

# **The Truth About Helmet Laws**

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## **Introduction:**

In 1966, the US Department of Transportation threatened to withhold millions of dollars in highway funds from states that chose not to implement mandatory helmet laws. As a result of this, the United States became a country of helmeted riders. Congress later revoked the Department of Transportation's authority to impose such sanctions against the states in 1976, leaving every state the option of having a helmet law only if they see fit. Currently, 27 states have a helmet law allowing riders to choose whether or not to wear a helmet if a rider is of a certain age (some also have insurance requirements) and three states have no mandatory helmet law whatsoever. In other words, 30 states feel that forcing its citizens who ride motorcycles to wear helmets is wrong and thus have chosen to not to do so, allowing the riders to make the decision for themselves. North Carolina is not in this majority, as it currently still requires all riders to have a helmet no matter their age or the amount of insurance they carry. Recently, overwhelming evidence shows that there are many benefits to states that have only a voluntary helmet law. Some of these include more revenue for the state, safer riders, and more educated riders, and these as well as other benefits will be discussed (Weiss, A., "The effects of helmet use on the severity of head injuries," *Journal of the American Statistical Association*).

## **Helmet Hazards and Facts:**

There are several safety hazards that increase the risk of motorcyclists being involved in accidents if they are wearing a helmet. These hazards include a reduction of peripheral vision while wearing a helmet, the added weight and fatigue of the helmet, improper fitting helmet, inadequate testing of helmets, and increased risk of neck and spinal injury from wearing a helmet. Obviously, if riders were not forced to wear helmets, these risks would be avoided.

The National Highway Traffic Safety Administration (NHTSA) claims that the "correlation between the extent of head rotation and the time to complete the visually check was small and non-significant." The report goes on to illustrate that "for 19 of the 23 riders, wearing helmets resulted in a greater head rotation than riding without a helmet." The remaining four riders failed to compensate for the loss of the lateral field of view caused by wearing a helmet. Thus, 17.4% of riders tested experienced vision impairment that was not corrected by the rider, while the rest of the riders tested experienced the need for additional head rotation. Although NHTSA attempts to disprove the hazards of motorcyclists wearing a helmet, the evidence still provides that all riders must correct the loss of the field of vision by turning their heads an additional 18.1 degrees, while a significant amount of riders were unable to compensate for the loss of vision. If all riders were not forced to wear helmets, those motorcyclists who do not automatically adjust to the added rotation needed while wearing a helmet could make the proper visual checks, which would prevent some accidents from occurring (*The Effects of Motorcycle Helmets Upon Seeing and Hearing*, NHTSA).

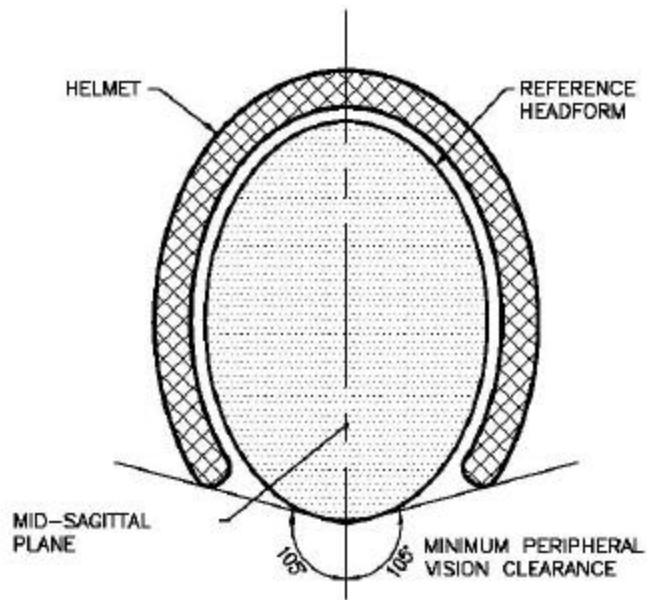


FIGURE 1  
 PERIPHERAL VISION  
 TOP VIEW SECTION THRU THE BASIC PLANE

Serious neck injuries are an important issue regarding the requirement of wearing a helmet when operating a motorcycle. There are three ways that a helmet can break the neck of a motorcyclist. The first is the Hangman's Noose Analogy. The interior edge of a helmet can be imagined as a complete circle including the chinstrap. The helmet forms a loop around a person's neck that can be compared to that of a hangman's noose. A hangman's noose may cause vertebral dislocation, which in turn can sever the spinal cord, leaving a victim paralyzed.

The “helmet-Fulcrum” scenario is another way that a helmet may break the neck of a motorcyclists. The helmet fulcrum investigation began with an illustration (Figure 2) of a man showing extension of the head. This illustration shows that even in normal extension, the helmet meets the spinal cord at the third and fourth vertebrae and “acts as a fulcrum to resist the force of translation of the head relative to the thorax” (Holt, Mike, *NHTSA’s Safety Standards are Shown to be Anything But Safe*). In this scenario, the victim’s neck can be sheered, damaging the spinal cord, as force is applied to the front of the helmet. This can result in instant death if the spinal cord is severed, or the spine may become hyper-extended where the chance of paralysis and slow death are very likely.

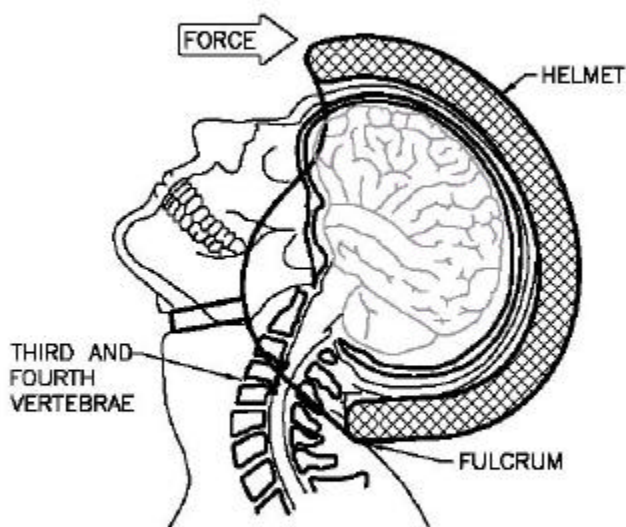
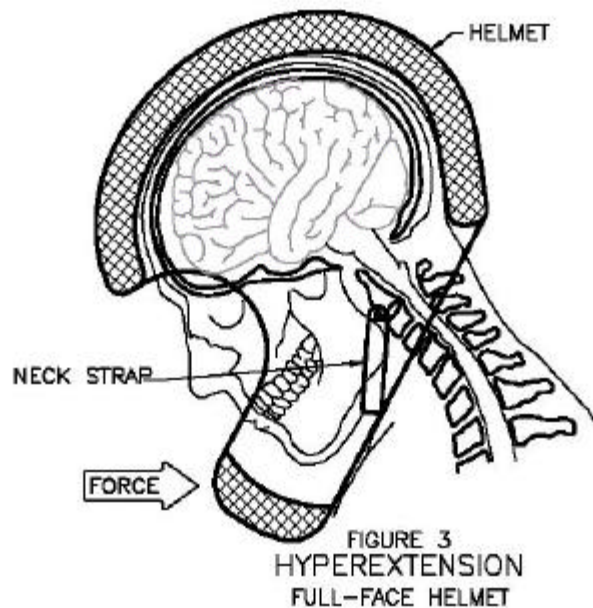


FIGURE 2  
HYPEREXTENSION  
HELMET-FULCRUM SCENARIO

The third way in which a motorcyclist's neck may break as a result of wearing a helmet in an accident is from damage to the brain stem from the chin-bar on a full-face helmets. (Figure 3). A strong force to the chin may hyper-extend the spinal cord and cause instant paralysis or death.



The American College of Surgeons declared that improper helmet removal from an injured person might cause paralysis (1980). Requiring all motorcyclist to wear helmets may put them at further risk in injured in an accident by witnesses attempting to help the victim or medical assistants improperly trained in appropriate helmet removal techniques.

According to a study done by Dr. Jonathan Goldstein on motorcycle helmet use and injury, “It is concluded that ... past a critical impact speed, helmets increase the severity of neck injuries.” The weight of a helmet becomes a factor in the severity of injury caused by wearing a helmet in an accident. The average helmet weighs four pounds. When traveling at a speed of 50 miles per hour, four pounds becomes 200 pounds upon impact due to the law of inertia. The added weight of a helmet upon a head can increase the rate of impact; possibly causing more damage to the person than if he was not wearing a helmet at all. (Goldstein, Jonathan. *The Effect of Motorcycle Helmet Use on the Probability of Fatality and Neck Injuries*).

The weight of a helmet on a motorcyclist's head can not only cause greater severity of impact, but may also cause added fatigue to the driver. The human head is designed to release heat, cooling the body and maintaining a constant temperature. A helmet traps the heat emitted from the head, which may result in overheating leading to increased fatigue. The added weight of a helmet, and fatigue that wearing one may cause, could lead to more motorcycle accidents, since fatigue is one of the leading causes of all motor vehicle accidents. (Sanfelipo, Tony Pan. *Understanding Head and Neck Trauma*).

Serious neck injuries, including paralysis have resulted from motorcycle accidents in which the driver was wearing a helmet. Many of these injuries were cited to be a direct result of wearing a helmet. There are literally thousands of different motorcycle helmets produced each year. The Department of Transportation cannot possibly test each and every brand and style. The helmet manufacturers certify their own helmets, which are then subject to random testing by the NHTSA. Therefore it is impossible for the consumer to know if the helmet he/she is wearing was actually tested by the NHTSA and if it was subjected to all four of the testing conditions. The following data illustrates how many helmets passed and failed safety standards from 1980 through 1994 (Table 1) (McCallister, Kim. *The Truth About Motorcycle Helmets*”).

Table 1: Helmet Safety Standards Tests from 1980 – 1994

Year	Tested	Passed	Failed
1980	162	99	63
1981	103	50	53
1982	Test results were not submitted		
1983	Test results were not submitted		
1984	32	11	21
1985	32	32	0
1986	30	30	0
1987	No helmets were tested		
1988	No helmets were tested		
1989	30	24	6
1990	30	26	4
1991	47	31	16
1992	30	23	7
1993	31	20	11
1994	167	39	128

Helmet manufacturers realize that the NHTSA does not effectively test all helmets; placing warning labels on the inside of helmets. An example of such a label reads: WARNING: No protective headgear can protect the wearer against all foreseeable impacts. This helmet is not designed to provide neck or lower head protection. This helmet exceeds Federal Standard FMVSS218: Even so death or severe injury may result from speeds as low as 15 mph while wearing this helmet.” (Label inside a new helmet 1992).

The state of North Carolina cannot affirm that all helmets sold within the borders have been satisfactorily tested by NHTSA, thus it is difficult to ensure that a rider wearing a helmet will be adequately protected by that helmet even though it was supposedly rigorously tested and approved.

It is impossible to regulate the sale of each helmet not only for the purpose of proper testing done by NHTSA, but also to ensure that each helmet bought and worn by a motorcyclist is correctly sized and fitted for that person's head. “Incorrectly fitted helmets can do more damage than no helmet

at all”, according to the Bell Helmet Dealers Guide (1986). Many people do not know how to properly fit themselves with a helmet and generally opt for helmets that are too loose since they are more comfortable.

Another risk of wearing a helmet comes from the false sense of security than a rider may feel when wearing a helmet. That false sense of security may cause the motorcyclists to take excessive risks and participate in more dangerous riding habits. Therefore, statistics on helmet wearers versus non-helmet wearers may be biased according to the personality and personal risk taking of a non-helmeted rider.

### Motorcycle Fatality Rates

Common sense would seem to dictate that of riders did not wear helmets than more riders would be killed, causing fatality rates to increase. This, however, is not exactly true according to recent evidence. States with no helmet laws actually have a fatality rate lower than that of states with mandatory helmet laws. There are several reasons for this. Firstly, states with voluntary helmet laws as a whole have better rider education programs and better-prepared riders. This education leads to better decisions made by the riders that in turn, reduce accidents and fatalities. The second reason for this fact is the increased number of registrations translated to more bikes on the road. There are in fact more fatalities as a whole, but when compared to the number of registrations, the fatalities per rider are actually less.

The following tables from the Motorcycle Industry Council show that the states with voluntary helmet laws actually do have fewer fatalities per accident, and fewer accidents per motorcycles registered in 1993.

Table 2: Summary of 1993 State Motorcycle Accident Statistics

	<b>Registrations</b>	<b>Reported Accidents</b>	<b>Fatalities</b>	<b>Accidents per 10,000 registrations</b>	<b>Fatalities per 100 accidents</b>
<b>Mandatory Helmet Use</b>	2,352,293	52,270	1,557	222.21	<b>2.98</b>
<b>Voluntary Helmet Use</b>	1,497,923	29,062	844	194.02	<b>2.90</b>
<b>Total</b>	3,850,216	81,332	2,401	211.24	2.95

Table 3: Summary of 1993 State Motorcycle Accident Statistics as a Percentage.

	<b>Registrations</b>	<b>Reported Accidents</b>	<b>Fatalities</b>
<b>Mandatory Helmet Use</b>	61%	64%	65%
<b>Voluntary Helmet Use</b>	39%	36%	35%
<b>Total</b>	100%	100%	100%

Table 4: Death Accident Ratio before and after Helmet Law in Maryland

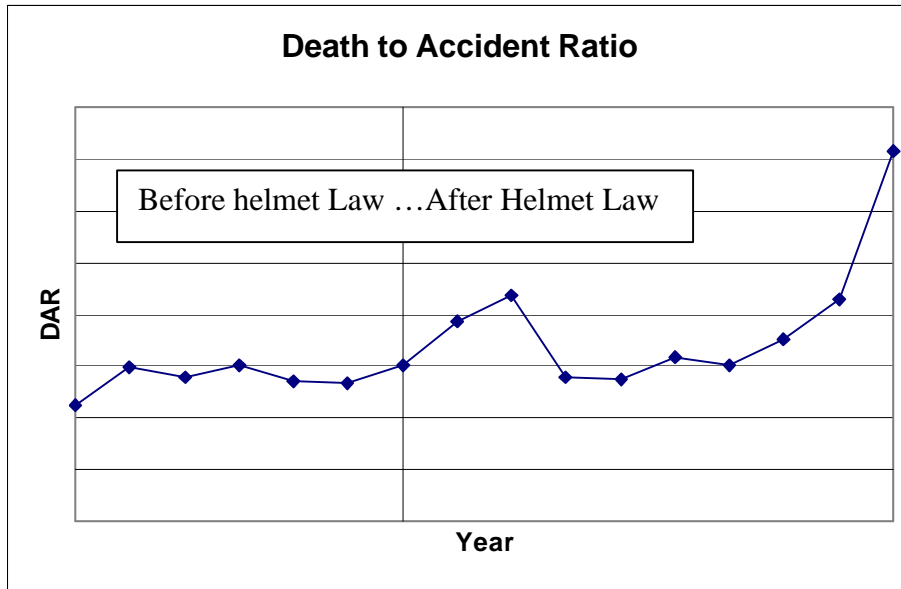
	Year	Accidents	Deaths	DAR
Before Mandatory Helmet Law	1985	3,182	72	2.26%
	1986	2,823	84	2.98%
	1987	2,328	65	2.79%
	1988	2,010	61	3.03%
	1989	1,693	46	2.72%
	1990	1,714	46	2.68%
	1991	1,752	53	3.03%
Total Accidents		15,502		
Total Deaths			427	
<b>Death Accident Ratio Before Mandatory Helmet Law</b>				<b>2.75%</b>

	Year	Accidents	Deaths	DAR
After Mandatory Helmet Law (1992)	1992	1,417	55	3.88%
	1993	985	43	4.37%
	1994	1,083	30	2.77%
	1995	989	27	2.73%
	1996	889	28	3.15%
	1997	898	27	3.01%
	1998	966	34	3.52%
	1999	1,070	46	4.30%
	2000	727	52	7.15%
Total Accidents		9,024		
Total Deaths			342	
<b>Death Accident Ratio After Mandatory Helmet Law</b>				<b>3.79%</b>

In Maryland, the death rate increased after the mandatory helmet law was introduced. The Death to Accident Ratio (DAR) increases significantly in Maryland after the law is passed, which means that helmet laws cannot be credited as having the benefits that helmet law proponents claim. The reason the number of accidents is reduced is because after the mandatory helmet law was passed, fewer people ride, and many of those who continue to ride, ride fewer miles resulting in a decrease in accidents.

The following graph illustrates the same information from the Maryland Department of Transportation. The death to accident ratio is higher after the mandatory helmet law came into effect. The average ratio increases by more than one percent when comparing the seven years before the law to the nine years after it passed.

Graph 1: Death to Accident Ratio before and after Helmet Law in Maryland.



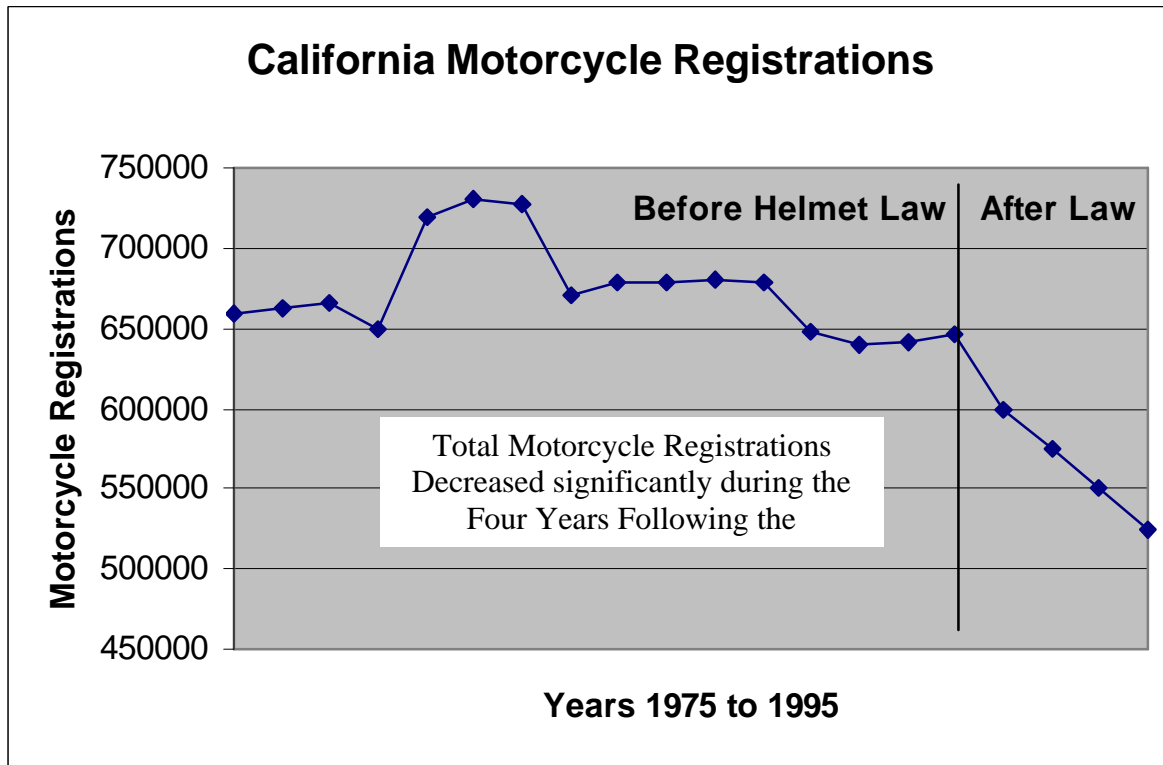
Relative to the number of registered motorcycles, states with mandatory helmet laws had 12.5% more accidents and 2.3% more fatalities than free choice states for the 14 year period 1977-90 (Accident and Fatality Statistics, analyzed by A.R. Mackenzie, M.D.)

- The national average of motorcycle fatalities per 100 accidents is 2.95. However, states with rider education and no helmet law show the lowest average of only 2.56 deaths, while states with helmet laws but no training have significantly higher rate of 3.09. (American motorcyclists Association, 1988)
- There is no discernible difference in motorcycle accident or fatality rates between states with mandatory helmet laws and those that allow freedom of choice. In fact, states that support voluntary use routinely achieve accident and fatality rates equal to or better than states with mandatory helmet laws for all riders. (American Motorcycle Association, 1995)
- There are no appreciable differences found relative to fatality rate, severity of injury, hospital stay, and discharge status between motorcycle accident victims who wore helmets and those who did not. (Arizona's Governor's Office of Highway Safety Study, 1990)

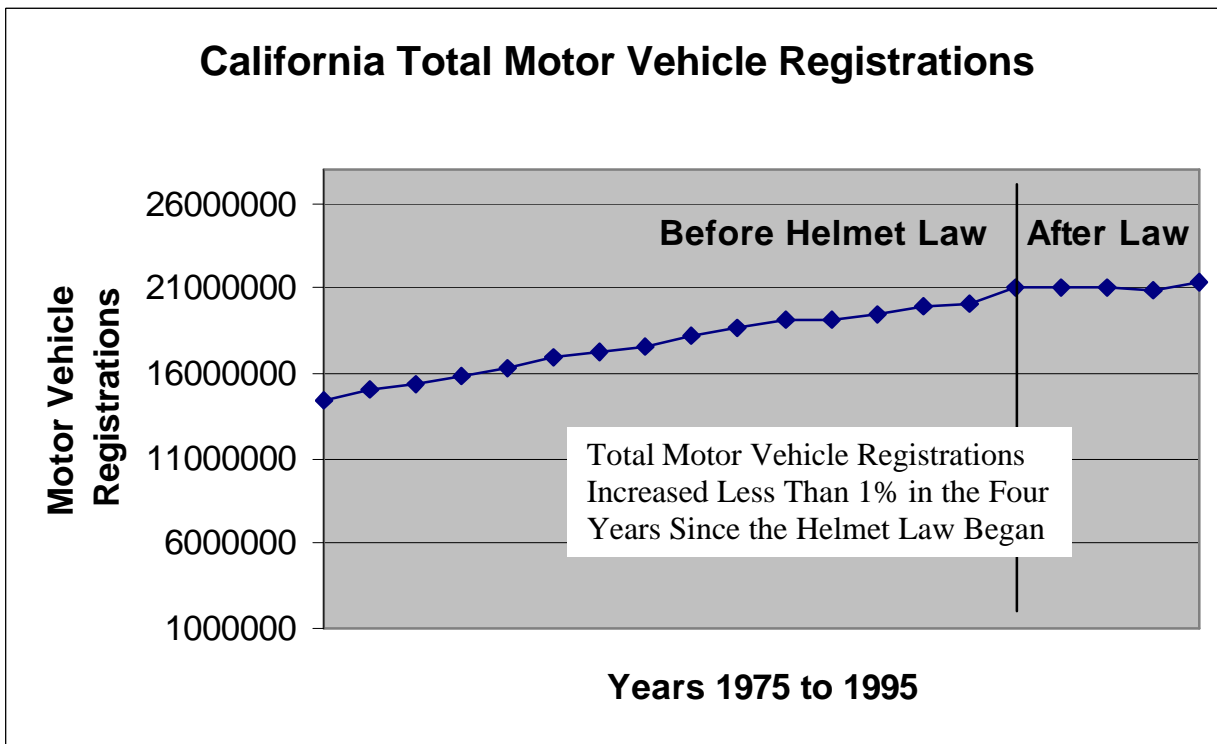
### Economic Impact of Riders

Statistically, helmets do not reduce injury as significantly as helmet laws reduce motorcycle ownership and use. This lack of ownership leads to a reduction in taxes, and license and registration fees. This can result in millions of dollars per year that the state loses. This reduction in ownership can be seen in the following graphs. When California instituted a mandatory helmet law in 1991, the motorcycle registrations dropped significantly, and continue to do so in the following years:

Graph 2: California Motorcycle Registrations 1975 – 1995. (Information received from CA DMV)



Graph 3: Total California Motor Vehicle Registrations 1975 to 1995



Similar data has been found for other states that have instituted mandatory helmet laws. After laws were passed in Nebraska, the sales of new motorcycles dropped 41%. Similarly the sales dropped 36% on Oregon and 20% in Texas in the first year following the enactment of these mandatory helmet laws. (R.L. Polk and Co., 1991)

By losing sales, taxes, and registrations, a states economy is negatively affected by enacting helmet laws. Conversely, when states choose to repeal their helmet laws, it has been shown to add revenue to the states that choose to do this. For example, in July of 2000, Florida repealed their mandatory helmet law that had been in effect in the state. The state of Florida registered 40,000 new motorcycles in the year after their mandatory helmet law was revoked. ABATE (American Bikers Aimed Towards Education) made the following estimates of what this amended law has brought into the economy of Florida:

- 40,000 new motorcycles at an average of \$10,000 each: \$400,000,000
- Sales tax on motorcycles at 6%: \$24,000,000
- Registration fees on motorcycles: \$1,444,000
- Change of titles fees: \$1,190,000
- Total: \$426,634,000

“This total is almost one half a billion dollars in one year that was put into the economy of the state of Florida,” says James “Doc” Reichenbach, President and Lobbyist for ABATE of Florida and Chairman of the board for the National Coalition of Motorcyclists. “ Of this amount, over 25 million dollars went directly into the state treasury for the budget. This also does not include the tourist money that increased because of Florida being a freedom of choice state. In 2001, over 300,000,000 dollars were spent in Florida at Bike Week during a ten day period.”

These motorcycle rallies are able to provide states with an incredible amount of revenue, in a very short period of time. However, the largest rallies in the United States are located in states without mandatory helmet laws, which leaves North Carolina out. In fact, North Carolina is losing money every year due to the fact that existing rallies in the state are not able to boast the attendance that would accompany a volunteer helmet law in the state.

For example, Bike Week is held every year in Daytona Beach, Florida. The Volusia County tourism board estimates that 500,000 riders attend this event, and 260 million dollars is added to the economy of the county. In Texas, Austin hosts a rally that brings 50,000 people to the city and adds over twenty million dollars to the economy.

Similar numbers can be seen throughout the country. According to the Greater Milwaukee Convention and Visitors Bureau, the four-day Harley-Davidson celebration in Milwaukee and other Wisconsin communities is estimated to provide an economic boost of 132 million dollars to the states economy.

One of the largest motorcycle rallies in the country is held in Sturgis, South Dakota. The following statistics (Table 5) are for the rallies held in 2000 (The 60<sup>th</sup> Anniversary) and 2001:

Table 5: Tax Revenue Gained from Sturgis 2000 and 2001.

<b>Category</b>	<b>2001 (61<sup>st</sup>)</b>	<b>2000 (60<sup>th</sup>)</b>
Attendance	410,000	500,000 – 633,000
Taxable Sales from Temporary Vendors	\$11,600,000	\$14,300,000
South Dakota State Sales Tax Collected	\$466,599	\$573,000
Sturgis City Sales Tax Collected	\$232,891	\$286,000
South Dakota Department of Tourism Tax Collected	\$116,013	\$143,000
<b>Total</b>	<b>\$12,415,503</b>	<b>\$15,302,000</b>

According to the North Carolina Department of Transportation there are currently 125,718 motorcycles registered in the state of North Carolina. It has been proven that the density of bikers is much lower in states that require helmet laws. For example, before Florida repealed their mandatory helmet law in 2000 they had more than three times fewer registered riders than Iowa (based on population), a state with no helmet law whatsoever. Florida is considered one of the most scenic and most enjoyable states to ride in, while Iowa is known for having a long cold winter and less than optimal riding conditions. Yet, Iowa is able to exceed Florida in the number of riders per population. Overall, states with no helmet laws had 2.6 motorcycle registrations per 100 citizens, which is roughly twice as many bikers as states with mandatory helmet laws, which have a density 1.3 registrations per 100 citizens.

This data suggests that if North Carolina had no mandatory helmet law, the number of registered motorcycles would be somewhere in the neighborhood of 250,000. Currently North Carolina charges a title fee of 35 dollars and a license plate fee of 12 dollars. (17 dollars in Wake, Durham, and Orange Counties). The tax in North Carolina is three percent of the value of the motorcycle.

Below is an illustration (Table 6) is an illustration of the current and predicted revenue in North Carolina from motorcycle registrations should the mandatory helmet law be repealed.

Table 6: Current and Predicted Revenue in North Carolina from Motorcycle Registrations

<b>Source of Revenue</b>	<b>125,718 registered bikes</b>	<b>250,000 registered bikes</b>	<b>Difference</b>
<b>Title Fees</b>	\$4,400,130	\$8,750,000	\$4,349,870
<b>License Fees *</b>	\$1,634,334	\$3,250,000	\$1,615,666
<b>Taxes **</b>	\$45,258,480	\$90,000,000	\$44,741,520
<b>Total</b>	<b>\$51,292,944</b>	<b>\$102,000,000</b>	<b>\$50,707,056</b>

\* Taking the average license fee to be 13 dollars.

\*\* Taking the average cost of a motorcycle to be \$12,000

This data illustrates that North Carolina currently brings in just over \$51 million dollars per year as a result of motorcycle taxes, titles and license fees. If North Carolina did not have a mandatory helmet law, and the registrations increase to the levels of the national averages, the state would be talking in

over 100 million dollars per year. This would increase the amount of revenue the state takes in by 51 million dollars per year. Again, this does not include the huge amounts of money that higher attendance during rallies would bring in.

In addition, if the license and registration fees were to be raised by a small amount, a rider safety course can be instituted in the state. Classes such as these have been credited for lowering fatality rates as well as accident rates in the states that these classes are offered.

## **Freedom of Choice**

Imposing helmet laws on motorcyclists takes away their freedom to make their own decision of whether or not to wear a helmet. Helmet laws make assumptions that motorcyclists lack the wisdom to make their own personal safety decisions and need the government to regulate their behavior. As a result of this, the personal liberty of our citizens is reduced.

There are many sports and activities that involve a degree of danger and thrill seeking, but there are few laws regulating personal safety and impeding the freedom of choice for participants for many of these activities. Motorcyclists are part of this thrill-seeking group of adventurers. So why should motorcyclists be the only ones discriminated against? The American Motorcyclists Association (AMA) believes that “a common principle should be applied when consideration is given to mandating personal safety, whether it be for motorcycling or some other risk-related activity” (AMA).

The role of government is not to regulate every aspect of a persons’ life. Adults are perfectly capable of making their own decisions regarding personal safety. An individual should be able to decide whether or not to wear a helmet while riding a motorcycle. The most effective way of preventing injuries is not to mandate the use of helmets, but rather to educate riders on proper riding techniques to reduce the total number of accidents occurring.

## **Social Burden Theory**

Many advocates of mandatory helmet laws claim that taking away the freedom of motorcyclists to choose whether or not to wear a helmet is a small cost compared to the social burden motorcyclists place on the rest of the population. The claim is that motorcyclists injured in accidents in which they are not wearing helmets imposes a social burden on everyone else. They assert that motorcyclists are generally not insured and therefore must rely on public funds such as Medicare and Medicaid to cover their health costs.

This is not true according to a study done by the University of North Carolina. The University published a study titled: An Examination of Motorcyclists Injuries and Cost Using North Carolina Motor Vehicle Crash and Trauma Registry Data. The study disproves the claims made by mandatory helmet law advocates, revealing that:

- Motorcyclists admitted to trauma centers for the treatment of injuries related to a crash were just as likely as other road trauma cases to be medically insured, and considerably better insured than non-road cases.
- Motorcyclists had the highest insurance payment rate of all groups.
- Motorcyclists relied on Medicare and Medicaid considerably less than any other group.
- Motorcyclists had a higher rate of self-pay than any other group.
- Motorcyclists average medical costs were less than other road trauma cases. (“Without Helmet Laws Who Pays?” article by Steve Zimmer)

The funds for public assistance programs such as Medicare and Medicaid come from tax dollars. Working motorcyclists pay taxes just as all other working people do. If a motorcyclist is uninsured at the time of injury, they should not be excluded from this money, since in the majority of cases, this person has worked at one time or another contributing to the funds. Motorcyclists involved in accidents do not raise insurance rates for all road users. Motorcyclists and automobile drivers have separate insurance pools, therefore the rates of automobile insurance is driven by the automobile drivers themselves, not all road users.

The study done by the UNC Highway Safety Research Center showed that 49.5% of injured motorcyclists had their medical costs covered by insurance. This percentage is almost identical to the 50.4% of all other road trauma victims that were insured. Motorcyclists rely on public sources for medical assistance comparable to every other motor vehicle operators, causing no increased social burden on those who do not ride motorcycles.

Motorcyclists are just as likely to be insured as any other road user and should not be blamed for increases in insurance or medical costs. Motorcyclists participate in their own insurance risk pools, as are automobile drivers. Motorcyclists also pay to the public tax insurance pools like all other road users and should have equal access to the funds. “Any financial burden for injured motorcyclists is, as it should be, paid for by motorcyclists themselves” (Zimmerman, AMA, 2003).

## **Rider Education**

Requiring motorcyclists to wear helmets while riding will not prevent accidents from happening, or even lower the percentages of accidents. The most effective method of preventing injuries and deaths from motorcycle accidents is to educate riders. By having the necessary riding skills, a rider is better able to avoid accidents compared to a rider with no formal training.

Many other states that have repealed their law requiring riders to wear helmets have also implemented a rider education program. According to the National Highway Traffic Safety Administration (NHTSA), preventing a crash from occurring in the first place “offers the greatest potential safety benefit for motorcyclists.” The most effective way to prevent riders from causing accidents is to train them on how to properly respond to potentially dangerous situations. Requiring a ride to wear a helmet alone will not prevent accidents or injuries. Teaching riders how to effectively and safely maneuver in various traffic situations can do much more for reducing motorcycle injuries and costs of recovery than mandatory helmets use for riders.

States such as Florida require motorcyclists under the age of 21 to complete a mandatory education program. The course involves at least eight hours of classroom training and ten hours of training on a motorcycle. The Motorcycle Safety Foundation nationally certifies the instructors for the course. This type of program with well educated and certified trainers, paired with classroom and on-road training allows motorcyclists to effectively prevent accidents from occurring, thus reducing the risks to themselves and automobile drivers, as well as lowering the number of injuries and deaths from motorcycle related activity.

The idea of increased rider education raises the question of where the money will come from to support such a program. Rider education programs can be easily funded by the increase in revenue generated by more motorcycle sales due to the helmet law repeal, as well as an additional fee on private motorcycle registrations.

In North Carolina, a fourteen-dollar-fee on passenger motorcycles can be implemented, as well as a twenty-one dollar fee for motorcycles with additional transport devices. The money raised from these fees will help fund the rider education programs. Any additional funding needed for the program may come from enrollment fees to the students.

## **Conclusion**

In the past two decades, our nation has seen a dramatic trend towards giving motorcycle riders a choice in the issue of riding with helmets. North Carolina would benefit substantially if the state followed this trend allowing voluntary helmet use. Riders should be given the freedom to choose whether or not to wear a helmet. Voluntary helmet use would help the state in terms of economic impact, especially in a time when the state is involved in a budget crisis. Along with this, the liberty of the citizens of the state would be respected, giving them the ability to determine what is best for them. Motorcyclists take on the responsibility of their actions since they are accountable for their own insurance, taking the social burden off those who do not own motorcycles. The best way to reduce injuries and deaths from motorcycles is not to force riders to wear helmets, but rather to train them more effectively on how to prevent accidents from occurring in the first place. The state of North Carolina would greatly benefit in many aspects if the mandatory helmet law were repealed.