

# **Economic Impact of Legal BAC Laws: 2016**

**Prepared for:**



**American Beverage Licensees**

**By**



**John Dunham & Associates, Inc.**

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## Abstract

Legislation in recent years has focused on efforts to further curb drunk driving by preventing an incident from occurring in the first place. Many proposals are the result of technological advances and studies on the effectiveness of Ignition Interlock Devices (IID). Other proposals focus on reducing the legal blood alcohol content (BAC) even lower than the current 0.08 limit. Generally, research on these two methods has produced inconclusive results as to whether they have any effect at all on reducing drunk driving incidents and their outcomes.

This analysis examines the effect of requiring IIDs in all vehicles and through these, reducing the legal BAC limit and what effect these actions have on alcohol retail sales and the economy of the United States. Using statistical analyses and a baseline 0.08 BAC limit, we estimate the 0.01 percent change in the BAC law on per-capita consumption and apply it to alcohol sales under two different scenarios, a legal BAC of 0.05 and 0.00. We find these changes would have a significant impact on retail employment, wages and economic output.

This is an update to the version of a study prepared in August 2016.

## Introduction

Ignition Interlock devices (IID) are mechanisms installed in automobiles that measure a person's Blood Alcohol Content (BAC) prior to starting a car. Most IIDs are installed near the dashboard and function like a breathalyzer, though passive detection technology is being developed that could detect BAC via transdermal and optical testing. If the BAC of a prospective driver is above the programmed limit set inside the IID, then the automobile will not start, thus preventing a driver from operating the vehicle. These devices are generally installed in the cars of repeat offenders of DUIs with the hope that the device will prevent recidivism.

Generally, an IID functions by a driver blowing into the mouthpiece. The fuel cell inside the mechanism then analyzes the BAC of the driver. If the BAC is above the pre-determined limit, 0.08 for example, the fuel cell ignites a relay to remain open and the car will not start. If BAC falls below the pre-determined limit, the fuel cell inside the device triggers a relay to close and the car will start.

While all fifty states have some sort of ignition interlock law for DUI offenders, some states and the Federal government have considered legislation to expand the installation of IIDs by requiring manufactures to install interlocks or similar devices in every vehicle.<sup>1</sup> This paper examines the effect of requiring IIDs in all vehicles sold in the US followed by a subsequent reduction in the legal BAC limit. This will include an analysis of two scenarios, a legal BAC limit of 0.05 and 0.00, and examine how this will impact on- and off-premise alcohol sales and subsequently retail jobs across the country.

## History and Legislation

IIDs were invented in the 1970's and these devices began to be used on the vehicles of DUI offenders in the mid-1980s. California began the first IID pilot program in 1986 and since then, all 50 states have passed laws that require or make as a sentencing option the installation of IIDs in the cars of DUI

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<sup>1</sup> See for example: *S.510 -- ROADS SAFE Act of 2011*, Introduced March 8, 2011 and referred to the Committee on Commerce, Science, and Transportation. On-line at: <http://thomas.loc.gov/cgi-bin/query/z?c112:S.510.IS>:

offenders.<sup>2</sup> The legislation that influenced states into creating laws for the installation of IIDs in the cars of DUI offenders was the Transportation Restoration Act of 1998. Signed into law at the federal level, this act required states to adopt safety incentives to prevent the operation of motor vehicles by intoxicated persons or else risk losing federal transportation funding.<sup>3</sup> For most states this has meant that repeat DUI offenders are required by state law to install IIDs.

In recent years, states have begun requiring the installation of IIDs in the cars of first time offenders, especially if the convict records a high BAC level.<sup>4</sup>

Recently, states and elected officials have called for legislation requiring IIDs as standard equipment in all new cars sold. While no official legislation has actually been proposed or passed for all manufactured vehicles, there have been a few bills requiring the installation of IIDs in all school buses and other transportation vehicles.<sup>5</sup> This sort of legislation is not limited to the United States. A French law, which went into effect July 1 2012, requires all motorists to have a breathalyzer test in the car.<sup>6</sup> Despite legislation and proposals expanding the installation of IIDs to include newly manufactured vehicles, it is unclear whether such laws will actually prevent DUIs.

A study conducted by the State of California Department of Motor Vehicles on the effectiveness of IIDs indicates that IIDs function well at reducing the risk of drunk-driving offenses of repeat offenders. Yet, in many instances once the IIDs are no longer required, DUI offenders repeat their crime.<sup>7</sup> The same study also found mixed results regarding the effectiveness of IIDs in the state. For example, researchers found that first time DUI offenders that were mandated to install a device in their vehicle had the same risk of an additional DUI conviction as first time offenders not having to install IIDs.<sup>8</sup> This indicates that revoking a driver's license is equally as effective at curbing recidivism for first time DUI offenders as mandating the installation of an IID.

In addition to studies on the effectiveness of IIDs at curbing recidivism of first time offenders, studies on further reducing the BAC limit from 0.08 have proven to be mixed as well. The Traffic Injury Research Foundation conducted research on the safety impact of lowering the BAC limit for drivers in Canada. After conducting a literature review and analyzing the experiences of other countries lowering their legal BAC limit to 0.05 the researchers failed to see any strong evidence that further lowering the BAC limit in

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<sup>2</sup> All fifty states have some sort of ignition interlock law. Twenty-nine states — Alabama, Alaska, Arizona, Arkansas, Connecticut, Delaware, Hawaii, Idaho, Illinois, Iowa, Kansas, Louisiana, Maine, Maryland, Mississippi, Nebraska, Nevada, New Hampshire, New Mexico, New York, Oregon, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia and the District of Columbia — have mandatory ignition interlock provisions for all offenses. California has a pilot program in four of its largest counties. Colorado and Maine's laws are not mandatory for a first conviction, but there are strong incentives to install an interlock device on the first conviction. See: State Ignition Interlock Laws, National Conference of State Legislatures, Updated September 2018, at: [www.ncsl.org/research/transportation/state-ignition-interlock-laws.aspx/](http://www.ncsl.org/research/transportation/state-ignition-interlock-laws.aspx/)

<sup>3</sup> U.S Department of Transportation Federal Highway Administration. TEA-21 Restoration Act (Title IX of HR 2676. Available at: <http://www.fhwa.dot.gov/tea21/hr2676t9.htm>

<sup>4</sup> In most states that have mandatory Ignition Interlock Devices for first time offenders, the BAC must be equal to or greater than 0.15.

<sup>5</sup> The New York State Senate considered a bill that called for ignition interlock devices for school buses manufactured after July 1, 2013 and authorizes school boards to determine the specifics of retrofitting school buses manufactured before such a date, and Rhode Island saw legislation on requiring interlocks in new vehicles introduced in 2017.

<sup>6</sup> Radio France International. "New French law makes alcohol tests mandatory in every car." March 2, 2012. Available at: <http://www.english.rfi.fr/visiting-france/20120302-new-french-law-makes-alcohol-tests-mandatory-every-car>

<sup>7</sup> State of California Department of Motor Vehicles. An Evaluation of the Effectiveness of Ignition Interlock in California. 2004. Available: [http://www.dmv.ca.gov/about/profile/rd/210\\_ignition\\_interlock\\_report.pdf](http://www.dmv.ca.gov/about/profile/rd/210_ignition_interlock_report.pdf)

<sup>8</sup> Ibid.

Canada from 0.08 to 0.05 would have an impact on DUI rates and the injuries and fatalities that result from drunk driving.<sup>9</sup>

While there is some limited research on the effect of mandatory IIDs on repeat offenders, there appears to have been no research conducted to date on how these devices impact non-offenders, or in the case of a standard equipment requirement, even non-drinkers. In addition, no research seems to have been conducted on how these devices might impact alcohol sales.<sup>10</sup>

The sections that follow will outline an analysis of regulations mandating IIDs in all vehicles and reducing the legal BAC to both 0.05 and 0.00 and their effect on the economy of the United States.

### **BAC Model Methodology**

A model was developed to determine if changes to per se BAC limits will impact overall retail sales of beverage alcohol products at the state and national level. A range of different regression models were tested using state per capita beverage alcohol sales data from 1982 through 2010. This period encompassed changes in state BAC limits from either 0.10 percent (or in the case of some states no limit) to 0.08 as required by the Transportation Restoration Act of 1998. This provides a case study of how changes in BAC limits might impact beverage alcohol sales.

Data on total alcohol sales were gathered from the Brewers Almanac, a compendium of data produced by the Beer Institute.<sup>11</sup> Beer sales were used as a proxy for overall alcohol sales in the analysis, although the model was tested using more limited wine and spirits shipment data and the results were similar. These data were transformed into per capita shipment data based on the number of people over the age of 21 in each state. This was regressed against the per se limit (either 0.08, 0.10 or missing) and a number of economic and control variables. While the final model was not particularly robust, it was statistically significant at the 0.05 level. The model results are presented in Table 2.

Based on this model, a change in the per se limit of 0.01 percent would reduce per capita sales by 0.859 gallons, suggesting that a total zero tolerance BAC policy would reduce per capita sales by 6.88 gallons all other things remaining equal.<sup>12</sup>

As the model results show, (see Table 1 on the following page) even though the regression is statistically significant, the low R-squared statistic shows that a linear model does not explain a great deal of the variability across state/year data elements. Simply put, there are many factors that go into the level of beverage alcohol sales and this model does not capture all of them. It does show; however, that the model is likely a good predictor of the changes resulting from changes in per se limits all else being equal.

While this model predicts the change in overall sales level it does not show if there is any shifting from on-premise to off-premise retailers. In order to determine this, another model was developed using a data set of beer, wine and spirits for on vs. off premise sales volume data from Adams Media.<sup>13</sup> Data were

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<sup>9</sup> Traffic Injury Research Foundation. *The Safety Impact of Lowering BAC Limit for Drivers in Canada*. 2002.

<sup>10</sup> A literature review was unable to uncover any published research on how per se BAC limits impact beverage alcohol sales, much less how IID requirement impact sales.

<sup>11</sup> See: <http://www.beerinstitute.org/statistics.asp?bid=200>

<sup>12</sup> This is equivalent to over 3 cases of beer, which contains just under 0.6 gallons of alcohol. Considering that the average adult in America consumes about 2.5 gallons of ethanol per year, a zero-tolerance policy would reduce per capita beverage alcohol sales by about 25 percent.

<sup>13</sup> Data from *Beverage Information Group's Handbook Advance*, Adams Media, 2004 and 2012.

available at a national level from 1995 through 2010. Total on-premise beverage alcohol sales were calculated and regressed against a population weighted average per se BAC for each year, the national median income, the national over 21 population, the average unemployment rate for the given year and the GDP for the year.

**Table 1 - Regression results**

Variable	Coefficients	t statistic	P-value
Intercept	6.808164	3.09	0.002
BAC Law	0.859444	3.09	0.002
State	0.000777	2.32	0.021
Year	(0.002851)	(2.55)	0.011
Med. Income	(0.000002)	(2.72)	0.007
Unemployment	(0.010022)	(4.23)	0.000
Beer Excise Tax Rate	0.043498	1.68	0.094
F Statistic			21.139994
R-Squared			8.08%

In both of these equations the model was generally linear and statistically significant and the coefficient on the BAC level was significant to the 0.01 level. Based on the different coefficients obtained for the on and off premise models, and on the average shares, a separate model (again at the national level) was developed to calculate the percentage change in sales from a 0.09 to a 0.08 per se BAC limit. The differences in the percentage changes were then used to calculate new on and off premise shares. This difference was then applied to the BAC model and assumed to be constant and linear as no other data were available. Overall, sales in on-premise establishments fell slightly faster than those in off-premise establishments meaning that lower BAC limits would increase the overall off-premise share all else being equal.

The final model was then tied to the 2018 economic impact model to link proposed changes in the per se BAC limit to the economic numbers. Other research has shown that there is a fairly linear relationship between retail sales and retail employment.<sup>14</sup> As such, a 10 percent change in on-premise sales would change on-premise employment by about 10 percent. The forecast changes in direct employment flow through linearly to supplier and induced employment based on changes in jobs, wages and output.

## Results

In looking at the economic impact of requiring IIDs in all manufactured vehicles and lowering the legal BAC limit to 0.05 and 0.00, there would be some loss in both on- and off-premise retail employment. Assuming that the 0.01 percent change in BAC would reduce per capita sales by 0.859 gallons as the sales regression model estimated and applying those lost gallons to the economic impact model, it is estimated that a change to legal BAC of 0.05 would result in a loss of over almost 34,100 direct on-premise retail jobs and 15,680 off-premise retail jobs, totaling about 49,800 retail jobs across the country. This would translate to a decline of roughly \$3.042 billion in US economic output.

<sup>14</sup> DeFranco, Laurence, Lilley, William and John Dunham, The Case of the Transient Taxpayer: How Tax-Driven Price Differentials for Commodity Goods Can Create Improbable Markets, Business Economics, July 1998

**Table 2 – Reduction in US Economic Impact From Change in Legal BAC to 0.05**

	<b>Direct Jobs</b>	<b>Direct Wages</b>	<b>Direct Output</b>
On-Premise Retail	34,140	\$ 903,046,000	\$ 1,876,510,400
Off-Premise Retail	15,679	\$ 517,692,000	\$ 1,165,928,800
<b>Total</b>	<b>49,819</b>	<b>\$ 1,420,738,000</b>	<b>\$ 3,042,439,200</b>

In addition to a reduction in jobs, wages and economic output, changing the legal BAC limit to 0.05 would also result in a negative fiscal impact. It is estimated that state business taxes would decline by \$438.643 million and federal business taxes would decrease by \$602.804 million. Note that this does not even include the loss in excise and sales taxes paid by consumers.<sup>15</sup>

**Table 3 – Reduction in Taxes From Change in Legal BAC to 0.05**

<b>Tax Impact</b>	<b>Business Taxes</b>
Federal Taxes	\$602,803,800
State Taxes	\$438,643,200
<b>Total</b>	<b>\$1,041,447,000</b>

If the Legal BAC limit were to drop to 0.00, it is estimated that this would result in an even greater economic impact. Using the same assumption that a 0.01 percent change in BAC would reduce per capita sales by 0.859 gallons, a change in the legal BAC limit from 0.08 to 0.00 would result in a loss of 91,040 direct on-premise retail jobs and 41,810 direct off-premise retail jobs, totaling a decrease of 132,850 retailing jobs across the US. This would also result in a reduction of \$8.113 billion in economic output.

**Table 4 – Reduction in US Economic Impact From Change of Legal BAC to 0.00**

	<b>Direct Jobs</b>	<b>Direct Wages</b>	<b>Direct Output</b>
On-Premise Retail	91,041	\$ 2,408,122,700	\$ 5,004,027,700
Off-Premise Retail	41,810	\$ 1,380,512,000	\$ 3,109,143,600
<b>Total</b>	<b>132,851</b>	<b>\$ 3,788,634,700</b>	<b>\$ 8,113,171,300</b>

The fiscal impact of changing the legal BAC from 0.08 to 0.00 would also lead to a significant drop in business tax revenues for federal and state governments. It is estimated that state business tax revenues would decline by \$1.17 billion and federal business taxes would decline by about \$1.61 billion.

**Table 5 – Reduction in Taxes From Change in Legal BAC to 0.00**

<b>Tax Impact</b>	<b>Business Taxes</b>
Federal Taxes	\$1,607,476,900
State Taxes	\$1,169,715,300
<b>Total</b>	<b>\$2,777,192,200</b>

<sup>15</sup> These models do not account for the effects of the Tax Cuts and Jobs Act as no data are yet available to determine the impact of these reforms by industry.

## **Conclusion**

Given the inconclusive evidence as to whether IIDs are effective at curbing DUIs for first time offenders (or in the case of a standard equipment requirement for non-offenders) and whether lowering the BAC level would have any effect on lowering the DUI rate, it seems excessive to require IIDs in all vehicles and further lower the legal BAC limit. This is particularly true if such legislation comes at a significant economic cost to jobs, wages and economic output. The same is true for the fiscal impact that federal and state governments must sacrifice in terms of business tax revenues to support policies that don't appear to deal with the problem of drunk driving.