



Special Edition

Riding SMART!

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President's News & Views

Helmet-Use Effectiveness Withstands Test of Time and Rigorous Review

THE INTENT OF THIS SPECIAL EDITION OF *RIDING SMART* IS TO PROVIDE SMARTER members and others with a document that is easy to share and distribute that describes the research on the effectiveness of motorcycle-helmet use in reducing the risk of death and injury in the event of a crash, as well as to describe the associated research that demonstrates that an all-rider helmet-use law is a highly effective, low-cost, and vital component of a comprehensive motorcyclist-safety program.

The Skilled Motorcyclist Association-Responsible, Trained and Educated Riders, Inc. (SMARTER) sup-

ports comprehensive motorcyclist-safety efforts. SMARTER uses the word "comprehensive" in the traditional sense: meaning extensive coverage of many things or the inclusion of everything so as to be complete. *Inclusive, complete, wide-ranging,* and *broad* are other words with similar meaning. *Incomplete, partial,* or *sketchy* are antonyms.

If we are to reduce the number of motorcyclists dying on our roadways and reduce the number and severity of injuries sustained by motorcyclists in crashes, it simply does not make sense to expect incomplete, partial, and sketchy efforts to be successful. In fact, doing the same thing over

and over again and expecting a different result is a common, but apt definition of insanity.

SMARTER supports all-rider (universal) motorcycle helmet-use laws as a vital component of a comprehensive motorcyclist-safety program because **research proves that helmets and helmet laws work.**

This issue provides a brief history of helmet use and helmet-use laws, a summary of recent quality research and/or literature reviews related to helmet use and helmet-use laws, and an overview of the components and goals of a comprehensive motorcyclist-safety program.

Dan

This issue provides (1) a brief history of helmet use and helmet-use laws, (2) a summary of recent quality research and/or literature reviews related to helmet use and helmet-use laws, and (3) an overview of the components and goals of a comprehensive motorcyclist-safety program.

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A Brief History of Motorcycle-Helmet Use and Helmet-Use Laws

The early age of advocacy for motorcycle-helmet use dates back to May 1935, when the World War I hero Col. T. E. Lawrence, popularly known as Lawrence of Arabia, suffered a traumatic brain injury in a motorcycle crash and subsequently died from his injuries. The British neurosurgeon Sir Hugh William Bell Cairns, who treated Lawrence, felt the injury might have been avoided if Colonel Lawrence had been wearing a protective crash helmet. Based on his research on head injuries and deaths among army motorcyclists during the Second World War, Cairns concluded that adoption of a crash helmet as standard wear by all motorcyclists would save considerable lives, lost working time, and hospital resources.

By the mid 1960s, research evidence that helmet use reduced the risk of death and injury was sufficient enough that federal highway construction funds provided to states were made contingent on the enactment of all-rider helmet laws. States responded quickly, and within two years thirty-eight states had passed helmet laws; however, these laws were not popular with certain motorcycle groups, like ABATE, who became politically active and fought to have them repealed.

In his Oct. 26, 2011, statement to the Michigan House

Committee on Transportation, in opposition to the repeal of Michigan's universal helmet law, **Christopher A. Hart, vice chairman of the National Transportation Safety Board, noted the disastrous results of helmet-law repeals by saying, "Unfortunately, these repeals have amounted to a vast experiment affirming the effectiveness of helmet laws and regulations in reducing death and injury."** Post-repeal research conducted in Texas, Arkansas, Kentucky, Louisiana, and Florida supports Hart's statement and is linked on SMARTER's website at <http://www.smarter-usa.org/research/helmet-law-studies/>.

Also linked on SMARTER's website, at <http://www.smarter-usa.org/research/cost-studies/>, is the April 2007 report *Motorcycle Helmet Laws: The Facts, What Can be Done to Jump-Start Helmet Use, and Ways to Cap the Damages*, by Melissa Neiman, M.D., J.D. It begins with a review of the modern history of helmet-use laws in the United States. SMARTER recommends that you read this historical background to help place our current motorcyclist-safety situation regarding helmet use and helmet-use laws in context: a trend toward repeal of all-rider helmet laws and a corresponding decline in use rates despite overwhelming evidence of the effectiveness of helmets and helmet-use laws.

Three recent rigorous reviews of previous direct scientific research

Three recent reports on the effectiveness of helmets and helmet-use laws are high-quality, extensive, and rigorous reviews of previous direct research. Direct research on these questions has essentially stopped. Scientific research is conducted to find answers to questions; once the answers have been repeatedly found and the question is determined to be scientifically proven, there is no longer any need to conduct further direct research merely to generate cumulative evidence. These "reviews of the literature" are nonetheless extremely important because they pull together research that would otherwise be scattered and difficult to find.

These three reports, the first three enumerated on SMARTER's website at <http://www.smarter-usa.org/>

[research/helmet-law-studies/](http://www.smarter-usa.org/research/helmet-law-studies/), demonstrate the huge volume of research that has been conducted on the questions of the effectiveness of helmet use and helmet-use laws. Below is a brief overview of each.

"Helmets for Preventing Injury in Motorcycle Riders" was published online by The Cochrane Collaboration in 2009. **Sixty-one observational studies published between 1977 and 2006 were selected for review.** References for each of these studies are listed, and a brief description of the characteristics of each study along with the results are also provided. Despite methodological differences in the 61 included studies, the results showed remarkable consistency, particularly for death and head-injury outcomes: **Motorcycle helmets were found**

to reduce the risk of death by 42 percent and head injury by 69 percent in motorcyclists who crashed.

"An Evidence-Based Review: Helmet Efficacy to Reduce Head Injury and Mortality in Motorcycle Crashes" was published in the Nov. 2010 *Journal of Trauma: Injury, Infection, and Critical Care*. The literature search in this review was of 507 citations, from 1990 through 2009, identified in the U.S. National Library of Medicine. The abstract for each was reviewed, and 197 articles having possible applicability to the topic were retrieved and reviewed. General reviews, letters to the editor, single case reports, and retrospective reviews of poor quality were excluded, leaving 45 articles that were reviewed in detail.

(See **Three Recent Reviews**, p. 3)

Three recent reviews of the research (continued from p. 2)

A reference for each of these 45 studies is included in the published review along with the results and a brief description of the characteristics of each study.

The authors concluded that the use of motorcycle helmets

- 1) decreases the overall death rate from motorcycle crashes when compared with nonhelmeted riders.
- 2) decreases the incidence of lethal head injury in motorcycle crashes when compared with nonhelmeted riders.
- 3) decreases the severity of nonlethal head injury in motorcycle crashes when compared with nonhelmeted riders.
- 4) increases in jurisdictions with mandatory universal helmet laws, and those areas have reduced rates of mortality and head injury compared with areas that do not.

“Use of Motorcycle Helmets: Universal Helmet Laws” was published in the July 2014 *Community Guide*. The review of helmet-use and helmet-law effectiveness

was completed Aug. 2013. Also included is a review of the literature on economic impact, which was completed Oct. 2013. This review was conducted by members of the Community Preventive Services Task Force, which is an independent, nonfederal, unpaid panel of public-health and prevention experts appointed by the director of the Centers for Disease Control and Prevention (CDC).

Following completion of the review of the available literature, the task force recommended universal motorcycle helmet laws (laws that apply to all motorcycle operators and passengers), based on strong evidence of effectiveness.

To provide easier access to the results and an understanding of the comprehensiveness of this review, SMARTER has chosen to subdivide it and link to four separate subsections, providing a description of each. See below and <http://www.smarter-usa.org/research/helmet-law-studies/>.

- * 19 studies about helmet use
- * 17 studies on total deaths
- * fatality rates per registered motorcycle (17), per vehicle mile traveled (3), and per crash (10)
- the impact of implementing a universal helmet law
- comparison of death and injury data across states having a universal, partial, or no helmet law
- the impact on death, injury, and use of a helmet among young riders with repeal of universal helmet laws, implementation of a universal helmet law, and comparison across states with different types of laws or no law.

SUBSECTION 3

The supporting material related to helmet and helmet-law effectiveness. This section provides reference information for

- 69 studies that were included in the review
- 6 papers that provided more information about included studies
- 13 studies determined ineligible due to study country or article language
- 20 studies determined ineligible due to unsuitable study type
- 15 studies determined ineligible due to lack of outcomes of interest

SUBSECTION 4

The supporting material related to economic impact, including the reference information for the 22 studies that provided the information for assessment of economic impact of repeal or implementation of universal helmet laws.

An Overview of the major subsections of the report “Use of Motorcycle Helmets: Universal Helmet Laws”

SUBSECTION 1

A summary and review of the “Task Force Findings and Rationale Statement” regarding the effectiveness of helmet use in preventing death, injury, and reducing the severity and risk of head injury, including the results of

- 41 studies on helmet use
- 37 studies comparing fatalities
- 35 studies comparing fatalities per registered motorcycle
- 7 studies comparing fatalities per

miles traveled

- 14 studies comparing fatalities per crash
- 12 studies regarding head-injury fatalities
- 18 studies regarding nonfatal injuries, total
- 18 studies nonfatal, head-related

SUBSECTION 2

A summary of the results of

- the impact of repealing a universal helmet law, including

Are there any safety drawbacks to wearing a helmet?

The literature reviews described on pages 2 and 3 offer conclusive evidence regarding the effectiveness of motorcycle-helmet use in reducing the risk of death and injury in the event of a crash; and the associated research demonstrates that an all-rider helmet-use law is a highly effective, low-cost, and vital component of a comprehensive motorcyclist-safety program.

Anti-helmet lobbyists, however, often cite a 25-year-old study (Goldstein) that reported more spinal injuries in helmet wearers. That study has been criticized by many because of flawed statistical reasoning. “Motorcycle Helmets Associated with Lower Risk of Cervical Spine Injury: Debunking the Myth,” published online in the *Journal of the American College of Surgeons* in Sept. 2010, found just the opposite.

This research concluded that “Helmeted motorcyclists are less likely to suffer a cervical spine injury after a motorcycle collision,” which directly contradicts this longstanding claim of anti-helmet lobbyists as a reason to object to all-rider helmet laws.

In fact, it was found that helmeted riders were 22 percent less likely to suffer cervical-spine injury than those not wearing helmets. Put simply, helmets do not contribute to any significant injuries, including those to the cervical spine. The study reviewed and mined the National Trauma Data-bank, looking through information on more than 40,000 motorcycle collisions between 2002 and 2006.

Research leader Adil H. Haider, M.D., M.P.H., F.A.C.S., stated in a

news release about the results of his research, **“We are debunking a popular myth that wearing a helmet while riding a motorcycle can be detrimental during a motorcycle crash. Using this new evidence, legislators should revisit the need for mandatory helmet laws.”**

Below are two links associated with this research. The first link provides some background and discussion of the research and the second is a research-report abstract.

<http://www.news-medical.net/news/20110208/Motorcycle-helmets-reduce-spine-injuries-after-collisions.aspx>

<http://www.journalacs.org/article/PIIS1072751510011580/abstract?rss=yes>

What does a comprehensive—inclusive, complete, wide-ranging, and broad—motorcyclist-safety program entail?

The two most recognized statements of comprehensive motorcyclist-safety programing are published by the National Highway Traffic Safety Administration (NHTSA) and the Governors Highway Safety Association (GHSA).

The NHTSA “Uniform Guidelines for State Highway Safety Programs, Highway Safety Program Guideline No. 3: Motorcycle Safety” can be found at <http://www.nhtsa.gov/nhtsa/whatsup/tea21/tea21programs/pages/motorcyclesafety.htm>

This guideline describes 11 components that a state motorcyclist-safety program should include as well as the criteria that the program components should meet.

The Governors Highway Safety Association has also published a document that addresses components of a comprehensive motorcyclist-safety program. The components as identified by GHSA are in section H of the GHSA 2013–2014 Policies and Priorities document, which can be found at <http://www.ghsa.org/html/publications/pdf/13-14PP.pdf>

Each of these documents encourages states to have and to enforce an all-rider helmet-use law as a component of any comprehensive motorcyclist-safety program.

Three Common Goals

While specific goals of a comprehensive motorcyclist-safety program are not directly identified in either of these documents, the components identified in both documents do address three commonly identified goals.

ONE OBVIOUS GOAL IS TO

reduce the number of crashes

BUT ELIMINATING ALL CRASHES IS UNLIKELY, SO TWO MORE GOALS IN THE EVENT OF A CRASH ARE TO

**prevent deaths and injuries
lessen the severity of injuries**



Helmets have been scientifically proven to reduce the risk of death and injury in the event of a crash

How do motorcyclist-safety programs that only focus on rider-training and motorist-awareness efforts stack up?

Many state motorcyclist-safety programs only focus on rider training and motorist awareness, efforts that are aimed at reducing the number of crashes.

The Centers for Disease Control and Prevention (CDC), however, has indicated, "...there is no consistent evidence that any of these measures reduce the number of motorcycle crashes or deaths." (Motorcycle Safety: How to Save Lives and Save Money, CDC, p. 19, <http://www.cdc.gov/>

motorvehiclesafety/pdf/mc2012/motorcyclesafetybook.pdf)

Additional efforts sometimes include

- some effort directed toward increasing motorcyclist conspicuity
- some effort directed toward encouraging riders not to drink and then ride
- some effort directed toward increasing the number of motorcyclists who are properly licensed

These additional efforts are almost always only at an awareness or public-relations level, and again these are efforts aimed at the single goal of reducing the number of crashes.

While reducing the number of crashes must be ONE of the goals of a comprehensive effort, it is unlikely all crashes will ever be eliminated; therefore, **comprehensive efforts must also include actions aimed at both preventing deaths and injuries and lessening the severity of injuries in the event of a crash.**

the takeaway

RESEARCH INDICATES THAT

- ⇒ motorcycle helmets are highly effective in protecting motorcycle riders' heads in a crash
- ⇒ state all-rider helmet-use laws are effective at increasing helmet use

The evidence of these two facts is overwhelming and undeniable. The three high-quality literature reviews referenced in this special edition of *Riding Smart* describe the scientific proof regarding the effectiveness of motorcycle helmet use, and as such they are excellent resources to point to as irrefutable confirmation of the above facts.

States without an all-rider motorcycle helmet law are lacking a vital component of a comprehensive motorcyclist-safety program.



"Facts do not cease to exist because they are ignored."

—Aldous Huxley, Complete Essays 2, 1926-29