# Indiana Residents' Perceptions of Driving and Lower Blood Alcohol Concentration

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**ABSTRACT**

*Since Congress passed .08 blood alcohol concentration (BAC) as the national standard for impaired driving in October 2000, 28 U.S. States including Indiana have enacted .08 BAC law. This study investigated perceived impact of the .08 law among Indiana residents and their attitudinal and perceptional changes since the enforcement of the law. The focus of this study was to examine demographic differences in these changes. Using random-digit dialing that included unpublished numbers and new listings, a representative sample of 525 adult Indiana residents ages 18 or older was interviewed. Of the total respondents, 61% (n=320) reported having 12 or more drinks in a year, 15% (n=81) reported a decrease in the number of alcohol drinking occasions compared to their drinking behavior before the passage of the .08 law and 30% advocated further reduction of the legal limit of impaired driving below .08 g/dl, which reflects the perception of increased safety. Even though 38% of the total respondents expressed that the BAC law should be enforced only when drinking and driving was a factor in an accident, 75% acknowledged that their driving skills became worse after consuming a couple of drinks. Chi-square and logistic regression analyses indicated that gender, education and income were significant predictors for the majority of attitudinal and perceptional outcome variables regarding drinking and driving or .08 BAC law whereas race/ethnicity, age, employment status, religion and political views contributed little to the prediction.*

Motor vehicle crashes are the leading cause of death[1] for Americans ages 2 through 33 causing $231 billion of economic cost in 2000.[2] In 2002, 42,815 Americans were killed by motor vehicle crashes and 41% of those deaths (17,419) were alcohol-related.[3] This translates to one alcohol-related traffic fatality every 30 minutes in the United States. With increasing social concern about impaired driving and research findings indicating substantial impairment with regard to critical driving tasks such as braking, steering and lane changing at .08 g/dl BAC, Congress passed .08 BAC as the national standard for impaired driving in October 2000 and it became a law on October 23, 2000.[4] Since then, 28 U.S. States including Indiana have joined 20 other States or territories that had already enacted .08 BAC law before October 2000. Currently, as of May 2004, 46 States, the District of Columbia and Puerto Rico are enforcing the .08 law.[5]

Despite the enforcement of lower BAC standard along with other major initiatives such as the *Friends Don't Let Friends Drive Drunk* campaign, no visible improvement has been observed over the last several years in terms of both the number of alcohol-related fatalities and alcohol-related fatality rate per 100 million vehicle miles of travel (VMT) for the nation. The number of alcohol-related fatalities was 15,935 in 1998, 15,786 in 1999, 16,653 in 2000, 17,448 in 2001 and 17,419 in 2002.[3, 6-9] The alcohol-related fatality rate per 100 million VMT was 0.63 in 1998, 0.62 in 1999, 0.63 in 2000, 0.62 in 2001 and 0.61 in 2002.[10] These data might throw doubt upon the effectiveness of the .08 BAC law, bringing attention to

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the 1999 report by the U.S. General Accounting Office (GAO) that conducted a critical review of the .08 BAC studies and stated that the evidence of impact of the .08 law is not conclusive.[11]

Thus, there is a critical need to examine the effectiveness of the .08 BAC law. It appears premature or impossible, however, to fully evaluate the effectiveness of the .08 law because the majority of the states that adopted and enforced the .08 law have less than one year of available data or none since the enforcement of the .08 law. In addition, initiation or reinforcement of other impaired driving prevention programs or campaign during the same time frame—so-called history bias—would make it more difficult, if not impossible, to adequately evaluate the impact of the .08 law. Also, it should be noted that by far the great majority of drunk drivers do not end up with fatal crashes, which is evident by the fact that there are about 1.5 million driving while intoxicated (DWI) arrests each year in the United States.[12,13] This means that the .08 law may not result in an immediate decrease in the number of alcohol-related traffic fatalities. It is quite possible that we do not observe any improvement in the alcohol-related fatalities, especially for a short time period, even with a substantial decrease in the number of drunk drivers on the road. That is why safety professionals focus more on antecedents of accidents rather than on accidents.[14]

Lack of scientific measures for the actual number of impaired drivers on roadways makes it necessary to examine people's attitudinal, perceptional and behavioral changes with regard to drinking and driving as a result of the .08 law enforcement to estimate a short-term effect of the law. Also, to the authors' knowledge, few studies have evaluated demographic differences in people's attitudinal, perceptional and behavioral changes in drinking and driving in the context of lowering the legal BAC limit to .08. Indiana is one of the three states that enforced the .08 law on July 1, 2001, the earliest since Congress passed .08 BAC as the national standard for impaired driving in October 2000.[5] This study investigated perceived impact of the .08 law among Indiana residents to whom the .08 law was enforced for more than two years and their attitudinal, perceptional and behavioral changes since the enforcement of the law.

## METHOD

### *Sample*

The national random-digit dialing (RDD) sampling and data collection procedures found in Seo and Torabi[15] were replicated in this statewide RDD study. A representative sample of 525 adult Indiana residents was interviewed using RDD that included unpublished numbers and new listings. Adults 18 years of age or older at each selected residential telephone number were eligible for the study. If two or more adults were at home, an adult household member was randomly selected by the Center for Survey Research (CSR). A total of 2,700 random telephone numbers were generated for this survey. Among them, 685 turned out to be ineligible, which included disconnected numbers, fax/data line, non-housing unit, cell phone numbers and no adult in household. Eligibility was not established for another 486 because of failure to contact after a minimum of eight calls. Another 1,004 were eligible but did not complete the interview or refused to be interviewed.

The response rate 3 (RR3), calculated by standards established by the American Association for Public Opinion Research (AAPOR), was 30%.[16] The formula used was RR3 = Complete interviews / [(complete interviews + partial interviews) + (refusals + noncontacts + other) + *e* (unknown household + unknown other)], where *e* is an estimated proportion of cases of unknown eligibility that are eligible. The *e* was computed to be .36, the proportion of eligible cases whose eligibility was unknown initially but later identified as eligible among all cases whose eligibility was initially unknown. The cooperation response rate 3 (COOP3), the proportion of all complete interviews to all eligible households ever contacted, was 42%.

### *Instrument*

The survey instrument was a questionnaire designed for computer-assisted telephone interviews. Considering the nature of the telephone interview in which refusing to be interviewed after starting interview (break-off) is a concern, individual items rather than scales were used to avoid redundancy that may contribute to the break-off. Hence, no internal consistency measure was computed. Instead, consistency of respondents' responses was evaluated by checking coherence between narrative description to an open-ended question and other answers to closed-ended questions. To reduce measurement errors, each respondent was told at the beginning of the interview "As you may know, in 2001 Indiana passed a law that lowered the legal blood alcohol concentration level from .10 to .08. This law makes it illegal for a driver to operate a vehicle when their blood alcohol concentration level is .08 or higher."

The instrument contained 19 closed-ended questions and one open-ended question in addition to 10 sociodemographic questions. Of the closed-ended items, nine were attitudinal questions, six perceptional, and four behavioral. Two attitudinal questions were "Do you think that the legal limit for driving under the influence of alcohol should be further reduced to below .08, stay the same, or be increased?" and "Some people think that the government should enforce the blood alcohol concentration law only when drinking and driving were factors in an accident. How much do you agree or disagree with this view?" Most of response options to attitudinal questions were 4-point Likert type: "Strongly agree," "somewhat agree," "somewhat disagree," and "strongly disagree." One of the perceptional questions was "Do you think the state's highways are more safe, about as safe, or less safe since the blood alcohol concentration law changed?" The following behavioral question was asked of the respondents who reported drinking 12 or more drinks in the past one year: "Compared to your drinking behavior before the passage of the .08 law in 2001, has the number of times you drank

at bars, restaurants and parties increased, decreased, or stayed about the same?" If respondents reported a decrease or increase in drinking frequency, a follow-up question was asked about the extent of change using three options: "a lot," "some," and "a little." The open-ended question asked the impact of the .08 BAC law on respondents' lifestyle with the aim of obtaining rich qualitative information on the impact of the .08 law, which also served as a validation check item.[17] A jury of experts (n = 3) composed of one faculty member in the field and two telephone survey experts reviewed a draft of the questionnaire and made changes for clarity where necessary.

*Data Collection*

The survey was first pilot tested (n = 36) July 22 through July 24, 2003. Interviews were recorded during the pilot test to determine which questions needed revisions. Suggestions were also collected from the interviewers each evening of the pilot test and modifications were made to the questionnaire after the pilot test. A second pilot test (n = 15) was conducted September 2, 2003 and minor changes were made after the second pilot test. The data collection procedures of this study were similar to those found in Seo and Torabi.[15] The telephone interview was administered in English by professional telephone interviewers at the Center for Survey Research (CSR) in Bloomington, IN, from September 16, 2003 to October 19, 2003, using the University of California Computer-Assisted Survey Methods software (CASES). All interviewers received three hours of specific training on this survey and were instructed to read questions and response categories at a 2-words-per-second pace and to use neutral probes and feedback phrases. The 52 interviewers who performed the telephone interviews were monitored for quality and comparability by 17 survey supervisors using specialized telephone lines and computer equipment, which do not allow the interviewers to know they are being monitored. The audio and visual monitoring was conducted randomly, with each interviewer being monitored at least once during each 3-hour shift. The median duration of each interview was 11 minutes. The institutional review board of the university approved the design and all procedures for this study.

*Data Analysis*

Statistical analyses were conducted with the Statistical Package for the Social Sciences, Windows version 11.5 (SPSS Inc., April 2003). Frequencies and percentages of each response by item were calculated for the 19 items. Each of the 19 items was a categorical dependent variable. The associations between categorical dependent variables and demographic variables were examined using chi-square significance tests to identify variables to be submitted to logistic regression analyses. The response options with few cases were collapsed into an adjacent option to satisfy the assumption of adequate cell sizes in chi-square tests. For example, the options to attitudinal questions "strongly agree" and "somewhat agree" were collapsed into one option. In case of two-by-two tables, the chi-square values with continuity correction were used in significance tests. Considering multiple tests, significance level was set at the .01 level.

Logistic regression was conducted for the categorical dependent variables that showed significant associations with one or more demographic variables in the chi-square tests to further examine odds ratio (OR) of each level of significant predictors in each regression model. When categorical predictors were coded, the category that was clearly defined was chosen as a reference for stable reference comparisons. The sampling error for reported percentages was no more than 4.28 percentage points at the 95% confidence level. No imputation of missing values was performed.

## RESULTS

*Demographics of Respondents*

Five-hundred-and-twenty-five individuals participated in the survey and 517 resulted in completed interviews. The median age was 47.5 years (*SD* = 16.7). Sociodemographic characteristics of the survey respondents are shown in Table 1.

As compared with the Indiana population represented in the 2000 Census of Population and Housing,[18] the sample overrepresented women (59% vs. 51%) and Whites (90% vs. 86%), which is typical of samples in RDD telephone survey.[19-20] The sample moderately underrepresented Black or African-American (hereafter labeled African-American) (6% vs. 8%) and Hispanic or Latino (Hispanic) (2.3% vs. 3.5%) populations.

*Perceived Impact*

As shown in Table 2, 79% of the respondents reported that the .08 BAC law would save lives in the long run and 34% felt that the state's highways were safer than before the .08 BAC law was enforced.

Gender ($C^2_1 = 6.2$, $p = .01$) and race/ethnicity ($C^2_3 = 14.0$, $p = .003$) were significant predictors for the positive perception of the .08 law in saving lives. Females were more likely than males (adjusted odds ratio [OR] = 1.70) and Hispanics were less likely than Whites (OR = 0.20) to believe that the .08 law would save lives (Table 3).

Age as categorized into four different groups (18 – 29, 30 – 44, 45 – 64 and 65 or older) was a significant predictor for the perception of safer highways after the .08 law enforcement ($C^2_3 = 17.2$, $p = .001$). The respondents 45 years of age or older were more likely than those 30-44 years of age to report the perception that the state's highways were safer than before the .08 BAC law enforcement (45 – 64: OR = 2.25; 65 or older: 1.89) (Table 3).

*Behavioral Change*

Of the total respondents, 61% (n = 320) reported having had 12 or more drinks in the same year. People with college education, students and people working for pay, and males reported having more drinks than those with 12 years or less education ($C^2_3 = 24.0$, $p < .001$), those who were temporarily unemployed, retired, or homemakers ($C^2_4 = 13.7$, $p = .008$) and females ($C^2_1 = 12.8$, $p < .001$), respectively. In terms of income as categorized into six different groups (under $15,000, $15,000-$24,999,

**Table 1. Characteristics of Survey Respondents**

| Characteristics | % | N |
|---|---|---|
| **Gender** | | |
| Female | 59.4 | 312 |
| Male | 40.6 | 213 |
| **Age** | | |
| 18-29 | 13.1 | 69 |
| 30-44 | 28.6 | 150 |
| 45-64 | 38.9 | 204 |
| 65 or older | 18.9 | 99 |
| **Race/ethnicity** | | |
| White, non-Hispanic | 90.3 | 474 |
| Black or African-American | 5.5 | 29 |
| Hispanic, Latino or Spanish origin | 2.3 | 12 |
| Some other race | 1.1 | 6 |
| **Education** | | |
| 0–11 years | 5.1 | 27 |
| 12 years | 33.3 | 175 |
| Some college | 24.2 | 127 |
| College degree or higher | 36.6 | 192 |
| **Employment status** | | |
| Working for pay | 59.8 | 314 |
| Temporarily unemployed | 4.0 | 21 |
| Retired | 20.4 | 107 |
| Keeping house | 6.3 | 33 |
| Student | 5.1 | 27 |
| Household's total annual income before taxes and other deductions in 2002 | | |
| Under $15,000 | 7.2 | 38 |
| $15,000-$24,999 | 10.5 | 55 |
| $25,000-$34,999 | 11.4 | 60 |
| $35,000-$49,999 | 17.7 | 93 |
| $50,000-$74,999 | 26.3 | 138 |
| $75,000 or more | 22.3 | 117 |

Notes. *N*=525. The percentages may not add to 100 because of "refused" or "don't know" responses.

$25,000-$34,999, $35,000-$49,999, $50,000-$74,999 and $75,000 or more), more people with higher income reported having had 12 or more drinks in the same year ($C^2_5 = 27.7$, $p < .001$), except the lower two income groups where the tendency was reversed (under $15,000: 50%; $15,000-$24,999: 42%). Seventy-seven percent of people who earned $75,000 or more reported having had 12 or more drinks in the same year (OR = 2.42 compared to those earning $15,000-$24,999) (Table 3).

A notable finding was that a quarter of the respondents (*n*=81) who reported having had 12 or more drinks in the same year reported that the number of drinking occasions decreased compared to their drinking behavior before the passage of the .08 law in 2001. The reported decrease in the drinking occasions after the .08 law enforcement was observed indiscriminatly throughout all different demographic characteristics. That is, no significant differences were found in the reported decrease in drinking occasions after the .08 law enforcement between different age groups ($C^2_3 = 1.2$, $p = .758$), race/ethnicity ($C^2_3 = 5.4$, $p = .144$), education levels ($C^2_3 = 3.5$, $p = .317$), employment status ($C^2_4 = 2.7$, $p = .613$), income levels ($C^2_5 = 9.2$, $p = .101$) or gender ($C^2_1 = 4.2$, $p = .041$).

***Perception about Drunk Driving Policies***

As measured two years after the .08 BAC law was first enforced in Indiana, 81% ($n = 426$) of the respondents reported favoring the .08 law whereas 18% ($n = 97$) opposed the .08 law. No significant differences were found in the proportion of favoring/opposing the .08 law between different demographic characteristics. Also, 30% ($n = 157$) of the respondents advocated the idea of further reducing the legal limit for driving under the influence of alcohol below .08 g/dl although a majority of the respondents (68%, $n = 358$) opposed it (Table 2). The student (OR = 0.20) and high-income groups ($50,000-$74,999: OR = 0.41; $75,000 or more: OR = 0.39) were more resistant to the idea of further reducing the legal limit of impaired driving below .08 g/dl than people working for pay and those earning $15,000-$24,999, respectively (Table 3).

A substantial number of respondents (38%, $n = 200$) expressed that the government should enforce the BAC law only when drinking and driving was a factor in an accident. Low-income people were more likely to advocate this notion than high-income people ($50,000-$74,999: OR = 0.48; $75,000 or more: OR = 0.44). However, 75% ($n = 394$) of the total respondents acknowledged that their driving skills became worse after consuming a couple of drinks. More females (82%) than males (67%) reported the experience of driving skills change after a couple of drinks ($C^2_1 = 14.6$, $p < .001$,

**Table 2. Perceived Impact of, Behavioral Change after, and Perceptions about the .08 BAC Law Enforcement**

| Perceived Impact | *N*(%) | *N*(%) |
|---|---|---|
| | Yes | No |
| In the long run .08 law will save lives | 414 (79%) | 106 (20%) |
| | Safer | About as safe |
| State's highways are safer | 177 (34%) | 300 (57%) |
| **Behavioral Change** | | |
| | Decreased | Stayed about the same |
| Number of drinking occasions compared to the drinking behavior before the passage of the .08 law in 2001 | 81 (15%) | 233 (44%) |
| **Perception about the Law** | | |
| | Yes | No |
| Legal limit should be further reduced | 157 (30%) | 358 (68%) |
| | Disagree | Agree |
| BAC law should be enforced only when DWI is a factor in an accident | 322 (61%) | 200 (38%) |
| | Favor | Oppose |
| Favor/oppose the .08 law | 426 (81%) | 97 (18%) |

Notes. *N* = 525. The percentages may not add to 100 because of "not applicable," "refused," or "don't know" responses. DWI = driving while intoxicated.

OR=2.64).

Another notable finding was observed when respondents were asked to make their best guess of the number of people who were killed in 2002 in alcohol-related crashes in the United States and asked a follow-up question. As shown in Table 4, only 3% (n = 18) of the respondents identified a number in the correct range (15,000 – 19,999).

As many as 55% (*n*=288) of the respondents underestimated the traffic fatalities in alcohol-related crashes, whereas 37% (*n*=193) overestimated the number of fatalities. Twenty-seven percent (*n*=143) of the respondents even guessed a number less than 3,000 when the correct number was 17,419.[3] After respondents were informed that about 17,000 individuals were killed in alcohol-related crashes in 2002, they were asked if their attitude toward the .08 BAC law had changed. One-hundred-and-thirty-one (25% of the respondents) reported a change in their attitude: two-thirds (*n*=88) in the direction of favoring the .08 law and one-third (*n*=43) in the direction of opposing the .08 law. Respondents with college degrees or higher (OR=0.34) and those earning less than $15,000 (OR=0.23) and $75,000 or more (OR= 0.44) were less likely to change their attitudes toward the .08 law compared to their respective reference groups (12 years of education and $15,000 - $24,999 of income).

Seventy-nine percent (71% of males, 85% of females) of the respondents favored the open container law that makes it illegal to have opened alcohol containers inside a vehicle and 74% (59% of males, 84% of females) favored sobriety checkpoints both in towns and in rural areas. As shown in Table 3, females were more likely than males to favor the open container law and sobriety checkpoints.

### *Impact on Lifestyles*

Of the respondents, 34% (*n*=177) reported that the .08 law influenced their lifestyles either positively (28%, *n*=148) or negatively (6%, *n*=29). More females (74%) than males (26%) reported positive impact of the .08 law on their lifestyles ($C^2_1$=15.2, $p< .001$). Those who reported impact on their lifestyles were further asked an open-ended question about the way .08 law influenced their lifestyles. The positive impact included feeling safer on the road (*n*=68); being more conscious of how much one drinks (*n*=27); not drinking before driving (*n*=17); less drinking and driving (*n*=13); drinking at home rather than in the pub (*n*=7); and cutting down on drinking (*n*=5). The negative impact included being excessively worried about being caught (*n*=13); narrowing down one's social life (*n*=5); and having consumed illegal substances other than alcohol before driving (*n*=2).

## DISCUSSION

The finding that a quarter of the

**Table 3. Correlates of Self-reported Outcome Variables Related to Drinking and Driving and .08 BAC Law**

| Correlates | Have ever had 12 or more drinks in the same year | | BAC legal limit should be further reduced | | BAC law only enforced when DWI is an accident factor | | Attitude change toward .08 law[A] | | Driving skills change with a couple of drinks | |
|---|---|---|---|---|---|---|---|---|---|---|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Gender | | | | | | | | | | |
| Female | 0.54** | 0.36–0.84 | | | | | | | 2.64*** | 1.72 – 4.05 |
| Male | 1.0 | reference | | | | | | | 1.0 | reference |
| Education | | | | | | | | | | |
| 0 -11 years | 0.73 | 0.28–1.93 | | | | | 2.38 | 0.99 – 5.74 | | |
| 12 years | 1.0 | reference | | | | | 1.0 | reference | | |
| Some college | 1.75* | 1.04 – 2.97 | | | | | 0.89 | 0.53 – 1.52 | | |
| College degree or higher | 2.28*** | 1.40 – 3.73 | | | | | 0.34*** | 0.20 – 0.61 | | |
| Employment status | | | | | | | | | | |
| Working for pay | | | 1.0 | reference | | | | | | |
| Unemployed | | | 0.63 | 0.21 – 1.85 | | | | | | |
| Retired | | | 1.31 | 0.78 – 2.19 | | | | | | |
| Keeping house | | | 2.05 | 0.97 – 4.33 | | | | | | |
| Student | | | 0.20* | 0.05 – 0.74 | | | | | | |
| Income | | | | | | | | | | |
| Under $15,000 | 1.01 | 0.40 – 2.55 | 1.69 | 0.67 – 4.30 | 0.96 | 0.41–2.26 | 0.23** | 0.08 – 0.64 | | |
| $15,000-$24,999 | 1.0 | reference | 1.0 | reference | 1.0 | reference | 1.0 | reference | | |
| $25,000-$34,999 | 1.15 | 0.52 – 2.54 | 0.75 | 0.34 – 1.65 | 0.63 | 0.29 – 1.36 | 0.55 | 0.25 – 1.23 | | |
| $35,000-$49,999 | 1.46 | 0.69 – 3.07 | 0.55 | 0.27 – 1.16 | 0.50 | 0.24 – 1.02 | 0.61 | 0.29 – 1.25 | | |
| $50,000-$74,999 | 1.83 | 0.90 – 3.72 | 0.41* | 0.20 – 0.84 | 0.48* | 0.24 – 0.93 | 0.52 | 0.26 – 1.05 | | |
| $75,000 or more | 2.42* | 1.12 – 5.25 | 0.39* | 0.19 – 0.83 | 0.44* | 0.22 – 0.91 | 0.44* | 0.21 – 0.95 | | |

| Correlates | Believe .08 BAC law will save lives in the long run | | State's highways are safer since BAC law changed | | Favor open container law | | Favor sobriety checkpoints within cities or towns | | Favor sobriety checkpoints in rural areas | |
|---|---|---|---|---|---|---|---|---|---|---|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Gender | | | | | | | | | | |
| Female | 1.70* | 1.09 – 2.64 | | | 2.42*** | 1.53 – 3.83 | 3.55*** | 2.30 – 5.47 | 3.62*** | 2.41 – 5.44 |
| Male | 1.0 | reference | | | 1.0 | reference | 1.0 | reference | 1.0 | reference |
| Age | | | | | | | | | | |
| 18-29 | | | 0.84 | 0.42 – 1.68 | | | | | | |
| 30-44 | | | 1.0 | reference | | | | | | |
| 45-64 | | | 2.25*** | 1.41 – 3.59 | | | | | | |
| 65 or older | | | 1.89* | 1.07 – 3.33 | | | | | | |
| Race/ethnicity | | | | | | | | | | |
| White[B] | 1.0 | reference | | | | | | | | |
| African American | 3.30 | 0.77 – 14.2 | | | | | | | | |
| Hispanic/Latino | 0.20** | 0.06 – 0.65 | | | | | | | | |
| Some other race | 1.00 | 0.11 – 9.15 | | | | | | | | |
| Education | | | | | | | | | | |
| 0 -11 years | | | | | 0.43 | 0.16 – 1.16 | | | | |
| 12 years | | | | | 1.0 | reference | | | | |
| Some college | | | | | 0.40** | 0.22 – 0.72 | | | | |
| College degree or higher | | | | | 0.79 | 0.44 – 1.42 | | | | |

Notes: $N = 525$. This table shows independent variables that yielded a statistically significant logistic regression model for each dependent variable when all the significant covariates at the chi-square test were entered in the model; OR = adjusted odds ratio; CI = confidence interval; DWI = driving while intoxicated; [A]Right after respondents were informed of the correct number of alcohol-related fatalities in 2002. [B]Non-Hispanic White ; $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

**Table 4. Respondents' Knowledge of Traffic Fatalities in Alcohol-related Crashes and Their Attitude Change Toward .08 BAC Law When Correct Information Was Provided**

| Fatalities Guessed by Respondents | % | n |
|---|---|---|
| Less than 1,000 | 11.8 | 62 |
| 1,000 – 2,999 | 15.4 | 81 |
| 3,000 – 5,999 | 12.2 | 64 |
| 6,000 – 9,999 | 2.9 | 15 |
| 10,000 – 14,999 | 12.6 | 66 |
| 15,000 – 19,999 | 3.4 | 18 |
| 20,000 or more | 36.8 | 193 |
| **Attitude Change Toward .08 BAC Law[A]** | **%** | **n** |
| Strongly favor .08 law | 12.6 | 66 |
| Somewhat favor .08 law | 4.2 | 22 |
| Somewhat oppose .08 law | 3.0 | 16 |
| Strongly oppose .08 law | 5.1 | 27 |
| No change in the attitude | 73.9 | 388 |

Notes. $N = 525$. The percentages may not add to 100 because of "refused" or "don't know" responses.
[A]Right after respondents were informed that about 17,000 individuals were killed in alcohol-related crashes in 2002 (According to NHTSA, actual fatalities were 17,419).

respondents ($n$=81) who had 12 or more drinks in the same year decreased the number of drinking occasions compared to their drinking behavior before the passage of the .08 law indicates that the .08 law has succeeded at least to a moderate extent as a general deterrent to people who may drink and drive. This is affirmed by the narrative responses to the open-ended question. Sixty-nine people reported changed behavior with regard to drinking and driving since the .08 law was enforced, not including drinking if they were expected to drive, thinking twice about getting behind the wheel after they had drinks, and cutting down on drinking. Another indication of this positive impact lies in the finding that the reported decrease in drinking occasions was observed indiscriminatingly throughout all different demographic characteristics. This implies that enforcement efforts of the .08 law have permeated throughout all different segments of Indiana residents regardless of different income or educational levels.

This positive impact appears further affirmed by Indiana fatal crash data[21] as well as alcohol consumption prevalence data of the Behavioral Risk Factor Surveillance System (BRFSS) of the Centers for Disease Control and Prevention.[22] Traffic fatalities in Indiana have declined dramatically from 909 in 2001 to 792 in 2002, marking the year 2002 the lowest fatality year on record in Indiana.[21] The BRFSS alcohol consumption data for the State of Indiana are available for 1997, 1999, 2001 and 2002. Because the .08 law was enacted on May 9, 2001 and enforced on July 1, 2001 in Indiana, it would be appropriate to compare the data between 1999 and 2002. Eleven percent of the respondents in 1999, but 9.9% in 2002, reported drinking 21-31 days when asked the question "During the past month, how many days per month did you drink any alcoholic beverages, on the average?" Fifteen percent of the respondents in 1999, but 12% in 2002, reported having five or more drinks when asked the question "On the days when you drank, about how many drinks did you drink on the average?" Even though this comparison is by no means based on enough multiple data points that can ensure trend stability, it allows better-than-chance estimation over the short-term effect of the .08 law.

An interesting finding of this study was that a majority of the respondents (68%) opposed the idea of further reducing the legal limit for driving under the influence of alcohol below .08 g/dl whereas the vast majority (81%) favored the .08 law. Actually there is an international trend to continue to reduce the illegal limit to .05 BAC or lower. The illegal limit is .05 BAC in many countries including Australia, Belgium, Bulgaria, Denmark, Finland, France, Germany, Greece, Ireland, Israel, The Netherlands, Portugal, South Africa, Spain and Turkey; .03 in Poland; and .02 in Russia, Sweden and Norway.[23] It is not surprising that students and high-income people were found to be more resistant to the idea of lowering the illegal limit of BAC as they were more frequent drinkers than their counterparts. This implies that aggressive and effective social marketing, especially for the students and high-income individuals, would be needed to reduce the incidents of drunk driving.

Another interesting finding of this study was that even though 38% ($n$=200) of the respondents expressed that the BAC law should be enforced only when drinking and driving was a factor in an accident, 75% ($n$=394) acknowledged that their driving skills were worse after having consumed a couple of drinks, whereas 61% ($n$=320) reported having had 12 or more drinks in a year. According to a comprehensive report by the National Center for Health Statistics under the CDC,[24] 62% of U.S. adults were current drinkers and 15% of adults former drinkers in the 1999–2001 study period. These findings suggest that the vast majority of drinkers experienced that their driving skills worsened after consuming a couple of drinks. This might provide a good rationale for argument of the need for further reducing the illegal limit of BAC below .08 g/dl. A .08 BAC is not typically reached with a couple of beers or a glass or two of wine with dinner.[25] To reach .08 BAC level, a 170-pound man would have to drink more than four 12-ounce cans of beer

within one hour on an empty stomach or a 137-pound woman would have to drink at least three cans of beer in one hour on an empty stomach.[25, 26]

It should be noted that only 3% of the respondents identified a number in the correct range (15,000–19,999) of alcohol-related traffic fatalities in the U.S. and 55% underestimated the alcohol-related fatalities. More important, 25% of the total respondents reported a change in their attitude toward the .08 law (13% strongly favor; 4% somewhat favor; 3% somewhat oppose; and 5% strongly oppose) after they were informed of the correct number of the fatalities. This implies that there is lack of proper social marketing and communication of important information with regard to drinking and driving, and that some people might change their attitude and behavior with regard to drinking and driving if they were simply provided with the correct information.

The findings of this study should be interpreted in light of the following limitations. First, causal relationships should not be inferred from the present findings since this study used a cross-sectional survey design. Second, recall bias may have confounded the study since some of the assessments in this study were necessarily retrospective. Third, the response rate is relatively low. However, a comprehensive study[27] that investigated two RDD national telephone surveys that used identical questionnaires but had different levels of response rates (36% vs. 61%, computed according to the AAPOR standards reported above) found that there was little difference in the results between the two surveys. Across 91 comparisons, the average difference between the two surveys was only two percentage points. This finding was affirmed by another study[28] in which 211 RDD national telephone surveys conducted between 1979 and 1996 were analyzed. Fourth, the demographic categories such as "some other race" and "Hispanic" had a small number of cases. Therefore, racial/ethnic differences involving these two categories need to be interpreted with caution. Finally, like all other survey studies, the statistics calculated from the sample are subject to measurement errors. Future research should investigate long-term effects of the .08 BAC law for all the states and U.S. territories that adopted the .08 law. Also, it would be beneficial to conduct the study in terms of behavioral and perceptional changes since the .08 law enforcement as well as changes in alcohol-related traffic crashes or fatalities.

### *Implications for Health Education*

This study has important implications for health education in general. There is a strong need for effective social marketing and provision of correct information regarding damages and human sufferings arising from drinking and driving. The finding that only 3% of the respondents identified a number in the correct range of alcohol-related traffic fatalities and that 17% of the total respondents changed their negative attitude toward the .08 law into positive simply after being informed of the correct number of the fatalities clearly demonstrates the need for aggressive public health education.

The findings of this study also suggest the need for different strategies for different groups of people. For example, respondents with a college degree or higher education and those earning $75,000 or more were less likely than those with 12 years of education and $15,000-$24,999 of income, respectively, to change their attitude toward the .08 law after being informed of the correct number of alcohol-related traffic fatalities. This indicates that simple informational strategies would be more effective for people with low education and less effective for people with higher education levels. Overall, this study does not support segmentation of target populations based upon race/ethnicity, age, employment status, religion and political views. Instead, it supports segmentation of target populations based upon education, income and gender.

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