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APPENDIX C3A LOWERING STATE LEGAL BLOOD ALCOHOL LIMITS TO 0.08%: THE EFFECT ON FATAL MOTOR VEHICLE CRASHES

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ABSTRACT

The first five states that lowered legal blood alcohol limits to .08% to reduce alcohol-related fatal traffic crashes were paired with five nearby states that retained a .10% legal standard. Within each pair the maximum equal available number of pre- and post-law years were compared. States adopting .08% laws experienced 16% and 18% relative post law declines in the proportions of fatal crashes

involving fatally injured drivers with blood alcohol levels at .08% or higher, and .15% or higher. If all states adopted .08% legal blood alcohol limits at least 500-600 fewer fatal crashes could occur annually.

INTRODUCTION

In 1994 16,589 people died and nearly 297,000 persons were injured in alcohol-related traffic crashes.¹ Driver impairments begin at blood alcohol levels well below the .10% legal standard in most states. Experimental laboratory studies have shown that at .08%, a level reached by a 150-pound person consuming four drinks an hour on an empty stomach, there is reduced peripheral vision, poorer recovery from glare, poor performance on complex visual tracking, and reduced divided attention performance.² Driver simulation and road course studies have revealed poor parking performance, impaired driver performance at slow speeds and steering inaccuracies.³ Roadside observational studies have identified speeding and breaking performance deterioration.⁴ A national comparison of drivers in single vehicle fatal crashes with drivers not in fatal crashes stopped at roadside surveys indicate that each .02% increase in blood alcohol level nearly doubles the risk of fatal crash involvement. In all age and sex groupings the fatal crash risk at a blood alcohol level of .05%-.09% was at least 9 times greater than at zero blood alcohol.⁵

To reduce alcohol related fatal traffic crashes 14 states have lowered the legal blood alcohol limit from .10% to .08%. Johnson and Walz⁶ monitored six different measures of driver involvement in alcohol related fatal crashes in the first five states to adopt .08% laws. Nine of the thirty pre- to post-law comparisons identified statistically significant decreases. However, comparison areas were not included to assess whether the post law declines were independent of general regional trends.

This study assessed whether relative to nearby states, states adopting a .08% legal limit experienced a reduction in the proportion of fatal crashes involving

- Fatally injured drivers with blood alcohol levels above .08% or higher and .15% or higher.
- Any driver with a blood alcohol level at .08% or higher and .15% or higher.

METHODS

Prior to 1992 five states lowered legal blood alcohol limits from .10% to .08%: Utah in August 1983, Oregon in November 1983, Maine in August 1988, California in January 1990 and Vermont in July 1991.

Each of those states was paired with a nearby state that retained a .10% legal limit. Within each pair the maximum equal number of available pre- and post-law years were compared. Utah was compared to Idaho from August 1976 to July 1991, Oregon with Washington from November

1976 to October 1991, Maine with Massachusetts from August 1984 to July 1993, California with Texas from January 1986 to December 1993, and Vermont with New Hampshire from July 1990 to June 1993.

We initially focused the analysis on fatally injured drivers with blood alcohol levels of .08%+ to minimize potential bias resulting from variation in testing policies. In study states, during the analysis period blood alcohol test results were available from the U.S. Fatal Accident Reporting System on 81% of fatally injured drivers. Because not all drivers in fatal crashes are fatally injured, we also examined the proportion of crashes with any driver with blood alcohol levels of .08%+. We included analyses of the proportion of crashes with drivers and fatally injured drivers with blood alcohol of .15%+ to examine whether .08% laws reduce crashes involving severely intoxicated drivers.

We examined the proportion of fatal crashes involving drivers and fatally injured drivers at .08%+ or .15%+ instead of the absolute number of crashes with drivers with these alcohol levels to control for the long-term downward trend in total fatal crashes from 1980 to 1993⁷ and changes in exogenous variables that might influence the total number of fatal crashes, such as the economy, safety characteristics of vehicles and highways, and the price of fuel.

Within each state, we describe the change in the level of alcohol involvement in fatal crashes from before to after the implementation of a .08% law through the ratio (relative risk) of the post-law to the pre-law proportion of crashes with drivers with high blood alcohol levels. A relative risk less than 1.0 indicates a reduction in the level of alcohol involvement. This relative risk is related to the percent change in the proportion of crashes with drivers with high blood alcohol level: $\% \text{ change} = 100\% \times (p_{\text{post}} - p_{\text{pre}}) / p_{\text{pre}} = \text{RR} - 1$ and we describe changes through this percent change.

Within each state pair, we calculated the relative change and the 95% confidence interval in the proportion of alcohol involved crashes in the law state relative to the control state as the ratio of the two relative risks. Subtracting one from this ratio gives the percent change in the proportion of alcohol involved crashes in the law state relative to the control state.

We used meta-analytic methods⁸ to calculate an overall relative change due to .08% laws across our set of five state pairs. States implemented their .08% laws in different years, and under different circumstances. We conducted a test of the heterogeneity of effects across the five state pairs to test the significance of state to state variation in effects. Regardless of the observed variation in effects, we treated the relative change in the proportion of crashes involving drivers with high alcohol level as a random effect in our meta-analysis. We calculated a pooled estimate and standard error for the natural log of the ratio of relative risks from each state pair. This estimate and its 95% confidence

interval are transformed back to the scale of the ratio of relative risks for presentation, and subtracting one from this ratio gives an estimate for the overall percent change in the proportion of alcohol involved crashes in law states relative to control states.

RESULTS

Four of the five .08% law states showed a reduction relative to their control state in the proportion of crashes with a fatally injured driver with blood alcohol at .08% or greater (Table 1). The 95% confidence intervals for these relative reductions remained below 1.0 for three of the five law states. The variation across the five law states in these relative reductions was not significant ($p = .168$). The pooled estimate of the law effect suggests that overall, the .08% law states experienced a 16% post-law reduction in the proportion of fatal crashes with a fatally injured driver with blood alcohol at .08% or greater (with 95% confidence limits from a 22% reduction to a 10% reduction). Overall the .08% law states also experienced an 18% post-law reduction in the proportion of fatal crashes with a fatally injured driver at .15% or greater (95% C.I. = 23%, 13%). (Table 2). Similar results were observed for the proportion of fatal crashes with any driver at .08% or greater (a 13% reduction) or at .15% or greater (a 19% reduction, data available on request).

DISCUSSION OF RESULTS

Several methodologic issues should be considered in interpreting the results of this study. First, blood tests were obtained from 88% of fatally injured drivers in the .08% law states and 74% in comparison states and these proportions did not change from pre to post law years. This high consistent rate of testing favors the validity of results measuring fatally injured drivers. Blood tests were completed on half of all drivers in fatal crashes in study states during the analysis.

Second, unlike previous studies this analysis included comparison states to control for regional fatal crash trends.

Third, .08% law states may have been more concerned about alcohol impaired driving and responsive to legislative initiatives to reduce the problem. They were more likely to have other stringent laws demonstrated to reduce alcohol-related fatal crashes. All .08% law states had criminal per se laws in effect prior to the study, while only two comparison states did, Texas and Vermont. The comparison states of Idaho and Washington introduced criminal per se laws during the study. It is likely that the .08% law effects were independent of criminal per se laws. Post .08% law alcohol involved fatal crash reductions were seen both in pairs of states where both .08% law states and comparison states had criminal per se legislation throughout the study and those where comparison states adopted the law during the study period.

TABLE 1 Proportion of Fatal Crashes with a Fatally Injured Driver with Blood Alcohol of 0.08% or More Before and After Passage of .08% Legal Blood Alcohol Limits

	Proportion Prior to .08% Law (n's)	Proportion After .08% Law (n's)	% Change in Proportion (RR)	Ratio of RR's (95% CI)
OR (.08%)	0.29 (1275/4455)	0.24 (1023/4186)	-15% (0.85)	0.82 (0.75, 0.89)
WA	0.28 (1735/6184)	0.29 (1582/5390)	+5% (1.05)	
UT (.08%)	0.14 (319/2252)	0.16 (329/2085)	+11% (1.11)	0.78 (0.64, 0.95)
ID	0.15 (310/2057)	0.22 (382/1773)	+43% (1.43)	
ME (.08%)	0.26 (262/1024)	0.22 (207/942)	-14% (0.86)	0.93 (0.77, 1.12)
MA	0.22 (726/3241)	0.21 (562/2703)	-7% (0.93)	
CA (.08%)	0.22 (4275/19370)	0.19 (3174/16278)	-12% (0.88)	0.82 (0.77, 0.88)
TX	0.20 (2364/11924)	0.21 (2340/10961)	+8% (1.08)	
VT (.08%)	0.25 (47/186)	0.25 (46/181)	+1% (1.01)	1.45 (0.87, 2.44)
NH	0.22 (62/280)	0.15 (34/222)	-31% (0.69)	
Overall Law Effect				0.84 (0.78, 0.90)

TABLE 2 Proportion of Fatal Crashes with a Fatally Injured Driver with Blood Alcohol of 0.15% or More Before and After Passage of .08% Legal Blood Alcohol Limits

	Proportion Prior to .08% Law (n's)	Proportion After .08% Law (n's)	% Change in Proportion (RR)	Ratio of RR's (95% CI)
OR (.08%)	0.22 (992/4455)	0.18 (769/4186)	-17% (0.83)	0.79 (0.70, 0.88)
WA	0.20 (1266/6184)	0.21 (1158/5390)	+5% (1.05)	
UT (.08%)	0.10 (220/2252)	0.12 (245/2085)	+20% (1.20)	0.91 (0.72, 1.15)
ID	0.11 (232/2057)	0.15 (265/1773)	+33% (1.33)	
ME (.08%)	0.19 (198/1024)	0.15 (143/942)	-21% (0.79)	0.77 (0.61, 0.97)
MA	0.15 (493/3241)	0.15 (418/2703)	+2% (1.02)	
CA (.08%)	0.16 (3009/19370)	0.14 (2291/16278)	-9% (0.91)	0.82 (0.76, 0.89)
TX	0.15 (1780/11924)	0.16 (1804/10961)	+10% (1.10)	
VT (.08%)	0.19 (36/186)	0.19 (34/181)	-3% (0.97)	1.23 (0.68, 2.23)
NH	0.17 (48/280)	0.14 (30/222)	-21% (0.79)	
Overall Law Effect				0.82 (0.77, 0.87)

All five .08% law states also had administrative licence revocation laws during the study, three implemented within one year of their .08% law. Administration licence revocation laws have been associated with 5% declines in fatal crashes⁹. Among the control states only New Hampshire had this law during the study period. This restricted our ability to separate the effects of .08% legislation from administrative licence revocation laws. Maine was the only .08% law state to implement an administrative licence revocation law prior to the study period and hence the only state where post .08% law alcohol involved fatal crash reductions could be clearly separated from the effects of administrative licence revocation laws passed during the study period.

Finally, this analysis focused only on fatal crashes. Studies of other traffic laws indicate that the magnitude of their impact can be influenced by accompanying educational and enforcement efforts.^{10,11,12} Studies of .08% laws are needed that not only assess their impact on fatal crashes but that also measure how effectively the laws are implemented.

On balance, the results of this study suggest .08% laws, particularly in combination with administrative licence revocation, reduce the proportion of fatal crashes involving drivers and fatally injured drivers at blood alcohol levels of .08% and higher and .15% and greater. This legislation warrants consideration in other states.

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APPENDIX C3B

DISCUSSION COMMENTS

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The topic of the presentation is environmental strategies, yet, our approaches to the "topic of combating impaired driving in an era of diminished resources and shifting priorities" are still following the same "dominant paradigm" of the past 20 years. Unless we make a paradigm shift, we will not combat the problem; we will be left in the dust.

There are four areas we should be exploring in order to make our paradigm shift. Economic, environmental, public health and business literature all have something to offer us in understanding how to make our paradigm shift.

First, the literature in the business sector has been very clear in the last 10 years as to what corporate visions doom companies to obsolescence and self-destruction and what visions allow for expansion. Examples abound on how corporations who defined themselves narrowly extinguished themselves and how corporations who diversified and saw themselves more broadly survived and thrived. As long as we see impaired driving only within the context of drinking-driving legislation, enforcement adjudication and sanctioning or as alcohol control policies, we will be doomed to failure in maintaining it as a priority. Yet, there are many, many entry points in other areas to bring these issues forward. For example, in terms of international relations and free-trade agreements, the clauses of GATT, NAFTA and the like contain the following principles, and I am not kidding about this, I challenge you to read these international trade agreements yourself. First, the overriding principle is to maximize corporate profits and the principle of maximum profits overrides all other national legislation. For example, with regard to NAFTA:

1. It has no minimum labor standards, nothing like a minimum wage requirement, occupational health and safety regulations.
2. It recognizes no labor rights: no rights regarding organizing, collective bargaining, child labor, forced labor, racial or sexual harassment prohibitions.
3. Neither labor unions nor individual workers have any standing in NAFTA's dispute settlement procedures.
4. There are no mechanisms for labor complaints, no rules of procedure or regulatory codes to be enforced.
5. Because the prescribed risk assessment procedure includes balancing economic benefits and costs against those of health and safety, worker safety may be traded off against high profits.
6. The only recognized unfair trade practices in NAFTA are those that destroy expected or real corporate profits, not those that destroy people's lives, the quality of peoples lives or even whole communities.
7. Finally, and most importantly, in the event of unequal regulations, for example, safety standards for motor vehicles, the agreement states that the regulations must "harmonize" down to the lowest level.