ALCOHOL-AGE CRASH ANALYSIS:

Projections of the Effect of Lowering the Legal Drinking Age in Alabama

David B. Brown

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INTRODUCTION

This analysis was performed at the request of Dr. Russ Fine, Director of the Injury Control Research Center at the University of Alabama in Birmingham. He requested it for the purpose of providing an estimate of the effect that a lowering of the legal alcohol drinking age in Alabama from its current level of 21 to the projected age of 18. As background, it is important to note that those who were around before the drinking age was raised from 18 to 21 in Alabama, including this author, can recall when age 18 was quite over-represented in alcohol-related crashes. With the change in the law, the most over-represented age became age 21, and it has remained at that age to this day.

The basic theory behind the following analysis is that a reduction in the drinking age will result in an age distribution of DUI crashes that once again returns the major over-representation to age 18. This premise is not really subject to debate. The lethal combination of inexperienced drinking with inexperienced driving has been so well established that the analysis given below may well err on the side of a conservative estimate of increased injuries and fatalities. This is because the “inexperience factor” would certainly apply to the 18 year old much more than it applies to a 21 year old. Thus, applying the odds ratios based on the 21 year olds’ over-representation is, if anything, quite conservative.

The approach given below assumes that the over-representations (as measured by the odds ratios) that currently apply to ages 19 through 23 will shift to be centered on 18 as opposed to 21. So these odds ratios will apply to 16 through 20 if the permissible alcohol age is reduced to 18.

FATALITY ANALYSIS

The four year period of 2004 thru 2007 was also used for the fatality analysis. The results output from CARE are for fatal alcohol crashes, not number of fatalities. However, the number of fatalities is easily calculated below since over the four year period there were 1.127 fatalities per alcohol fatal crash.

The figure and table in Display 1 below demonstrates the over-representations for the ages of 19, 20 and 21, which continue for the ages through 30. Note that the red bars are alcohol-involved fatal crashes, while the blue bars are non-alcohol-involved fatal crashes. The Over Rep column is commonly called the Odds Ratio – it is the ratio for each age of the probability of the causal driver being in that particular age first for alcohol related fatal crashes (red) and then for the non-alcohol fatal crashes. The percentages given in the table would be the probability of someone coming up on a crash and finding that someone of that age caused the crash.

Display 1. CARE IMPACT Comparison of Alcohol and Non-Alcohol Fatal Crashes
Calendar Years 2004-2007

CARE 8.2.37.0 - [IMPACT Results - 2004-2007 Alabama Crash-Road Data - Alcohol Related And Fatal Crashes vs. Alcohol Related NOT And Fatal Crashes]

File Filters Analysis Locations Search Continuous Impact Tools Help

Default Data Source: 2004-2007 Alabama Crash-Road Data | Default Filter: Alcohol Related And Fatal Crashes

Filter Logic - (PRI CONTRIB CIRC = DUI OR OFCR OPINION SOBRIETY DR C = ALCOHOL ONLY OR OFCR OPINION SOBRIETY DR C = DRUGS ONLY OR OFCR OPINION SOBRIETY

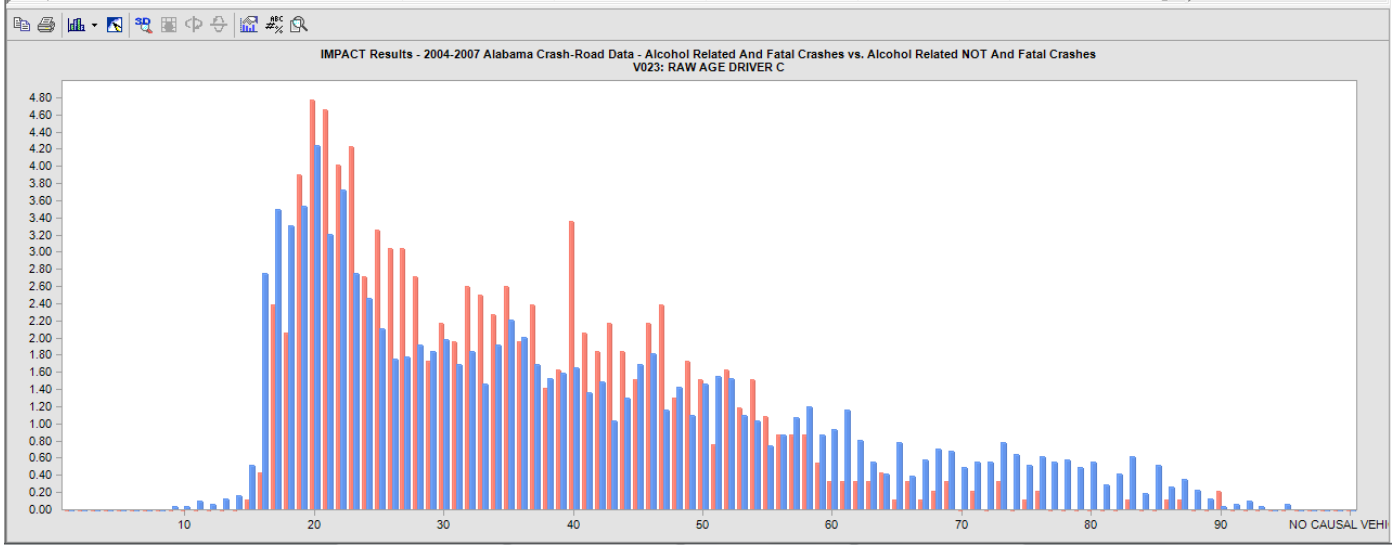
Order By: Natural Order / Descending | Suppress Zero-Valued Rows | Over Representation | Max Gain | Threshold: 2.0

V023: RAW AGE DRIVER C

Value	Subset Freq	Subset Per	Other Freq	Other Per	Over Rep	Max Gain
16	4	0.434	85	2.756	0.157	-21.412
17	22	2.386	108	3.502	0.681	-10.288
18	19	2.061	102	3.307	0.623	-11.494
19	36	3.905	109	3.534	1.105	3.413
20	44	4.772	131	4.248	1.123	4.836
21	43	4.664	99	3.210	1.453	13.403
22	37	4.013	115	3.729	1.076	2.619
23	39	4.230	85	2.756	1.535	13.588
24	25	2.711	76	2.464	1.100	2.279
25	30	3.254	65	2.108	1.544	10.567
26	28	3.037	54	1.751	1.734*	11.856
27	28	3.037	55	1.783	1.703*	11.557
28	25	2.711	59	1.913	1.417	7.361
29	16	1.735	57	1.848	0.939	-1.041
30	20	2.169	61	1.978	1.097	1.763
31	18	1.952	52	1.686	1.158	2.454
32	24	2.603	57	1.848	1.408	6.959
33	23	2.495	45	1.459	1.710	9.547
34	21	2.278	59	1.913	1.191	3.361
35	24	2.603	68	2.205	1.181	3.671
36	18	1.952	62	2.010	0.971	-0.536

V023: RAW AGE DRIVER C

Sort by Sum of Max Gain



Display 2 below is a copy of the relevant data from Display 1. Note that the odds ratio currently shows under-representations for age 16, 17 and 18. Ages 19 and 20 are somewhat over-represented, perhaps due to their association with their older friends who can obtain alcohol beverages for them. A very high odds ratio (1.453) at age 21 is expected, since this is the first year that these individuals are legally allowed to drink alcohol beverages. There is a carry-over in the over-representation to ages 22 and 23, which is also expected. We remind the reader that these results are for alcohol fatality crashes, and the relatively few crashes tend to make the distribution somewhat choppy.

To provide an estimate of the effect of lowering the legal drinking age to 18, we will apply the over-representations that currently center on age 21 to center them on age 18. The estimate of the number of crashes that 16 through 20 year olds will have (after

the drinking age is lowered) will be the result of taking these odds ratios and applying them to the actual numbers of crashes that these age groups currently have, which will allow for the fact that 16 year olds do not drive as many miles as 21 year olds.

Display 3 applies the odds ratios for the 19-23 age group to the 16-20 age group. Given that these odds ratios apply, the additional number of fatal crashes can be calculated. Applying the factor of 1.127 fatalities per fatal crashes enables the additional number of fatalities per year to be estimated.

Display 2. Abstract of Relevant Data from Display 1

Age	Alcohol Fat Crashes	Alcohol %	Non-Alcohol Crashes	Non-Alcohol %	Odds Ratio
16	4	0.43%	85	2.76%	0.157
17	22	2.39%	108	3.50%	0.681
18	19	2.06%	102	3.31%	0.623
19	36	3.90%	109	3.53%	1.105
20	44	4.77%	131	4.25%	1.123
21	**43**	**4.66%**	**99**	**3.21%**	**1.453**
22	37	4.01%	115	3.73%	1.076
23	39	4.23%	85	2.76%	1.535

Display 3. Estimate of Number of Additional Fatalities Per Year

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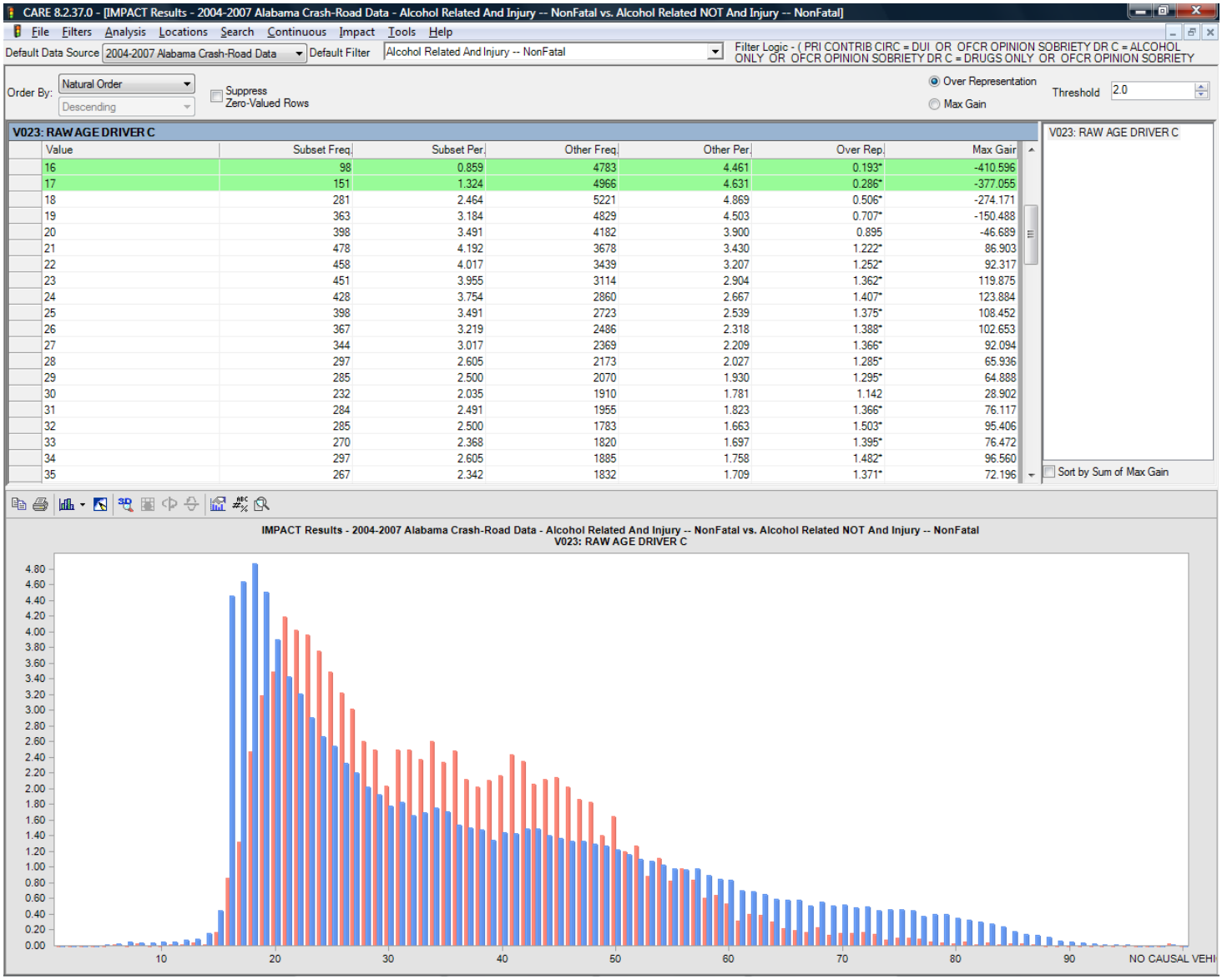
Age	Projected Odds Ratio	Projected Alcohol %	Additional Crashes	Additional Fatalities	Additional Fat/Yr
16	1.105	3.04%	24.07	27.13	7
17	1.123	3.93%	14.27	16.09	4
18	1.453	4.81%	25.30	28.52	7
19	1.076	3.80%	-0.93	-1.05	0
20	1.535	6.52%	16.11	18.15	5
TOTALS			**78.83**	**88.84**	**22**

In summary, if the current legal drinking age is reduced to 18, the estimate is that this will result in the death of 22 persons per year. The age distribution for alcohol fatality crashes in Alabama (CY 2004-2007) indicates that the average age of those who were killed in alcohol crashes was 36.3 years of age. This is a conservative figure in that it would be expected that those who were killed in crashes caused by 16-20 year old drivers would be considerably younger than those killed in alcohol crashes in general.

INJURY ANALYSIS

The four year period of 2004 thru 2007 was also used for the injury analysis. In the data that are presented below, “injuries” refer to non-fatal injuries so that these results can appropriately be added to those given above. The results are for injury crashes, not number of injuries. However, the number of injuries can be determined since over the four year period there were 1.364 injuries per alcohol injury crash. The displays below are identical in explanation to those given above, with the exception that rather than applying to fatalities, they apply to non-fatal injury crashes and then to non-fatal injured persons.

Display 4. CARE IMPACT Comparison of Alcohol and Non-Alcohol (Non-Fatal) Injury Crashes Calendar Years 2004-2007



Value	Subset Freq.	Subset Per.	Other Freq.	Other Per.	Over Rep.	Max Gain
16	98	0.859	4783	4.461	0.193*	-410.596
17	151	1.324	4966	4.631	0.286*	-377.055
18	281	2.464	5221	4.869	0.506*	-274.171
19	363	3.184	4829	4.503	0.707*	-150.488
20	398	3.491	4182	3.900	0.895	-46.689
21	478	4.192	3678	3.430	1.222*	86.903
22	458	4.017	3439	3.207	1.252*	92.317
23	451	3.955	3114	2.904	1.362*	119.875
24	428	3.754	2860	2.667	1.407*	123.884
25	398	3.491	2723	2.539	1.375*	108.452
26	367	3.219	2486	2.318	1.388*	102.653
27	344	3.017	2369	2.209	1.366*	92.094
28	297	2.605	2173	2.027	1.285*	65.936
29	285	2.500	2070	1.930	1.295*	64.888
30	232	2.035	1910	1.781	1.142	28.902
31	284	2.491	1955	1.823	1.366*	76.117
32	285	2.500	1783	1.663	1.503*	95.406
33	270	2.368	1820	1.697	1.395*	76.472
34	297	2.605	1885	1.758	1.482*	96.560
35	267	2.342	1832	1.709	1.371*	72.196

Display 5. Abstract of Relevant Data from Display 4

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Age	Alcohol Crashes	Alcohol %	Non-Alcohol Crashes	Non-Alcohol %	Odds Ratio
16	98	0.86%	4783	4.46%	0.193
17	151	1.32%	4966	4.63%	0.286
18	281	2.46%	5221	4.87%	0.506
19	363	3.18%	4829	4.50%	0.707
20	398	3.49%	4182	3.90%	0.895
21	478	4.19%	3678	3.43%	1.222
22	458	4.02%	3439	3.21%	1.252
23	451	3.96%	3114	2.90%	1.362

Display 6. Estimate of the Number of Additional Injuries Per Year

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Age	Projected Odds Ratio	Projected Alcohol %	Additional Crashes	Additional Injuries	Additional Inj/Yr
16	0.707	3.15%	261.54	294.76	74
17	0.895	4.15%	321.61	362.46	91
18	1.222	5.95%	397.53	448.02	112
19	1.252	5.64%	279.89	315.43	79
20	1.362	5.31%	207.67	234.04	59
TOTALS			**1468.24**	**1654.71**	**414**

In summary, it will be expected that an additional 414 non-fatal injuries will result from the reduction of the legal drinking age to 18. The age distribution for those injured in alcohol injury crashes in Alabama (CY 2004-2007) indicates that the average age of those who were injured in alcohol crashes was 33.5 years of age. This is a conservative figure in that it would be expected that those who were injured in crashes caused by 16-20 year old drivers would be considerably younger than alcohol crashes in general.

APPENDIX: Op-ED

MINIMUM DRINKING AGE OF 21 REDUCES DRINKING AND DEATHS SAYS UAB INJURY CONTROL RESEARCH CENTER SUPPORTED BY A CAPS CARE RESEARCH STUDY

More than 100 college and university presidents joined together in support of the Amethyst Initiative, which questions the effectiveness of the minimum legal drinking age of 21 (MLDA 21), and suggests the nation reconsider dropping that to age 18. They claim that the current minimum age is not working and actually encourages increased binge drinking in underage students.

Evidence overwhelmingly proves them wrong.

The University of Alabama at Birmingham Injury Control Research Center (UAB ICRC)--created to understand why injuries happen and what can be done to lessen their impact—has reviewed that extensive evidence. Here's the real story.

The lethal combination of inexperienced driving with inexperienced drinking has been well established. The over-representation of 18 to 23 year olds we currently see involved in alcohol-related crashes would shift to center on 18, meaning we'd see more 16 to 20 year olds in crashes involving alcohol.

In a study requested by ICRC, the Center for Advance Public Safety (CAPS) at the University of Alabama estimated that the reduction of the drinking age in Alabama would result in an additional 22 fatalities per year, and an additional 414 persons injured per year if the drinking age in Alabama is reduced to 18 years.

The National Highway Traffic Safety Administration estimates that the MLDA 21 laws have saved more than 30,000 lives nationally since 1975, or approximately 1,000 lives per year. MLDA 21 laws are one of the most studied public health policies ever. The number of traffic fatalities involving underage drunk drivers has been cut in half since the early 1980s and the declines began immediately after the laws were implemented.

What's more, the benefits have occurred with little active enforcement, such that societal costs from injuries and death from underage drinking could likely be further reduced with greater enforcement of the existing laws. Another benefit is that MDLA 21 laws also result in less overall drinking by people under 21, a trend that continues through their early twenties.

The Centers for Disease Control and Prevention (CDC) has concluded, after review of the large body of research on MLDA 21, that lowering the minimum age to 18 would increase fatalities by 10 percent just in those under 21. Instead of calling for the age to be lowered, the UAB ICRC supports continued and increased enforcement of the lifesaving MLDA 21 laws.

To do otherwise would ignore the evidence….and endanger the health and lives of people traveling our roads.

Injury Control Research Center
The University of Alabama at Birmingham
205-934-2861