

# Comment on “Low BAC Policies: Results and Mechanisms”

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## INTRODUCTION

The questions we are being asked to address are as follows: What have been the results of lowering BAC limits for the general driving public? For specific populations? What are the likely mechanisms by which these results have been achieved?

One of the advantages about being a discussant is that it provides the opportunity not only to put one’s own perspective on the data, but also to be somewhat more speculative. I will try to avoid the temptation to stray too far from the science in so doing.

In his paper Voas discusses the effectiveness in reducing alcohol-related crashes (to the extent that it is known) of various laws in the United States that have lowered BAC thresholds for some or all of the population. Included was the move from 0.15 to 0.10 percent in the United States (see Voas for a discussion of this issue), Minimum Purchase Age Laws, an 0.04 threshold for commercial drivers, zero tolerance laws for young drivers, and the reduction from 0.10 to 0.08 percent in some states. The Voas paper does not address the effectiveness of reductions in the BAC threshold in other countries such as Canada, Sweden, and Australia. Nor does he draw from the experiences of our neighbor to the north who have not followed the same path when it comes to underage drinking. I will take a moment to discuss what is known from these experiences because I think these changes, and the overall pattern of drinking and driving and alcohol-related crashes in other countries can provide some insights about the mechanisms by which any reductions seen in alcohol-related crashes might be occurring. Although policy is not the purview of this paper, these changes also have important implications for where we go in the future.

## YOUNG DRIVERS

I would like to examine the issues related to drinking and driving among young drivers in more depth because it is clear we have been doing a better job of reducing alcohol-related fatalities among this group than among other age groups. Given the inevitable aging of the population, it is perplexing that when these same youth reach 21 some of the gains we have made begin to wane.

There is very strong evidence that Minimum Legal Drinking Age Laws (MLDAs) in the United States have been effective in reducing alcohol-related crashes. A number of different studies have consistently estimated about a 10-20 percent reduction in crashes/fatal crashes as the result of the passage of these laws (GAO, 1987; Williams et al, 1983; Wagenaar, 1993; Voas et al, 2000). Zero tolerance laws also have been effective in reducing alcohol-related fatal crashes in underage drivers. A number of studies have estimated about a 10-25 percent reduction in such crashes (Hingson et al, 1986; Hingson et al., 1991, Hingson et al., 1994; Blomberg, 1992).

The question is, what are the mechanisms by which these reductions have occurred? Survey data indicate that Minimum purchase age laws have affected youth drinking as well as drinking and driving as measured by fatal crash rates (O'Malley and Wagenaar, 1991). However, as Hedlund et al (2001) point out, among high school seniors decreases in self-reported drinking throughout the 1980s were not entirely due to these laws because reductions also occurred in states that already had age 21 laws in place during the same period. Survey data from the Monitoring the Future Study and other studies of college students and young adults (see Hedlund et al, 2001 for a summary), suggest that the decrease in drinking among high school seniors has also occurred into the early 20s. There is also clear evidence of an even larger reduction in reports of drinking and driving among high school and college students. There is still substantial drinking that occurs in underage youth, but according to Hedlund et al. there is evidence young people under the age of 21 are separating their drinking from their drinking and driving more than those 21 and older. During 1982-1998 the magnitude of the reductions in reported drinking and driving and fatal crashes involving youth were similar, whereas measures of reported drinking during the same period did not decline as much.

This viewpoint is mirrored in a recent study by Wagenaar et al (2001) who looked at the effects of zero tolerance laws on drinking and drinking and driving among high school seniors using data from the Monitoring the Future study. According to Wagenaar, the lower BAC thresholds did not appear to affect the overall amount of drinking among underage youth but they did find about a 20 percent reduction in drinking and driving before and after passage of zero tolerance laws in the United States.

Why did these changes come about? This is a more difficult question to answer because neither MLDA laws nor zero tolerance laws are widely enforced (Ferguson et al, 2000; Wolfson et al, 1995). Neither is knowledge of zero tolerance laws widespread according to surveys conducted in selected states (Ferguson et al, 2001; Hingson et al., 1991; Voas et al., 1998). Underage youth still have fairly ready access to alcohol and for a variety of reasons very few young drivers are cited for zero tolerance violations. Enforcing zero tolerance laws is difficult in practice. Drivers with low BACs will not exhibit the same kinds of driving cues that intoxicated drivers do and police officers have not changed impaired driver enforcement practices to target this population. Drivers with low BACs therefore may only come to the attention of police officers if they commit some other infraction. Furthermore, the laws in some states make it very difficult to enforce in practice (Ferguson et al, 2000). Another puzzling factor is that, in Canada where 18 and 19 year-olds are permitted to purchase alcohol, there has been a similar downward trend in alcohol-related fatal crashes involving teenage drivers (Hedlund et al, 2001). Surveys in Ontario also show large reductions in self-reports of drinking and drinking and driving (Smart et al., 1994). Furthermore, zero tolerance laws were not typically enacted until 1994-1999, after the reduction in alcohol-related crashes had occurred. All of this suggests that laws and their enforcement alone were not responsible for the reductions in the United States. Hedlund et al. (2001) point to educational and motivational programs in place during the last 20 years as a possible, but unconfirmed source of these changes. Somehow we have managed to convince a substantial proportion of teenagers to separate their drinking from their driving.

So what happens when drivers turn 21? According to data presented by Voas, the proportion of drinking to non-drinking drivers in fatal crashes is much higher than that of underage drivers. Furthermore, the reductions in alcohol-related fatal crashes and those involving illegal levels of alcohol have not declined by as much in this age group (IIHS, 2000). Results of

observational surveys also confirm higher proportions of drinking drivers in this age group. Foss, based on a number of different surveys across the United States and Canada, finds far higher percentages of 21-34 year-olds are driving with low BACs compared with underage drivers. Data from the 1996 National Breath Survey indicates the proportion of drivers with BACs of 0.05 and 0.10 percent and above was much higher among drivers 21-34 than among younger drivers (Voas et al., 1997).

Once young people turn 21 there is a realization that they are now able to drink some amount of alcohol and still legally drive. When you ask most people how many drinks it takes to be over the legal limit they are likely to say 2 or 3 (Ferguson et al., 2000; Jones and Boyle, 1996), but when asked how many drinks it would take to affect driving or make them an unsafe driver this number is often larger – closer to 4 or 5 (Caetano et al., 2000; Ferguson et al., 2000). Clearly from crash and survey data many more in this age group are drinking in excess of the legal threshold compared with drivers of other ages. There is also evidence that drinking drivers have no real perception of what their own BACs might be. Among drivers interviewed at the roadside in Canada, 83 percent of drivers with BACs of between 0.08 and 0.15, thought they were not over the limit (Mayhew, 1995). For those in excess of a 0.15 percent BAC the percentage was around 60.

Why this disconnection? Beirness (1984, 1987) has argued that drinkers are extremely poor at estimating their BACs and/or the extent of their impairment. Errors such as these can lead people to make inappropriate decisions about whether they are safe to drive. Once young people reach the age of 21 if they begin to drive on occasion after drinking too much they will quickly discover that can do so without fear of a DWI conviction. Do they assume that this is because they are safe to drive or do they do it in full knowledge that they are disobeying the law? I would argue that it is some of both. That most people have no idea what their BAC is after drinking so they make a judgment based on how they feel. Survey data, if it can be believed, would suggest that most people who drive with illegal amounts of alcohol in their blood are reaching the conclusion that they are not impaired. Furthermore, there is likely a poor understanding of the metabolic effects of alcohol. How many people realize that once you have reached a high BAC it is a very slow process to eliminate alcohol from the body? Someone who has reached a BAC of 0.15 could take as long as 3-7 hours to be below the legal threshold of 0.08 (assuming a rate of 0.01-0.02 percent an hour elimination). Furthermore, there is evidence that once someone has reached a peak BAC and is in the elimination phase (the descending limb) they are even more likely to underestimate their BAC (Martin et al., 1991).

## **THE EFFECT OF LOW BAC POLICIES**

There has been a prolonged debate in the U.S. about the effects of a reduction in the BAC threshold from 0.10 to 0.08. Several recent studies that have reviewed the literature have also reached mixed conclusions. A study undertaken by the Centers for Disease Control concluded that on average crash deaths dropped about 7 percent after 0.08 laws were adopted (Shults et al., 2001). Mann et al. (2001) came to a slightly different conclusion, that although findings were generally positive it was too soon to tell definitively. Studies undertaken in other countries that have reduced their thresholds from 0.08 to 0.05 percent and 0.05 to 0.02 percent (Sweden, Australia) have reported similar reductions (e.g., Henstridge et al., 1997; McLean and Kloeden, 1992; Ross and Klette, 1995). Although there is still some question about the methodological rigor of some of these studies, it seems reasonable to claim that reductions in the legal threshold

could have a small effect on drinking and driving (see also Mann et al., 2001). These changes in the law typically have not been accompanied by heavy enforcement. Programs in the United States and Australia show that much bigger gains can be made when such changes are accompanied by a convincing show of enforcement. Random breath testing in Australia and widespread and frequent checkpoint programs in the U.S. can show reductions in alcohol-related crashes of from 20–48 percent (Henstridge et al., 1997; Lacey et al., 1999).

It is by now axiomatic that enforcement accompanied by publicity is the most effective means to reduce drinking and driving and alcohol-related crashes. No matter what the BAC threshold, people need to be convinced that there will be swift and sure penalties if they exceed it. As Ross took pains to point out, people will continue to drink and in many cases driving is a perceived necessity to get home particularly in countries where drinking establishments are not in close proximity to home. Presumably most people who go out to drink do not start out with the assumption that they will be getting too intoxicated to drive home so there comes a point in the evening when they have to make a decision about whether to get in their car. Subjective impressions of impairment as well as likelihood of arrest if you make the wrong decision both play a role in the ultimate outcome. It is tempting to suggest that we need to do a better job of getting the public well educated about the relationship between drinking and BAC, that is in their appreciation of the link between subjective perceptions of intoxication and actual BAC. There is a danger however in education. If many people currently believe they are over the limit after 2 or 3 drinks, educating them that they actually could drink more may be counterproductive. Furthermore this would change nothing if those who drink and drive routinely do not fear they will be apprehended for DWI if they are over the limit. In other words, we need to give them an incentive to care. The perceived threat of a DWI is the way to engender the concern regardless of the BAC threshold in place.

One final point. The lower the BAC threshold, the greater difficulty there will be in enforcing it. As Foss points out the likelihood of detection of a high BAC, even once a driver is stopped is very low. Furthermore, in the United States as Bob Voas points out, despite per se laws in almost every state, the gold standard for arrest and conviction of DWI is a combination of behavioral and chemical testing. A lower threshold than 0.08 percent would be a real challenge for the enforcement paradigm in use today. Australia has the perfect solution, random breath testing, but this is not going to work in the United States because it would not be acceptable under the Constitution. Wide use of passive sensors could help to detect drinking drivers in the first place, but it will be much tougher to achieve an enforcement paradigm where the results of chemical testing will be sufficient evidence to support a conviction.

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