreases hospital admissions and treatment costs, and lowers insurance claims. Studies in States that enacted universal helmet laws observed use rates of 90% or higher immediately after the laws became effective, compared to 50% or lower before the laws (Ulmer & Preusser, 2003, Section II). States that repealed universal helmet laws observed the opposite effect, as use rates dropped from above 90% to about 50% (Kyrychenko & McCartt, 2006; Preusser, Hedlund, & Ulmer, 2000, Section V; Ulmer & Preusser, 2003, Sections IV and V). Reenactment of a universal law in Louisiana (after a cycle of repeals and reenactments since 1968) resulted in an increase in use among riders involved in crashes, from 42% before reenactment to 87% following (Gilbert, Chaudhary, Solomon, Preusser, & Cosgrove, 2008).

The Community Preventive Services Task Force conducted a systematic review of 69 studies (through August 2012) evaluating motorcycle helmet laws in the United States. It found that universal coverage motorcycle helmet laws consistently increased helmet use and decreased injuries and deaths associated with motorcycling. The Task Force concluded that universal coverage laws were substantially more effective than partial coverage laws or no law (Guide to Community Preventive Services, 2013).

The U.S. General Accountability Office (GAO) reviewed 46 methodologically sound studies of State helmet laws published before 1990. GAO concluded that motorcycle rider fatality rates were 20 to 40% lower with universal helmet laws (GAO, 1991; Ulmer & Preusser, 2003, Section II). Studies since 1990 confirm these results (Cummings et al., 2006; Houston & Richardson, 2008; Kyrychenko & McCartt, 2006; Morris, 2006; Ulmer & Northrup, 2005; Ulmer & Preusser, 2003, Section II).

Some States have helmet laws that only cover young riders. Helmet use is generally low in these States (GAO, 1991), and non-comprehensive laws do not translate into meaningful reductions in young rider fatalities rates (Brooks et al., 2010; Houston, 2007). Additionally, Weiss, Agimi, and Steiner (2010) compared the risk of traumatic brain injury among youth in States with limited-age helmet laws and States with universal helmet laws. They found a 37% increase in risk of traumatic brain injury requiring hospitalization for youth in States with partial coverage helmet laws compared to States with universal helmet laws. A reduction in fatality rates among all ages was estimated for partial coverage laws compared to no law by Houston & Richardson (2008), but the effect was much smaller (7% to 8%) than that for universal coverage (22% to 33%). Moreover, when Florida eliminated the requirement that all motorcycle riders 21 and older wear helmets, there was an 81% increase in motorcyclist fatalities (Ulmer & Northrup, 2005). Fatalities even increased among riders under 21 who were still covered by the helmet law.

Hospital admissions and treatment costs have also increased following repeal of universal helmet laws (Derrick & Faucher, 2009; GAO, 1991). Almost half of all motorcyclists admitted to hospitals lacked sufficient health care insurance or were covered by government services, so the public ultimately shares many of these costs, as well as a greater long-term burden of care (Derrick & Faucher, 2009; GAO, 1991). In addition, an analysis of insurance claims data found that when Michigan's helmet law was amended from a universal coverage law to a partial coverage law, claims increased by more than 22% compared with control States (HLDI, 2013).

The Community Preventive Services Task Force found in their systematic review of 22 studies that universal coverage motorcycle helmet laws resulted in significant economic benefits (Guide to Community Preventive Services, 2013).

The studies show that universal coverage laws provide greater safety and cost benefits than laws that cover only a specific age group.

Costs: Once legislation requiring universal helmet use has been enacted, implementation costs are minimal. The inevitable controversy surrounding the legislation will help to publicize the new law extensively. Motorcycle helmet laws can be enforced during regular traffic patrol operations because helmet use is easily observed.

Time to implement: Although a universal helmet use law can be implemented as soon as the law is enacted, enacting such a law is a complex and time-consuming process.

Other issues:

- **Opposition to motorcycle helmet laws:** Any effort to enact a universal helmet law can expect immediate, well-coordinated, and highly political opposition (NHTSA, 2003). Helmet law opponents claim that helmet laws impinge on individual rights. They also claim that helmets interfere with motorcycle riders' vision or hearing, though research shows that these effects are minimal (NHTSA, 1996). See Jones and Bayer (2007) for a history of opposition to helmet laws in the United States. Derrick and Faucher (2009) also discuss national policy, organized opposition, and helmet law changes over the past four decades.
- **Noncompliant helmets:** Some riders in States with universal helmet laws wear helmets that do not comply with FMVSS 218 (Pickrell & Liu, 2014). See the discussion in Chapter 5, Section 1.3.

1.2 Motorcycle Helmet Use Promotion Programs

Effectiveness: ★	Cost: Varies	Use: Unknown	Time: Varies

A few States without universal motorcycle helmet use laws promote helmet use through communications and outreach campaigns. To date, there is little evidence that these efforts to educate and promote helmet use among motorcyclists in the absence of universal helmet laws are effective, unless the publicity helps to gain enactment of such laws (NCHRP 2008). A parallel experience is evident in the efforts to increase seat belt use through educational and promotional efforts prior to the enactment of laws requiring seat belt use. Years of educational and promotional campaigns did little to increase seat belt use. It was only after laws requiring use were enacted that seat belt use began to rise substantially (NCHRP, 2008).

The MSF, GHSA, NHTSA, and other groups encourage helmet use. NHTSA has developed helmet use promotion brochures, flyers and public service announcements suitable for television and radio that are available online. NCHRP (2008) describes elements that should be included in a campaign should one be undertaken.

Use: Baer, Ayotte, and Baldi (2010) distributed self-report surveys to States on their motorcycle safety programs and received responses from 45 States. Thirty-three of the 43 States that responded to a question on helmet use promotion, both with and without helmet laws, indicated they actively promote helmet use, but the nature and extent of these promotions is unknown. Only one State reported using paid broadcast media spots.

Effectiveness: There appear to be no formal evaluations of the effect of helmet use promotion programs in States without universal helmet laws (NCHRP, 2008). However, helmet use remains substantially lower in States without universal helmet laws than in States with such laws (Pickrell, & Liu, 2014).

Costs: Good communications and outreach campaigns can be expensive to develop and implement: see Chapter 2, Section 3.1. Helmet use promotion material is available from various sources including MSF, NHTSA (2003), and from States that have conducted these campaigns.

Time to implement: A proper campaign, including market research, material development, and message placement, will require at least 6 months to plan and implement. Baseline data and post-campaign evaluation can require an additional 6 months or longer.

1.3 Motorcycle Helmet Law Enforcement: Noncompliant Helmets

Effectiveness: ★	Cost: $	Use: Unknown	Time: Medium

Law enforcement officers in universal helmet law States easily can observe and cite motorcycle riders who are not wearing helmets. This likely explains why helmet use rates are high in universal helmet law States (Chapter 5, Section 1.1). In addition, many States require motorcyclists to wear helmets that comply with FMVSS 218, and Federal regulations require all motorcycle helmets sold in the United States to meet or exceed the FMVSS 218 standards. Helmets that do not meet the FMVSS 218 performance requirements are considered noncompliant. The prioritized recommendations of the National Agenda for Motorcycle Safety lists effective strategies to increase the use of FMVSS 218-compliant helmets as a high priority item (NHTSA, 2013b). Use of noncompliant helmets by all riders decreased from 7% in 2013 to 5% in 2014 according to a nationally representative observational survey of helmet use (Pickrell & Choi, 2015). Use of compliant helmets increased to 64%.

Motorcycle riders wearing noncompliant helmets are essentially no safer than if they wore no helmets at all. NHTSA tested a number of non-compliant helmets and found that the energy allowed to transfer to the head by the non-compliant helmet gave a 100 percent probability of fatal head injuries (NHTSA, 2007b). In addition to offering no energy-absorbing materials, a noncompliant helmet often covers only a portion of the rider's head and has inadequate or unused chin straps so the helmet is not likely to stay on the rider's head in a crash (NHTSA, 2007b). A recent study also found that not all compliant helmets provide the same level of protection. Brewer et al. (2013) found a reduced risk of injury to motorcyclists wearing full face helmets compared to other types of DOT-compliant helmets.

The challenge of motorcycle helmet law enforcement in States requiring FMVSS 218-compliant helmets is to actively identify and cite motorcycle riders wearing noncompliant helmets. Identifying a noncompliant helmet is easier than proving that it is noncompliant. Some noncompliant helmets have spikes or other protrusions, making them fairly easy to identify as noncompliant. Compliant helmets are formally identified by a DOT label on the back of the helmet. However, counterfeit DOT stickers are easily available and are found on many noncompliant helmets (although some noncompliant helmets may have labels that say they are novelty helmets and not motorcycle helmets). As a result of these stickers, it is difficult to enforce a noncompliant helmet citation in some courts (NHCRP, 2008, Strategy E1). In May 2011, NHTSA issued a Final Rule (effective May 2013) to strengthen helmet labeling requirements and to make it easier to prove that a helmet is noncompliant. For helmet laws to be effective, such laws must be vigorously enforced, extensively publicized, and adequately funded. NHTSA prepared a video clip for motorcyclists and law enforcement demonstrating how to identify compliant and noncompliant helmets and how to choose a helmet that fits properly (NHTSA, 2006b). NHTSA also produced a brochure on how to identify noncompliant helmets (NHTSA, 2004).

Use: Sixteen of 43 States that reported to Baer, Ayotte, and Baldi (2010) indicated that they conduct law enforcement activities to identify and cite noncompliant-helmet wearers, but only States having universal helmet laws would implement such programs (19 States and the District

of Columbia as of June 2015; GHSA, 2015; IIHS, 2015). In 2007, the New York State Police pilot-tested a motorcycle safety checkpoint enforcement program. In the pilot effort, 225 motorcycles of 280 passing through the checkpoint were inspected. Traffic citations were issued to 104 motorcyclists; the most common citation (41 issued) was for operating with a non-compliant helmet (Salmon, 2008).

Effectiveness: The effectiveness of an active helmet law enforcement program on noncompliant helmet use has not been evaluated.

Costs: Since helmet laws can be enforced during regular traffic patrols, the only costs will be for training law enforcement officers, prosecutors, and judges to identify noncompliant helmets.

Time to implement: An active helmet-law enforcement program requires planning an effective enforcement strategy, training law enforcement officers to identify noncompliant helmets and to carry out the enforcement, and training for prosecutors and judges to assure that citations will be prosecuted and adjudicated. This training can require 4 to 6 months to implement**.** Publications are available to help with non-compliant helmet identification, but other program aspects and training may need to be developed or adapted. These elements may require 6 months or longer.

2. Alcohol Impairment

2.1 Alcohol-Impaired Motorcyclists: Detection, Enforcement, and Sanctions

Effectiveness: ★★★	Cost: Varies	Use: Unknown	Time: Varies

Alcohol impairment is a substantial problem for motorcyclists, even more than for drivers of other motor vehicles. In 2013, 27% of motorcycle riders involved in fatal crashes had BACs of .08 or higher, which is higher than passenger car drivers (23%) and light-truck drivers (21%) (NHTSA, 2015). Even higher proportions of fatally injured 35- to 49-year-old riders had BACs of .08 or higher (33% for riders 35 to 39, 40% for riders 40 to 44, 40% for riders 45 to 49; NHTSA, 2015). An additional 7% of motorcycle riders in fatal crashes had at least some measurable level of alcohol in their blood (BAC .01 to .07 g/dL). Fatally injured motorcycle riders with BAC levels .08 g/dL or higher were less likely to wear helmets than were sober riders (NHTSA, 2015). Furthermore, in 2013 40% of riders killed in single-vehicle crashes had BACs of .08 or above, and on weekend nights this figure climbed to 63% (FARS data). The 2007 National Roadside Survey similarly found that 5.6% of motorcycle riders on weekend nights had BACs of .08 or above, as compared to 2.3% of passenger vehicle drivers (Lacey et al., 2009a).

Motorcyclists are included in and affected by the comprehensive strategies to reduce alcohol-impaired driving discussed in detail in Chapter 1. However, some law enforcement and sanction strategies may be especially useful for motorcyclists, while others may be less effective.

Law enforcement officers on traffic patrol use characteristic driving behaviors, or cues, to identify drivers who may be impaired by alcohol. Some of the cues for motorcycle riders, such as trouble maintaining balance at a stop, are different from those for cars and trucks. Stuster (1993) identified and validated 14 cues useful for identifying alcohol-impaired motorcycle riders. NHTSA prepared a brochure, a law enforcement training video, and a pocket detection guide discussing the cues (NHTSA, 2000b). The cues for motorcycle riders are part of the Standardized Field Sobriety Tests training given to all law enforcement officers.

Vehicle impoundment or forfeiture can be an effective deterrent to drinking and driving for all drivers (see Chapter 1, Section 4.3). It may be even more effective for motorcyclists. Research by Becker, McKnight, Nelkin, and Piper (2003) confirmed earlier findings that many motorcyclists do not find traditional impaired driving sanctions such as fines and license suspension to be effective deterrents, although self-reported beliefs may not reflect actual effectiveness of these other sanctions. However, motorcyclists tended to be highly concerned for the safety and security of their motorcycles.

These findings suggest a potentially effective strategy to reduce alcohol-impaired motorcycling: high visibility enforcement using officers trained in identifying impaired motorcycle riders and other motor vehicle drivers, with offender sanctions including vehicle impoundment or forfeiture. This strategy would treat motorcyclists on an equal footing with other vehicle drivers in impaired-driving enforcement and publicity.

Use: Thirty-two of 43 responding States reported having programs to focus on spotting impaired motorcyclists or on enforcing laws related to operating motorcycles while impaired (Baer et al., 2010). NHTSA (2006a) provides examples and links of State programs that distribute the NHTSA cue cards and brochures widely to law enforcement (Illinois), present this information in a web-based seminar for officers (Minnesota), and regularly establish high visibility law enforcement presence at major rider events (Ohio, Wisconsin).

Effectiveness: Some agencies have reported some success in using the cues for identifying alcohol-impaired motorcycle riders, but no evaluation data on the extent of their use are available (NCHRP, 2008, Strategy B3). Although there is limited evidence of the effects of enforcement and sanctions on impaired motorcycle riding, sobriety checkpoints and saturation patrols have proven to be effective for reducing impaired driving and crashes generally. See Chapter 1 for more information on enforcement strategies and other tools.

Costs: Law enforcement training costs are low and training material is available. Enforcement itself can be carried out during regular traffic patrol and as part of all impaired driving enforcement programs. A major campaign including alcohol-impaired motorcyclists may require additional costs for publicity.

Time to implement: Law enforcement training can be conducted quickly. A major campaign will require 4 to 6 months to plan and implement.

Other issues:

- **BAC limits:** BAC levels as low as .05 g/dL caused some detectable levels of impairment, primarily in reaction time, among experienced riders in tests on controlled courses (Creaser et al., 2007). Puerto Rico passed a law in 2007 lowering the BAC limit for motorcyclists to .02.
- **Drugs other than alcohol:** Drugs other than alcohol can impair motorcycle riders. Potentially impairing drugs include over-the-counter and prescription medications as well as illegal drugs. The 2007 National Roadside Survey reported that 31.9% of nighttime weekend motorcycle riders who provided oral fluid and/or blood samples tested positive for drugs (illegal drugs or medications), as compared to 16.5% of passenger car drivers (Lacey et al., 2009b). The extent to which various drugs impair driving performance or contribute to crashes is not well understood, however, for either four-wheeled vehicles or for motorcycles. Furthermore, individual differences in metabolism of drugs and level of impairment, as well as multiple-drug use complicate the understanding of drug impairement on motor vehicle drivers (Compton, Vegega, & Smither, 2009). (See Compton et al.'s [2009] Report to Congress on drug-impaired driving for a discussion of current knowledge and recommendations for improving States data and records systems and statutes.) Law enforcement should consider drugs as potential impairing agents for motorcycle riders just as for other vehicle operators. See also Chapter 1, Section 7 on drug-impaired driving.
- **Targeted enforcement:** As with other crash problems, better identification of problem areas (either impaired riding or impaired riding crashes) and targeting enforcement to such locations, events, or times could improve enforcement effectiveness.

2.2 Alcohol-Impaired Motorcyclists: Communications and Outreach

Effectiveness: ★	Cost: $$	Use: Medium	Time: Medium

Many States have conducted communications and outreach campaigns directed at drinking and riding. See NHTSA (2006a) and NCHRP (2008, Strategy B1) for more information and links. Organizations including AMA and MSF have produced campaigns and material on drinking and riding. See NHTSA (2006a) and NCHRP (2008) for strategies for implementation, examples, and links to materials. There are few evaluations of the effectiveness of any of these campaigns at any level, from awareness to knowledge and attitude change to any effect on motorcyclists' drinking and riding behavior. The experience of drinking and driving campaigns directed at all drivers suggests that they are unlikely to have a positive effect unless they are carefully researched and planned, well-funded, well executed, achieve high levels of target audience exposure (perhaps using paid advertising), use high-quality messages that are pre-tested for effectiveness, and are conducted in conjunction with enforcement activities directed at impaired motorcyclists. See Chapter 1, Section 5.2, for further discussion.

A focus group study (Becker et al., 2003) examined motorcyclists' attitudes, beliefs, and behaviors regarding drinking and riding. It concluded that many motorcyclists have strong feelings of freedom, independence, and individual responsibility and believe that drinking motorcyclists endanger only themselves. Consequently, they believe that government efforts to discourage drinking and riding are inappropriate. These beliefs also limit some motorcyclists' willingness to take actions to prevent others from riding while impaired.

A program, "Riders Helping Riders," targets the expressed willingness of some motorcycle riders to help other riders by encouraging them to intervene to prevent other motorcycle riders from riding impaired and to create a stronger safety culture among motorcyclists. This program is based on the beliefs and attitudes of riders from focus group research (McKnight & Becker 2007a, 2007b; McKnight, Becker, & Tippetts, 2008), and is available on a CD for individual and group use. The material was pilot-tested in Georgia. Riders' attitudes and intentions toward intervening seemed to improve based on surveys taken before and immediately after training. Longer-term evidence of attitude change, interventions actually carried out, or definitive safety effects from behavioral changes will require exposure to large numbers of riders and longer follow-up of crashes (McKnight et al., 2008McKnight, Becker, & Tippetts, 2008).

Another program called "Green-Yellow-Red" was recently developed and tested in Wisconsin (Aguilar & Delehanty, 2009). The campaign sought to educate motorcycle riders about the dangers of drinking and riding, encourage them to make safer choices, and provide impaired motorcycle riders with secure storage of their motorcycles so that they could find safe transport home. A coalition was established that included motorcycle riders, tavern owners, law enforcement, and local businesses, and substantial media attention was obtained at the program kick-off. While there is evidence that riders were willing to leave their motorcycles in secure storage containers, only small changes in rider behavior and alcohol-related motorcycle crashes were observed following the program (Aguilar & Delehanty, 2009).

Rider groups can play critical roles in planning and implementing activities to reduce drinking and riding. Some State and local rider groups sponsor alcohol-free events or adopt alcohol-free policies. As examples, the Fox Valley, Wisconsin, Harley Owners Group (H.O.G.) chapter has an alcohol-free policy for all organized rides and Illinois American Bikers Aimed Toward Education (ABATE) sponsors alcohol-free rides (NHTSA, 2006a, Section 1).

Use: Many States have conducted anti-drinking-and-riding campaigns (NHTSA, 2006a; NCHRP, 2008, Strategy C1), but the total number of States that have done so is unknown. Some examples of States campaigns include Connecticut's "Open the Throttle, Not the Bottle" and Minnesota's "Drinking and Riding: A Really Bad Idea." Many other States have brochures and other material. It also is not known how many States have included messages directed to motorcyclists in their overall alcohol-impaired driving campaigns. However, motorcycle riders are now included in the "Drunk Driving. Over the Limit. Under Arrest" paid media spots. NHTSA administers Incentive Grants for States that apply and meet regulatory criteria for programs that prevent impaired riding.

Effectiveness: There are no evaluations of the safety effectiveness of any drinking and riding campaigns.

Costs: A good campaign will require substantial funds to conduct market research, design and test messages, and place campaign material where it will reach motorcyclists frequently.

Time to implement: A substantive campaign will require at least 12 months to research, design, test, and implement. A vigorous implementation will require a significant duration in order to be effective.

3. Motorcycle Rider Licensing and Training

3.1 Motorcycle Rider Licensing

Effectiveness: ★	Cost: $	Use: High	Time: Medium

All 50 States, the District of Columbia, and Puerto Rico require motorcycle riders to obtain a motorcycle operator license or endorsement before they ride on public highways (MSF, 2012). The goal of licensing is to assure that motorcycle riders have the minimum skills needed to operate motorcycles safely (NHTSA, 2000a).

State motorcycle licensing practices vary substantially. Most States have learner's permits requiring only vision and/or knowledge tests. A motorcycle rider with a learner's permit can ride only in restricted circumstances, typically some combination of no passengers, only during daylight hours, and only with the supervision of a fully licensed motorcyclist. A riding skills test is required for full licensure (Alabama does not require a skills test for licensure). Two-thirds of the States use one of three tests developed by the MSF and American Association of Motor Vehicle Administrators, while one-third use their own test. Most States will waive the skills test, and sometimes the knowledge test, for motorcyclists who have completed approved motorcycle rider training courses, if the student passes the knowledge and skills tests administered at the conclusion of the course. See Motorcycle Safety Foundation (2012) for a summary of each State's licensing requirements and procedures and NCHRP (2008, Strategy C1) for brief summaries of the major skills tests currently in use.

The effectiveness of motorcycle operator licensing is not known. This is perhaps not surprising given the variability of licensing tests and procedures. NAMS recommends research to "ensure that licensing tests measure skill and behaviors required for crash avoidance" (NHTSA, 2000a). NCHRP (2008, Strategies C2 and C3) describes strategies to couple training and licensing to help ensure that riders are both trained and obtain the necessary endorsements, but notes that there are no evaluations of whether increasing the proportion of motorcycle riders who are validly licensed would reduce motorcycle crashes or injuries.

Despite State requirements, many motorcycle riders are not properly licensed. In 2013, 25% of motorcycle riders involved in fatal crashes did not have valid motorcycle licenses, compared to 12% of passenger vehicle drivers who were not properly licensed (NHTSA, 2015). Licensing systems in some States provide no incentive to become fully licensed because learner's permits may be renewed indefinitely (NCHRP, 2008, Strategy C3; MSF, 2012).

The Prioritized Recommendations of the NAMS (NHTSA, 2013) recommends the following approaches to encourage full licensure:

- Merge rider education/training and licensing into one-stop operations (Medium Priority)
- States issue motorcycle endorsements immediately upon course completion (Medium priority)
- Identify and remove barriers to obtaining a motorcycle endorsement (Low Priority)
- Enforce penalties for improperly licensed riders (Low Priority)
- Insurance policies should not be valid for improperly licensed riders (Low Priority)

- Train license examiners in motorcycle issues (Medium Priority)
- Develop and evaluate enhanced licensing model using graduated licensing concepts (Medium Priority)
- Research to assure that licensing tests measure crash avoidance skills, behaviors (Low Priority)

The NCHRP (2008, Strategy C3) describes how Maryland and Minnesota used some of these strategies to increase proper licensing for motorcycle riders. Maryland used the additional strategy of comparing their vehicle registration and driver licensing files. A letter was sent to each owner of a registered motorcycle who did not have a motorcycle operator's license. The letter reminded each registered owner that a motorcycle endorsement was required of anyone operating the registered motorcycle. This quick and inexpensive strategy caused 1,700 owners to become licensed within 4 months. A randomized controlled experiment of this intervention suggested that while the method did increase licensure, a large percentage remained unlicensed (Braver et al., 2007). California also tried this approach with similar licensure results (Limrick & Masten, 2013). Effective July 22, 2007, the State of Washington added an authorization to impound vehicles operated by drivers without a proper endorsement (including, but not limited to, motorcycles). However, an evaluation of the effects of this law did not find a significant impact on new or total motorcycle endorsements following implementation of the law (McKnight, Billheimer, & Tippetts, 2013).

Maryland and Pennsylvania have "one-stop shops" that provide a motorcycle endorsement immediately upon successful completion of a State-approved motorcycle rider training course or test, without having to wait after receiving a permit. For Pennsylvania's procedures, see www.pamsp.com/CourseInfo_Basic.aspx.

Baer, Cook, and Baldi (2005) reviewed and summarized each State's motorcycle education and licensing programs and practices. A companion report (Baer, Baldi, & Cook, 2005) describes training and licensing programs and actions to promote training and licensing. Under a cooperative agreement with NHTSA, AAMVA has updated its *Motorcycle Operator Licensing System* and *Integrating Motorcycle Rider Education and Licensing* manuals, by publishing the *Guidelines for Motorcycle Operator Licensing* (GMOL). The GMOL provides guidelines for State motorcycle licensing programs (Hanchulak & Robinson, 2009).

Use: All States require motorcycle riders to obtain a motorcycle license or endorsement to ride on public highways. Less than half of responding States indicated that they enforce laws relating to improperly licensed motorcyclists (Baer et al., 2010).

Effectiveness: The effectiveness of current licensing and testing on crashes and safety has not been evaluated. An evaluation of a California program to increase licensure among improperly licensed motorcycle owners through DMV letters found that while the letters did increase licensure, there was no identifiable causal effect on crash involvements or traffic violations (Limerick & Masten, 2013).

Costs: Most States charge a small fee for the motorcycle licensing tests (MSF, 2010). The costs of changing the licensing tests and procedures depend on the extent of changes and the amount

of retraining needed for licensing examiners as well as what portion of costs are covered by licensing fees.

Time to implement: Developing new policies to encourage higher rates of full motorcycle licensure (including limiting the number of times a provisional license may be renewed, administrative practices such as adding testing times and locations, or training motorcycle license examiners), or procedures such as waiving the skills test for those who have passed an approved training course, would likely require 6 to 12 months to implement. Enforcement of motorcycle licensing requirements could occur more readily, if requirements for full licensure are clear enough to enforce.

Other issues:

- **Graduated driver licensing (GDL):** The NAMS recommended that States enhance motorcycle licensing practices by incorporating and evaluating use of GDL concepts (NHTSA, 2000a) and ranks it as a medium priority item in the Prioritized Recommendations of the National Agenda for Motorcycle Safety (NHTSA, 2013b). Additionally, the United States Government Accountability Office recommended graduated licensing for motorcyclists as a high priority research item in a 2012 Report to Congress (GAO, 2012).

  Most States employ graduated driver licensing for beginning automobile drivers. Under GDL, new drivers must pass through learner's permit and provisional license stages before becoming fully licensed. A learner's permit allows driving only while supervised by a fully licensed driver and a provisional license prohibits unsupervised driving under certain conditions, such as at night or with passengers. GDL programs for automobile drivers have been shown to be effective in reducing crashes (Hedlund, Shults, & Compton, 2003, 2006; Williams, Tefft, & Grabowski, 2012). Evaluations in New Zealand and evidence from Quebec suggest that the same may be true for motorcyclists (Mayhew & Simpson, 2001). NHTSA's *Guidelines for Motorcycle Operator Licensing* includes a model graduated licensing program for motorcycle riders (Hanchulak & Robinson, 2009).

  Many States currently place restrictions on motorcycle riders with a learner's permit or younger than a specified age (MSF, 2012). For example, California GDL prohibits passengers, freeway riding, and nighttime riding during the learner permit stage and requires all people under 21 to complete a motorcycle rider training course offered by the California Highway Patrol. In Utah, motorcycle endorsements are restricted to motorcycles no larger than the size of the motorcycle used for the skills test, or used during the approved State training course (substitute). The endorsement can be changed by testing on a larger size motorcycle.

3.2 Motorcycle Rider Training

Effectiveness: ★	Cost: $$	Use: High	Time: Varies

As of 2013, all 50 States offered rider education (MSF, 2013). Sixty percent of the 44 States that responded to a survey question from Baer et al. (2010) reported they were able to accommodate all riders seeking training within a calendar year. Training also is provided by some rider organizations (for example, some ABATE and Gold Wing groups), manufacturers (Harley-Davidson), the U.S. Military, and others. Many States encourage training either by requiring it for all motorcycle operators or those under a specified age, or by waiving some testing requirements for motorcycle riders who complete and pass an approved training course (Baer, Cook, & Baldi, 2005). Most entry-level training uses the *Basic RiderCourse* curricula developed by the Motorcycle Safety Foundation. The *Experienced RiderCourse* suite (ERC) is offered to riders with some previous experience or for seasoned riders who want additional training; however, the ERC represents a very small part of total training provided.

Although training is available, it is not at all clear what constitutes appropriate rider education and training, or whether current training reduces crashes. Evidence suggests that in addition to teaching motorcycle control skills, programs would better prepare riders if they trained riders to recognize potentially hazardous riding situations and encourage riders to assess their own risks and limitations, and to ride within those constraints (e.g., Clarke, Ward, Bartle, & Truman, 2007; Elliott, Baughan, & Sexton, 2007). NHTSA supported the development of Model National Standards for Entry Level Rider Training, released in August 2011. These Model Standards recommend content that should be included in all motorcycle rider training courses. States are encouraged to go beyond the standards to address State-specific crash needs (NHTSA, 2011).

The NAMS encourages training (NHTSA, 2000a). NHTSA's Motorcycle Safety Program Plan recommends that States conduct frequent and timely education and training at sites that are accessible throughout the State (NHTSA, 2006b). NCHRP (2008, Strategy C2) further recommends that States evaluate crash experience, compare data and crash scenarios with training and licensing practices, and make adjustments as needed to ensure practices are effectively targeting crash problems. This effort requires cooperation on the part of multiple agencies, including those responsible for collecting and analyzing crash data and those responsible for training and licensing.

States should provide motorcycle training on a timely basis to all who wish to take it. See Baer, Baldi, and Cook (2005) and NHTSA (2006a) for examples of successful methods to use training capacity more effectively, including creative scheduling, centralized on- line registration systems, and use of private providers.

Use: Most States offer training to both experienced and beginning motorcycle riders. For more information about the features of training and education programs offered by the States, see Baer, Ayotte, and Baldi (2010).

Effectiveness: Kardamanidis, Martiniuk, Stevenson, and Thistlethwaite (2010) evaluated the results of 23 studies for a Cochrane Review and found conflicting evidence with regard to the

effectiveness of motorcycle rider training in reducing crashes or offenses. Due to the poor quality of available studies (most of the studies had likely selection and detection bias) the authors were unable to draw any conclusions about its effectiveness. However, data suggests that having mandatory pre-license training for motorcyclists may reduce crashes and offenses by discouraging motorcycle riding, thus limiting exposure.

Costs: Rider training programs are funded in part by the States and in part by fees paid by the students who take them. Many States offset some or all of their costs through motorcycle license or student registration fees.

Time to implement: Rider training currently is conducted in all States. Training capacity is limited by the number of available training sites (a broad expanse of paved surface is required), qualified instructors, and motorcycles for students to use during training. Some measures to increase capacity can be implemented quickly while others may take 6 to 12 months.

Other issues:

- **Training for other motorcycle configurations (three-wheeled motorcycles and motorcycles pulling trailers**): Several motorcycle organizations offer courses addressing these special motorcycle configurations. These courses have not been evaluated.

4. Communications and Outreach

4.1 Communications and Outreach: Conspicuity and Protective Clothing

Effectiveness: ★	Cost: Varies	Use: High	Time: Medium

Motorcycle riders should wear clothing that provides both protection and visibility. FMVSS 218 helmets (Chapter 5, Sections 1.1-1.3) with face shields protect the eyes from wind and foreign objects in addition to protecting the head in a crash (Brewer et al., 2013). Well-constructed jackets, pants, boots, and gloves can prevent abrasions and bruises. If made of impact-resistant material, they even may prevent arm and leg fractures or serious torso and spinal cord injuries (NHTSA, 2000a). The benefits of protective clothing, in particular protective clothing equipped with body armor, was further confirmed by a series of studies of Australian motorcyclists involved in crashes (de Rome et al., 2011; de Rome et al., 2012).

A common perception among riders is that a frequent cause of motorcycle crashes involving other vehicles is that other vehicle drivers do not see the motorcycle. The 1981 Hurt et al. (1981) study from the United States and a 2007 study from the U.K. (Clarke, Ward, Bartle, & Truman, 2007) report that right-of-way collisions involving other motorists are more frequently the fault of the other motorist. Failure of the other motor vehicle driver to perceive the motorcyclist seems to occur in a significant portion of these types of crashes (Clarke et al., 2007). One easy way to increase motorcycle conspicuity is through continuous headlight use. Most motorcycles manufactured since 1979 have headlights that turn on automatically when the vehicle is started (NCHRP, 2008, Strategy D2). Additionally, 24 States require daytime headlight use for all motorcycles manufactured after a certain date (all at least 20 years ago) (MSF, 2014).

A second way to increase conspicuity is to wear brightly colored clothing, use white or bright-colored helmets (for increased visibility during daylight), and incorporate retro-reflective materials or devices (for increased visibility at night). Research studies confirm that motorcyclists wearing conspicuous clothing or helmets are less likely to be involved in a crash (Wells et al., 2004; NCHRP, 2008, Strategy D1). However, many riders choose not to wear brightly colored clothing or riding gear.

As discussed in the introduction of this chapter, auxiliary head and brake lights, flashing headlights, and other vehicle technologies enhance conspicuity, but the effects on crashes have not been studied. Adoption of these technologies may be useful to promote among the motorcycling community, may require changes in laws if visibility enhancing technologies are restricted by States, and may also involve working with manufacturers and producers of motorcycles and auxiliary devices (NCHRP, 2008).

There are no data on how many motorcycle riders wear various types of protective clothing (other than helmets) or use auxiliary devices. Helmet manufacturers and distributors report that more than half the helmets sold for street use are black and the predominant color of motorcycle clothing is black (NCHRP, 2008, Strategy D1).

Communications and outreach campaigns promoting protective and conspicuous clothing have been conducted by States and by motorcyclist organizations. The NCHRP (2008, Strategy D1) provides examples of material from Oregon and the MSF and references to additional material from the SMSA, and the Gold Wing Road Riders Association.

Use: Of the 44 States responding to a survey question, 33 reported encouraging conspicuity-enhancing clothing and helmets to enhance motorcyclists' visibility (Baer et al., 2010). The extent or nature of these efforts is unknown.

Effectiveness: The use of high visibility clothing and protective gear enhances safety. There is some limited evidence to suggest that a program aimed at increasing conspicuous and protective clothing could be successful. An Australian study found that the observed proportion of riders wearing full body protection increased in the month following an enforcement/educational campaign with an emphasis on conspicuous and protective clothing (among other safety issues). However, it is unclear whether any potential benefits were sustained (Baldock et al., 2012).

Costs: Good communications and outreach campaigns can be expensive to develop and implement: see Chapter 2, Section 3.1. Information promoting protective and conspicuous clothing is available from various sources including MSF, other motorcyclist organizations, and States that have conducted these campaigns (NCHRP, 2008, Strategy D1).

Time to implement: A proper campaign, including market research, message development and testing, and implementation, will require at least 6 months to plan and implement.

4.2 Communications and Outreach: Other Driver Awareness of Motorcyclists

Effectiveness: ★	Cost: Varies	Use: High	Time: Medium

In general, studies show that when motorcycles crash with other vehicles, the other vehicle driver usually violates the motorcyclist's right-of-way (Clarke et al., 2007; Elliott et al., 2007; NCHRP, 2008, Strategy F3; NHTSA, 2000a). Motorcycles and motorcyclists are smaller visual targets than cars or trucks, resulting in low conspicuity (see Chapter 5, Section 4.1). Also, drivers may not expect to see motorcycles on the road (NCHRP, 2008, Strategy F3; NHTSA, 2000a). Clarke et al. (2007) reported that even when motorcyclists were using headlights and high-conspicuity clothing drivers sometimes failed to notice them.

Several States have conducted communications and outreach campaigns to increase other drivers' awareness of motorcyclists. Typical themes are "Share the Road" or "Watch for Motorcyclists." Some States build campaigns around "Motorcycle Awareness Month," often in May, early in the summer riding season. Many motorcyclist organizations, including MSF, SMSA, the Gold Wing Road Riders Association, and State and local rider groups, have driver awareness material available. See NHTSA (2006a, Section 5) and NCHRP (2008, Strategy F3) for links and references. Some organizations also make presentations on drivers' awareness of motorcyclists to driver education classes.

NHTSA developed model language on sharing the road safely with motorcyclists. The model language is appropriate for traffic safety education courses, driver manuals, and other communication and outreach activities (NHTSA, 2007a). NHTSA developed a "Share the Road" program planner for use by States, communities, and the motorcycling community (see www.trafficsafetymarketing.gov/ShareTheRoad).

Use: Thirty-six of 44 States that responded to a survey question reported that they communicate about ways for drivers to increase their awareness of motorcycles and motorcyclists (Baer et al., 2010). NHTSA (2006a, Section 5) and NCHRP (2008, Strategy F3) provide examples or links to campaigns from a dozen States.

Effectiveness: There are no evaluations of the effectiveness of campaigns to increase driver awareness of motorcyclists (NCHRP, 2008, Strategy F3).

Costs: Good communications and outreach campaigns can be expensive to develop and implement: see Chapter 2, Section 3.1. Motorcyclist awareness material is available from various sources including the MSF, other motorcyclist organizations, and States that have conducted these campaigns (NCHRP, 2008, Strategy F3).

Time to implement: A proper campaign, including market research, message development and testing, and implementation, will require at least 6 months to plan and implement.

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