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Thursday, Nov. 30, 2006

The Hidden Danger of Seat Belts

By DAVID BJERKLIE

If there's one thing we know about our risky world, it's that seat belts save lives, right? And they do, of course. But reality, as usual, is messier and more complicated than that. John Adams, risk expert and emeritus professor of geography at University College London, was an early skeptic of the seat belt safety mantra. Adams first began to look at the numbers more than 25 years ago. What he found was that contrary to conventional wisdom, mandating the use of seat belts in 18 countries resulted in either no change or actually a net increase in road accident deaths.

How can that be? Adams' interpretation of the data rests on the notion of risk compensation, the idea that individuals tend to adjust their behavior in response to what they perceive as changes in the level of risk. Imagine, explains Adams, a driver negotiating a curve in the road. Let's make him a young male. He is going to be influenced by his perceptions of both the risks and rewards of driving a car. The considerations could include getting to work or meeting a friend for dinner on time, impressing a companion with his driving skills, bolstering his image of himself as an accomplished driver. They could also include his concern for his own safety and desire to live to a ripe old age, his feelings of responsibility for a toddler with him in a car seat, the cost of banging up his shiny new car or losing his license. Nor will these possible concerns exist in a vacuum. He will be taking into account the weather and the condition of the road, the amount of traffic and the capabilities of the car he is driving. But crucially, says Adams, this driver will also be adjusting his behavior in response to what he perceives are changes in risks. If he is wearing a seat belt and his car has front and side air bags and anti-skid brakes to boot, he may in turn drive a bit more daringly.

The point, stresses Adams, is that drivers who feel safe may actually increase the risk that they pose to other drivers, bicyclists, pedestrians and their own passengers (while an average of 80% of drivers buckle up, only 68% of their rear-seat passengers do). And risk compensation is hardly confined to the act of driving a car. Think of a trapeze artist, suggests Adams, or a rock climber, motorcyclist or college kid on a hot date. Add some safety equipment to the equation — a net, rope, helmet or a condom respectively — and the person may try maneuvers that he or she would otherwise consider foolish. In the case of seat belts, instead of a simple, straightforward reduction in deaths, the end result is actually a more complicated redistribution of

risk and fatalities. For the sake of argument, offers Adams, imagine how it might affect the behavior of drivers if a sharp stake were mounted in the middle of the steering wheel? Or if the bumper were packed with explosives. Perverse, yes, but it certainly provides a vivid example of how a perception of risk could modify behavior.

In everyday life, risk is a moving target, not a set number as statistics might suggest. In addition to external factors, each individual has his or her own internal comfort level with risk-taking. Some are daring while others are cautious by nature. And still others are fatalists who may believe that a higher power devises mortality schedules that fix a predetermined time when our number is up. Consequently, any single measurement assigned to the risk of driving a car is bound to be only the roughest sort of benchmark. Adams cites as an example the statistical fact that a young man is 100 times more likely to be involved in a severe crash than is a middle-aged woman. Similarly, someone driving at 3:00 a.m. Sunday is more than 100 times more likely to die than someone driving at 10:00 a.m. Sunday. Someone with a personality disorder is 10 times more likely to die. And let's say he's also drunk. Tally up all these factors and consider them independently, says Adams, and you could arrive at a statistical prediction that a disturbed, drunken young man driving in the middle of the night is 2.7 million times more likely to be involved in a serious accident than would a sober, middle-aged woman driving to church seven hours later.

The bottom line is that risk doesn't exist in a vacuum and that there are a host of factors that come into play, including the rewards of risk, whether they are financial, physical or emotional. It is this very human context in which risk exists that is key, says Adams, who titled one of his recent blogs: "What kills you matters — not numbers." Our reactions to risk very much depend on the degree to which it is voluntary (scuba diving), unavoidable (public transit) or imposed (air quality), the degree to which we feel we are in control (driving) or at the mercy of others (plane travel), and the degree to which the source of possible danger is benign (doctor's orders), indifferent (nature) or malign (murder and terrorism). We make dozens of risk calculations daily, but you can book odds that most of them are so automatic—or visceral—that we barely notice them.

Risk compensation

From Wikipedia, the free encyclopedia

In ethology, **risk compensation** is an effect whereby individual animals may tend to adjust their behaviour in response to perceived changes in risk. It is seen as self-evident that individuals will tend to behave in a more cautious manner if their perception of risk or danger increases. An other way of stating this is that individuals will behave less cautiously in situations where they feel "safer" or more protected.

There is evidence that such an effect is seen in humans, associated with the use of safety features such as car seat belts and bicycle helmets. The evidence is particularly compelling for the case of antilock braking systems. The existence of this balancing behaviour does not mean an intervention does not work: the effect could be less than, equal to or even more than the true efficacy of the intervention, depending on how well the perceived efficacy matches actual efficacy - and this will differ from individual to individual. It is likely to be least when an intervention is imperceptible and greatest when an intervention is intrusive or conspicuous.

The theory grew largely out of investigations of road safety interventions. It was noted that most interventions had failed to achieve the forecast savings in lives and injuries. Theorists speculated that while the studies demonstrated that the probability of injury given a crash had reduced, the fact that the overall probability of injury was unchanged indicated that there must have been some change in the probability of crashing.

This controversial view was at first strongly resisted but detailed investigation, particularly of the case of compulsory seat belts, caused the theory to become more widely accepted, although it is still resisted by many who support an interventionist approach.

The logical conclusion of this theory has been reached with the shared space initiatives piloted first in Denmark and the Netherlands, and now being copied eleswhere in Europe and North America. Significant safety benefits have been claimed from the complete removal of street furniture and signage from urban environments, requiring all users to take more care.

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Seat Belts

In 1981 John Adams published a paper, *The efficacy of seatbelt legislation: A comparative study of road accident fatality statistics from 18 countries, Dept of Geography University College, London 1981* - published in 1982 by the Society of Automotive Engineers [1] (http://www.geog.ucl.ac.uk/~jadams/PDFs/SAE%20seatbelts.pdf) . This showed that in the countries studied, which included states with and without seat belt laws, there was no correlation between the passing of seat belt legislation and reductions in injuries or fatalities.

This paper was published at a time when Britain was considering a seat belt law, so the Department of Transport commissioned a report into the issue. In the event the report's author, Isles, agreed with Adams' conclusions. The Isles Report was never published officially but a copy was leaked to the Press some years later[1]. The law was duly passed and subsequent investigation showed, as predicted, no associated reduction in fatalities (although there was some reduction due to the simultaneous introduction of evidential breath testing)[2].

Other research has taken groups of drivers including those who did and did not habitually wear seat-belts and, under the guise of testing new types of belt material and measured the effect on driving style in the habitually unbelted. They were found to drive faster and less carefully when belted.

Anti-lock Brakes

There are at least three studies which show that drivers' response to antilock brakes is to drive faster, follow closer and brake later, accounting for the failure of ABS to result in any measurable improvement in road safety. The following references describe studies in Canada, Denmark and Germany.

Grant and Smiley, "Driver response to antilock brakes: a demonstration on behavioral adaptation" from Proceedings, Canadian Multidisciplinary Road Safety Conference VIII, June 14-16, Saskatchewan 1993

Sagberg, Fosser, and Saetermo, "An investigation of behavioural adaptation to airbags and antilock brakes among taxi drivers" Accident Analysis and Prevention #29 pp 293-302 1997

Aschenbrenner and Biehl, "Improved safety through improved technical measures? empirical studies regarding risk compensation processes in relation to anti-lock braking systems." In Trimpop and Wilde, Challenges to Accident Prevention: The issue of risk compensation behaviour (Groningen, NL, Styx Publications, 1994)

Cycle Helmets

The editor of Injury Prevention, a dedicated promoter of cycle helmets, long disputed the idea of risk compensation in cycle helmets, particularly in children. He set out to settle the issue but his study, *Risk compensation in children's activities: A pilot study, D Mok, G Gore, B Hagel, E Mok, H Magdalinos, B Pless, Paediatrics & Child HealthMay/June 2004, Volume 9, Number 5: 327-330*, showed strong evidence that children do indeed exhibit balancing behaviour (see abstract (http://www.pulsus.com/Paeds/09_05/mok_ed.htm)).

Skydiving

Booth's rule #2, coined by skydiving pioneer Bill Booth, states that "The safer skydiving gear becomes, the

more chances skydivers will take, in order to keep the fatality rate constant." Even though skydiving equipment has made huge leaps forward in terms of reliability in the past two decades, and safety devices such as AADs have been introduced, the fatality rate has stayed roughly constant since the early 1980s. Fatality Graph (http://web.archive.org/web/20030211051448/http://www.skydivenet.com/fatalities/fatalities_history.html) . This can largely be attributed to an increase in the popularity of high performance canopies, which fly much faster than traditional parachutes. High speed maneuvers close to the ground have increased the number of landing fatalities in recent years (see graph (http://www.iit.edu/~kallend/skydive/fatalities.gif)), even though these jumpers have perfectly functioning parachutes over their heads.

Risk Homeostasis

An associated theory is known as risk homeostasis. This extends risk compensation theory somewhat, although in practice the two terms are often used interchangeably.

Wilde (http://ip.bmjjournals.com/cgi/content/full/4/2/89) illustrates this by reference to the Swedish experience when they changed from right- to left-hand drive in 1967. This was followed by a marked reduction in the traffic fatality rate, but the trend returned to its previous values after about 18 months. Drivers had responded to increased perceived danger by taking more care; as they became accustomed to the new regime, the additional care evaporated.

Risk compensation is now widely accepted, but risk homeostasis, which goes much further, has a much smaller following.

See also

- Risk homeostasis

Further reading

- Adams, John (1995). *Risk*. Routledge. ISBN 1-85728-068-7.
- Wilde, Gerald J.S. (1994). *Target Risk (http://psyc.queensu.ca/target/)* . PDE Publications. ISBN 0-9699124-0-4. Retrieved on 2006-04-26.

Categories: Articles with unsourced statements since February 2007 | All articles with unsourced statements | Articles which may contain original research | Ethology | Psychological theories | Psychological adjustment

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Risk and Freedom: the record of road safety regulation: by yours truly

February 22nd, 2007 by johnadams

Now on sale. I've discovered a box with 20 copies, which I am offering through Amazon.co.uk at the original 1985 price of £10.

I reproduce the sole Amazon review (*****) below.

Risk and Freedom is a book of historic significance. Published in 1985 and out of print for many years it continues to have a profound influence on road safety policy. It provides the first coherent application of the concept of "risk compensation" to the management of risk on the road. Risk compensation is a term coined by Canadian psychologist Gerald Wilde in the 1970s to describe the behavioural adjustments of people to perceived changes in safety or danger. In *Risk and Freedom* Adams applies the idea to a wide variety of road safety measures - seat belts, helmets, speed limits, alcohol limits, highway improvements, crumple zones and other crash protection measures, improved brakes and tires, and accident blackspot treatments, to name the main ones.

The idea that risk compensation could explain the failure of such measures to achieve their promised benefits was, at the time, unanimously dismissed out of hand by highway engineers, vehicle designers, and regulators. Today it is widely accepted as mere common sense, and serves as the basis for the new, and increasingly popular, shared space schemes. The most obvious explanation for the success of these schemes is Adams' argument that road users are not obedient automatons, but alert and responsive participants in what Adams calls in his last book, *Risk*, "the dance of the risk thermostats". Also, unlike most books on this subject it is well-written and entertaining.

Posted in Uncategorized | No Comments »

Seat belt legislation and the Isles Report

January 4th, 2007 by johnadams

In most countries arguments about seat belt legislation are dead. But it remains a live issue in the United States where such laws are a matter for individual states. As a consequence there exists in the United States a variety of laws and levels of enforcement, and considerable debate about their effectiveness and moral legitimacy.

A recent article on the subject in Time Magazine ("The Hidden Danger of Seat Belts", 30 November 2006) cited research of mine done many years ago that concluded that seat belt laws had been ineffective in all jurisdictions that had implemented them. It provoked a number of hits on my blog and inquiring emails – hence this blog which attempts to answer some of them.

Why, if I was right, did so few people know that seat belt laws were ineffective? And why had so many legislators ignored this evidence?

Before Britain's seat belt law was passed there had been eight debates in Parliament about it over the previous ten years. The main debate that resulted in the passing of Britain's law was held on 28 July 1981. In this debate, a research report of mine, published earlier in the year, was much discussed, and much derided. It had a few eloquent libertarian supporters who liked its conclusions, but they were outnumbered by paternalistic health and safety enthusiasts who didn't. Most of the parliamentarians queuing up to praise me or denounce me appeared not to have read my report – only my conclusions, which they liked or disliked. All of those who praised me, and my denouncers, were already established opponents or supporters of a seat belt law – no minds were changed by my evidence.

However within the Department of Transport, the promoters of the seat belt bill, my study had raised concerns. The Department commissioned a critique of my report by J E Isles. His report examined evidence from eight European countries (a subset of the 18 examined in my report) that had passed seat belt laws. He concluded that a law making the wearing of seat belts compulsory "has not led to a detectable change in road death rates". For promoters of the bill this was an inconvenient truth. The Isles report was dated April 1981, more than three months before the parliamentary debate that led to the passage of the legislation. But it was suppressed. It was not published, and was not allowed to inform that debate. The Isles Report did not see the light of day until its existence was disclosed by New Scientist in an article published on 7 February 1985 – more than three years too late.

In the 1981 Parliamentary debate opponents of the law described my report variously as "bogus", "riddled with inaccuracies", "eccentric", "preposterous", "spurious", and "wrong". One supporter of the law (Austin Mitchell MP) described my report as "the only one that the hon. and learned Gentleman [Ivan Lawrence MP] can dredge up." The Secretary of State for Transport in his contribution to the debate described my risk compensation hypothesis as "dubious and not proven", but made no mention of his own department's study whose conclusions supported mine. And my principal champion (Ivan Lawrence) described my findings as "astonishing and unexpected". Such, at the time was the response to explanations of road accident statistics that invoked the risk compensation hypothesis.

A year later, too late for the parliamentary debate, I was invited to present my report to a meeting of the Society of Automotive Engineers in Detroit. It subsequently achieved peer-review status and was published as an SAE publication. To date, 25 years later, I am aware of no critique that has refuted its evidence, or conclusion – no country that has passed a seat belt law can demonstrate that it has saved lives. And "risk compensation" - is now widely accepted, and at the time of posting this blog registered 93,000 Google hits.

Since interest in the subject has revived, at least in the United States, and for historians of the role of statistical skulduggery in the formation of policy, I have scanned my scribbled-over copy of the Isles Report and put it on my website as a PDF file.

Posted in seat belts, risk compensation | 2 Comments »

Britain's seat belt law should be repealed

December 16th, 2006 by johnadams

The BBC's Today Programme is running a competition called Christmas Repeal in which listeners are invited to nominate an existing law that should be repealed.

I nominate Britain's seat belt law.

[*Update 23 December*. *Despite my high hopes and much encouragement, my Immodest Proposal did not succeed. It did not pass through the Today Programme's editorial filter. It did not make it on to the long list from which the programme's "panel of experts" was asked to choose a short list of six to be put to the vote of the listeners. It would appear that the myth of the efficacy of seat belt legislation is so deeply entrenched that it is not considered a fit subject for discussion in sensible company.***]**

First, despite what many people believe, it hasn't worked. There is no country in the world that has passed a seat belt law that can demonstrate that it has saved lives. The reason is "risk compensation"; people compensate for perceived changes in the risks they face. Trapeze artists with safety nets, rock climbers with ropes, cricketers with pads and helmets all take risks that they would not take without their safety equipment. Motorists with seat belts, the road accident statistics tell us, do likewise.

Second, it is unfair. In modifying their behaviour in response to their increased sense of security, belted motorists drive in a way that puts others at greater risk. The law redistributes the burden of risk from those already best protected, in cars, to those who are most vulnerable, on foot or bicycle. Following the introduction of the law in Britain, as in most other countries, the numbers of pedestrians and cyclists who were killed increased.

Third, it has set a dangerous, liberty-threatening precedent. In criminalizing self-risk it has established a principle that licenses the state to proscribe any thing or activity of which it might disapprove because it's not good for you – from rock-climbing, to drinking and smoking, to eating too many cream buns.

It's a bad law. It hasn't worked. It's unfair. It's based on a dangerous principle. It should be repealed.

.....

Evidence

An article supporting this nomination (pdf) has been accepted for publication by *Significance*, a journal of the Royal Statistical Society – to be published in March 2007.

At the time most belt laws were passed the concept of risk compensation was either unknown or simply dismissed. The fashion at the time was to seek engineering solutions to road safety problems. The phenomenon is now widely accepted – except, by some, in the case of seat belt laws.

Below are links presenting evidence in support of the repeal of Britain's seat belt law:
The Hidden Danger of Seat Belts, Time Magazine, 30 November 2006.
The Efficacy of Seat Belt Legislation (pdf) Society of Automotive Engineers, 1982.
The Failure of Seat Belt Legislation (pdf).

Still sceptical judges and listeners are invited to visit www.John-Adams.co.uk, or to Google "seat belts" + "John Adams" for numerous other contributions to the debate

Posted in risk, seat belts, risk compensation | 2 Comments »

New Hampshire

Toll Of Motor Vehicle Crashes,2003

Click here for Accessible Link

Change Year 2000 2001 2002 2003 2004

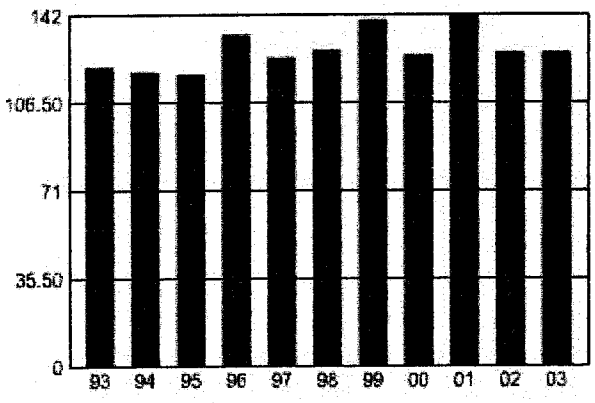
Contents Next Printer Friendly

2003	New Hampshire	US	Best State
Fatalities	127	42,884	
Fatality Rate per 100M VMT	0.96	1.48	0.83
Fatality Rate per 100K Population	9.85	14.75	7.20

2000 Economic Cost of Motor Vehicle Traffic Crashes	
New Hampshire	$ 1.014 Billion
US Total	$ 230.568 Billion

TOTAL TRAFFIC FATALITIES

1993 - 2003



	Fatalities in Alcohol-Related Crashes, 2003			Passenger Vehicle Occupant Restraint Use Rates, 2003	
	Percentage ≥ 0.01 BAC	Percentage ≥ 0.08 BAC	Rate per 100 million VMT	Fatally Injured Occupants (Known Use Only)	Observed Use
New Hampshire	40%	33%	0.39	29.2%	50%
US Total	40%	34%	0.59	43.6%	79%
Best State	15%	13%	0.20	63.2%	95%

Available NHTSA Financial Resources

Highway Safety Program Funds		
	FY 2003	FY 2004
Section 402 Formula	$776,938	$759,986
Section 154 Open Container Transfer	$0	$0
Section 164 Repeat Offender Transfer	$0	$0
Section 157 Safety Belt Use Incentive	$0	$0
Section 2003b Child Occupant Protection Education	$37,709	Not Avail.
Section 157 Safety Belt Use Innovative	$277,610	$0
Section 411 Data	Not Avail.	Not Avail.
Section 163 .08 Blood Alcohol Concentration (BAC)	$495,132	$419,115
Section 405 Occupant Protection	$0	$0
Section 410 Impaired Driving	$197,478	$197,478
Section 163 SES Enforcement	Not Avail.	$0
SAFETY TOTAL	$1,784,867	$1,376,579

DRUNK DRIVING — Status of Key Legislative Issues			
Administrative license revocation	Yes	Zero Tolerance for drivers under age 21	0.02 BAC
0.08 BA per se law	Yes	Graduated licensing	Yes
Qualifies for Section 410 Incentive Grant Program			Yes

SPEED	Number of Fatalities Involved in Speed Related Crashes, 2003	Percent of Fatal Crashes That Are Speed Related, 2003	Estimated Cost of All Speed Related Crashes, 2000
New Hampshire	31	23%	$172 Million
US Total	13,499	31%	$40,390 Million
Best State		11%	$44 Million

RESTRAINT	Passenger Vehicle Occupant Deaths (age 5+)	Current	Additional

USE (Safety Belts & Child Seats)	Total	Restrained	Unrestrained	Unknown	Lives Saved by Safety Belts	Savable at 100%
New Hampshire	91	26	63	2	30	33
(No Adult Law; Primary) All seats for occupants of motor vehicles age 4 to 17 - $25 Fine						

CHILD RESTRAINTS (Includes Child Seats & Belts)	Passenger Vehicle Occupant Deaths (age <5)				Current Lives Saved	Additional Savable at 100%
	Total	Restrained	Unrestrained	Unknown		
New Hampshire	0	0	0	0	Not Avail.	Not Avail.
Restraint required < 4 years old - $25 Fine						

MOTORCYCLES	Motorcycle Rider Deaths				Current Lives Saved by Helmets	Additional Savable at 100%
	Total	Helmeted	Unhelmeted	Unknown		
New Hampshire	9	5	4	0	3	1
09/03/67 Repealed effective 8-7-77 except for persons under 18 years of age.						

Fatalities Relating to Roadway, Pedestrian and Large Trucks by State and US					
State	Roadway Departure Fatalities*	Intersection Fatalities*	Pedestrian Fatalities	Fatalities in Crashes Involving Large Trucks	Total Fatalities
New Hampshire	84	15	19	13	127
Percent of Total Killed	66.1%	11.8%	15.0%	10.2%	
US Total	25,562	9,362	4,774	5,036	42,884
Percent of US Total Killed	59.6%	21.8%	11.1%	11.7%	
*Fatalities based on FHWA Definition					

	Occupants by Vehicle Type				Motorcycle Riders	Nonmotorists	
	Passenger Cars	Light Trucks	*Other/ Unknown	Total Occupants		**Total Nonmotorists	
New Hampshire	55	36	5	96	9	22	127
Percent of Total Killed	43.3%	28.3%	3.9%	75.6%	7.1%	17.3%	
US Total	19,725	12,546	1,356	33,627	3,714	5,543	42,884
Percent of US Total Killed	46.0%	29.3%	3.3%	78.4%	8.7%	12.9%	

*Other/Unkown include Occupants of Large Trucks, Buses and Other Unkown Vehicle Types
** Total Non Motorists include Pedestrians, Pedalcyclists and Other Non Motorists

Alcohol Related Fatalities by County

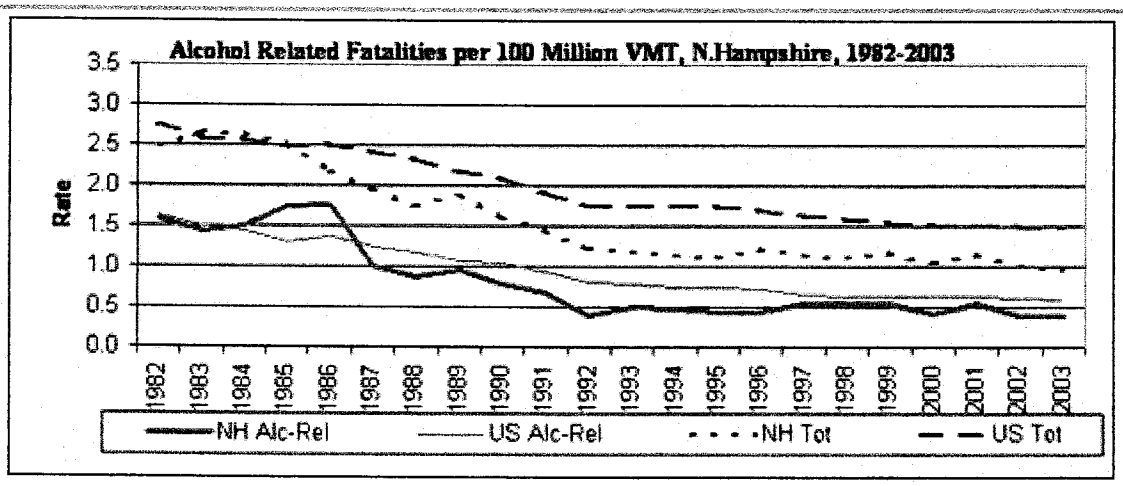
Source: National Center for Statistics and Analysis, 2003 FARS Annual Report File

NEW HAMSHIRE Fatalities and Fatality Rate per 100	Change in Alcohol Related Rates over time,

Million VMT					
Year	Fatalities			Fatality Rate	
	Tot	Alc-Rel	%	Tot	Alc-Rel
1982	173	111	64	2.48	1.59
1983	191	103	54	2.66	1.43
1984	192	109	57	2.63	1.49
1985	191	132	69	2.53	1.75
1986	172	139	81	2.17	1.76
1987	179	93	52	1.95	1.01
1988	166	84	51	1.73	0.88
1989	187	93	50	1.9	0.95
1990	158	77	48	1.61	0.78
1991	144	67	46	1.45	0.67
1992	122	40	32	1.21	0.4
1993	121	52	43	1.17	0.5
1994	119	50	42	1.13	0.48
1995	118	47	39	1.11	0.44
1996	134	47	35	1.22	0.43
1997	125	60	48	1.12	0.54
1998	128	63	49	1.11	0.54
1999	140	66	47	1.18	0.55
2000	126	49	39	1.05	0.41
2001	142	67	47	1.15	0.54
2002	127	50	39	1.01	0.40
2003	127	52	41	0.96	0.39

Source: 1982-2002 (Final) FARS Files and 2003 FARS Annual Report File, FHWA's Highway Statistics Annual Series

NEW HAMSHIRE vs. US		
Time Period	NEW HAMSHIRE	US
1982 to 2003	-75%	-64%
Last 10 years	-22%	-24%
Last 5 years	-28%	-6%
Last 3 Years	-5%	-6%
Last 1 Year	--3%	-3%



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