

A proposal to reduce mortality and morbidity in pennsylvania motorcyclists



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A Proposal to Reduce Mortality and Morbidity In Pennsylvania Motorcyclists

XXXXXXXXXXXXXXXXXXXX Submitted XXXX Introduction Currently in the United

States there are two groups in the arena of motorcycle safety equipment.

One group regards safety equipment as one's individual rights and freedoms.

That group has lobbied state governments since 1976 when congress struck

down the national helmet requirement. Many members of that group hold to

the " biker" image and fight mandatory safety standards. The other group is

comprised mainly of healthcare professionals and researchers that have

seen the results brought on by a lack of safety equipment.

That there is still any debate about the safety of helmets can be attributed to

the federal government's lack of focus and funding for motorcycle safety. It

has been 25 years since the federal government made the last large study of

motorcycle safety with the " Hurt Report" of 1981 1. Since then motorcycle

usage has grown exponentially and so have fatalities. Funding for a new

study is included in the 2006 Transportation Bill passed by congress.

Any program that seeks to lower the societal costs of motorcycle accidents

must identify the causes of accidents and the injuries that occur. Some

selected findings from the Hurt Report of 3600 motorcycle accidents

occurring in the Los Angeles area 5: 1. Approximately ? of motorcycle

accidents involved collision with another vehicle. 2. Vehicle failure accounted

for less than 3% of the studied motorcycle accidents. 3.

In single vehicle accidents, rider error was the precipitating factor in 2/3 of

the cases. 4. Weather is not a factor in 98% of motorcycle accidents. 5. Most

motorcycle accidents involve a short trip with the accident occurring very close to the trip origin.

6. The median pre-crash speed was 29.8 mph and the median incident speed was 21.1 mph. The one-in-a-thousand speed was 86 mph.

7. Riders with previous accidents and citations were overrepresented in the study. 8. 92% of the riders in accidents were self-taught or learned from friends and family.

9. Almost half of the fatalities showed alcohol involvement. 10. Large displacement motorcycles are underrepresented in accidents, but are associated with higher severity of injury.

11. Riders in accidents were significantly without motorcycle license, without any license, or with suspended license. 12. 96% of single vehicle accidents resulted in injury, 45% more than minor.

3. Voluntary helmet usage was lowest for untrained, uneducated, and young untrained riders. 14. 60% of the motorcyclists were not wearing a helmet at the time of accident, 53% of those had no expectation of accident. One has to look abroad to find reliable secondary data regarding motorcycle injuries and severity. One problem with non-US data is most foreign motorcycle licensing and registration laws are much different.

Wladis et al examined 8927 Swedish motorcyclists admitted to the hospital for injuries resulting from motorcycle crashes between 1987 and 1994. In Sweden helmets are mandatory (95% compliance), as are graduated

licenses that limit the displacement of the motorcycle that a new rider can
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legally use on public roads. Wladis provides the best picture available for the injuries and their severity. 1. The median age of patients was 22 2.

Fractures were the most common injuries with fractures of the leg (42. 1%) showing the highest incidence. 3. Vertebral fractures (12. 4%) were frequent with fractures of the lumbar and thoracic being the most common. 41.

2% of vertebral fractures involved injuries to the spinal cord. 4. The most common cerebral injury was concussions (24%) followed by severe brain injuries (19. 9%). 5.

The mean hospital stay was 7. 4 days and the median was 2 days 6. The median age of those who died was 30 years. With the information in those two studies, we can compile a general profile of a motorcycle accident victim and the injuries most likely. Our rider/patient will most likely be: 1. Untrained and unlicensed 2.

Not wearing a helmet 3. Consuming alcohol even if not intoxicated 4. In their 20's 5. Will have broken leg bones and very likely have head injuries.

Prevention programs must target this rider. Unlicensed and Untrained Riders Currently in the State of Pennsylvania anyone with a valid driver's license can obtain a motorcycle learner's permit.

All that is required is to pass a very minimal written test of knowledge. There is no training or physical examination of skills required. 5 Anyone can also purchase, register, and insure a motorcycle even without a valid license. All of these factors lead to a large amount of unskilled and dangerous riders on the road.

Stella and company studied 2 years worth of crash data from motorcycle related deaths in Australia from January 1998 to December 1999 to find a pattern in the accidents and head injuries. Their findings mirrored those of the Hurt study in the United States. Speeding was implicated in 31% of crashes along with alcohol (31%) or drugs (28%). Lack of a helmet (13%) even though mandated by law contributed to fatalities. One or more of those combinations were found in almost 2/3 of the fatalities.

13 A program of rider education in Pennsylvania is already in place. The Motorcycle Safety Foundation has a program available to all riders. The program does not have any cost to the participants or the state and is funded with motorcycle licensing fees. The basic MSF classes consist of 2 weekends of classroom training and safety course riding.

At the end of the beginner course, riders that successfully pass are awarded their motorcycle license. There is also an advanced rider class that trains more advanced riding skills and techniques. Pennsylvania should require riders to complete the MSF basic class before they are issued a valid learner's permit to operate a motorcycle on public roads. This would insure that all riders receive a basic education in the laws, operation, and techniques required for operating a motorcycle.

To obtain a full license, riders would have to complete the advanced rider training program as well. The state of Pennsylvania should also require a valid motorcycle license or permit to purchase a motorcycle. There would be nearly no additional expense required because valid identification is currently required to transfer the title to the new owner. This would prevent

unlicensed riders from purchasing a motorcycle whether it is a suspended operator or a new rider. Mandatory Helmet Laws Mandatory helmet laws are the most controversial safety element of motorcycling, yet they need not be. The amount of evidence that helmets reduce mortality and reduce the incidence of serious head injuries is overwhelming.

Still those that oppose them have lobbied state legislatures across the country so that only 20 states still have mandatory helmet laws. A quick search of the internet for groups like ABATE will yield references to obscure researchers and journals that have not been properly reviewed. The arguments against mandatory helmets are very similar to the arguments that a smoker will make that they knew someone that smoked for a lifetime, but never got sick. Motorcycle transportation is the most dangerous method of transportation available. Motorcyclists are 14 times more likely to die in an accident when compared to passenger vehicles in miles traveled. 2 Voluntary helmet use in states that repeal the mandatory use drops immediately by 30 to 40%.

2, 7, 8 Studies have also shown that states that re-instate mandatory helmet laws experience drastically lower fatalities. 2 The Maryland Experience Maryland mandated helmet use for all riders in 1967 whether driver or passenger. In 1979, the law was relaxed so that only minors were required wear helmets. In 1992, the legislature again required all riders to wear DOT approved helmets.

Auman et al examined autopsy reports of motorcycle fatalities for the 33 months before the repeal and the 33 months after for evidence of traumatic

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brain injury (TBI). Their goal was to find if there was linkage between TBI and helmet use. 2 There were 212 fatalities during the period with 130 occurring before and 82 after the law change representing a 39% decrease in fatalities over the period. Other than helmet usage, there was not a significant difference in age, sex, race, time, alcohol use, or region of the crash during the study period. Motorcyclist fatalities per 10, 000 registered vehicles dropped from a high of 10. 3 in 1992 to 4.

5 per 10000 vehicles in 1996. That is a drop of 43% with a nearly identical number of registered motorcycles. 2 Florida Too Florida changed its mandatory helmet law in 2000. It exempts adults that carry at least \$10000 of medical insurance from being required to wear a helmet.

Andreas Muller, PhD examined Florida's monthly motorcycle deaths from January 1994 to December 2001 to examine the correlation between helmet usage and death. Dr. Muller analyzed rider deaths, rider deaths per billion miles traveled, and rider deaths per 10000 registered motorcycles. 7 Muller's study estimated a 48.

6% increase in motorcycle rider deaths the year following the law change. The impact is reduced to 38. 2% when measured in billions of miles traveled and 21. 3% when measured in deaths per 10000 motorcycles registered. There was a 19. 6% increase in the number of motorcycles registered following the repeal, which is consistent with the registration rise in other states after the law changed.

Perhaps the most telling statistic is that in 2001, only 53% of underage

yclists killed wore helmets and for adults the number was 39%. Muller
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concludes that the age and insurance restriction is essentially a de facto repeal of the helmet law. Pennsylvania Didn't Learn Table 1 is from NHTSA data of Pennsylvania Motorcycle Fatalities. 9, 10, 11 Table 1 2004

Registration Data was approximated using the national growth data from 2003 to 2004. It is clear that something changed in 2003. Motorcycle fatalities jumped by 42 per year from 2002 to 2004 and the number of fatalities per 10000 registrations jumped by 17% during the same period.

At the same time total traffic fatalities were falling by 8%, motorcycle fatalities were rising 29% mirroring the results in other states that relaxed their helmet laws. What changed is Pennsylvania repealed its mandatory helmet laws. Senate Bill 259 in 2003 repealed the mandatory helmet law for riders over 21 with 2 years of riding experience or a rider education course. From past experience this is essentially repealing the mandatory helmet law. Cost Effective Solution What is the societal cost of motorcycle accidents and how can they be lowered? There have been few studies done with a cost-benefit analysis.

Most legislative decisions are based on the “popular policy” model of epidemiology, which lobbying group has the deepest pockets, and what group votes. Those are incorrect means of injury control that lead to millions of wasted dollars on ineffective prevention models and poor decisions. For motorcycle accident injury prevention costs and benefits, this paper will use the model developed by in the 1980 paper “Evaluation of the Costs and Benefits of Motorcycle Helmet Laws”. 8 Methodology To calculate the benefit of helmet use on medical care expenses three factors need to be identified:

1) The probability a motorcyclist will be involved in an accident, 2) The
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effectiveness of the helmet in preventing injury or death, and 3) the amount of medical care required for injuries of different severities. 1. Probability a motorcyclist will be involved in a serious accident.

NHTSA annually publishes a compilation of traffic safety facts gathered from FARS (Fatal Accident Reporting System). Two of the statistics in that report are the fatality rate and the injury rate. For 2003, the national rate was 6.1 deaths and 125 injuries per 10000 motorcycles registered. The Pennsylvania fatality rate was 6.

92 and the injury rate was unavailable, so the national rate is used for calculations. 10 Many studies over time have also put a motorcyclists chances of being in an accident at 2 percent annually. 2. Effectiveness of the helmet preventing injury or death. From FARS and projected 2004 registration data: 262000 motorcycles registered X Accident Rate of 2% 5240 Accidents Expected 250000 motorcycles registered X Injury Rate of 1.25% 3275 Injuries Expected 250000 motorcycles registered X Injury Rate of .071% 86 Deaths Documented Helmet use in Pennsylvania after mandatory use was observed to be 51% of riders. Using the injury severity distributions found by Muller and confirmed by Wladis et al in Sweden, all the severity the injuries are shown in below. The medical costs averted were calculated in Table 3 also using the same method as the model, but where updated using the data from Table 2 and adjusting medical costs to 2004 dollars.

14 Table 3 Motorcycle helmet laws require that riders and passengers wear helmets. The retail price of a DOT approved helmet ranges from \$50 to \$400 depending on the type and quality of the helmet. A quality helmet that <https://assignbuster.com/a-proposal-to-reduce-mortality-and-morbidity-in-pennsylvania-motorcyclists/>

provides face protection and meets DOT requirements can be purchased for approximately \$100. Using observed data, the normally 1 out of every 4 motorcyclists carries a passenger making the number of riders per motorcycle 1.25.

8 Dividing the number of projected registrations for Pennsylvania in 2004, riders would have needed 209000 helmets. The useful life of a helmet is 5 years, so in 2004 riders would have needed to purchase 41290 helmets at total cost of \$4,192,000. Cost-Benefit Analysis Medical Costs Averted - Additional Costs of Buying Helmets = Societal Savings \$8,103,062 - \$4,192,000 = \$3,911,062 From these calculations, it can reasonably be assumed that reinstating the mandatory helmet law in Pennsylvania would yield nearly 4 million dollars annually in societal savings annually. Spinal Injuries! That is the battle cry of the anti-helmet groups. Using very old studies, the helmet opposition contends that helmet use INCREASES the likelihood of spinal injuries. Orsay and colleagues studied 1153 motorcycle trauma accidents in 4 states from 1988 through 1990 to determine if there was a linkage between helmet usage and spinal injuries.

12 Two hundred fifty-four (22%) of the sample sustained severe head injuries. The overall rate of severe head injuries was over 1-in-4 for those not wearing a helmet and slightly more than 1-in-10 for those who were wearing a helmet. Significant spinal injuries occurred in 51 cases with no association to helmet use (odds ratio 1.12). Consumption of alcoholic beverages was found to be strongly linked to head injuries with only 11% who consumed alcohol wearing helmets compared to 38.

5 who did not consume alcohol. The authors concluded that alcohol use is associated with increased incidence of both head (odds ratio 3.89) and spinal (odds ratio 2.1) injuries.

Conclusions By implementing a program of mandatory rider education to obtain a motorcycle license and permit and restoring the helmet law the state of Pennsylvania will drastically reduce both the number of injuries and the severity from motorcycle accidents. Rigorous enforcement of the current .08 BAC standard will further decrease morbidity and mortality arising from motorcycle accidents. **Bibliography** 1.

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