The Potential Economic Effects of Alcohol Excise Tax Increases in Maryland

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Executive Summary

In late 2009, we issued a report detailing the potential benefits of alcohol excise taxes in Maryland. In that report, we concluded that alcohol excise tax increases save lives, reduce health care costs, create and preserve jobs, and prevent alcohol-related health problems.[1] The current report updates and expands on our earlier work. Key conclusions include:

- Alcohol use is responsible for 1,278 deaths and 7,470 violent crimes in Maryland every year.
- Alcohol is the leading drug problem among Maryland youth, and causes one out of three deaths of Marylanders between the ages of 15 and 20.
- Multiple reviews of the research literature have concluded that alcohol tax increases are an effective means of reducing alcohol-related harm, including problem drinking, among youth and adults.
- Maryland's alcohol taxes have been steadily eroded by inflation, and today alcohol excise taxes account for one-tenth of one percent of total state revenues.
- Alcohol costs the State of Maryland between $3.5 billion and $7.1 billion per year, including direct costs such as medical care and judicial and penal expenses, as well as indirect costs such as lost productivity as a result of premature death, illness, institutionalization and crime.
- A ten cents per drink increase in Maryland's alcohol excise tax will lead to $215.6 million in new revenues for the State, and an additional $225.2 million in cost savings for Maryland's economy. It will result in a 4.25 percent decrease in alcohol consumption.
- Conservatively estimated, the decrease in alcohol consumption resulting from a dime per drink increase will result in an annual increase in economic productivity of $131.7 million in Maryland.
- Productivity gains alone will exceed any job losses in the alcohol industry. In addition, if spent as designated in the current legislative proposal, funds raised by the tax will preserve and create jobs in health and mental health care, development disability support, tobacco use prevention and cessation, and alcohol and other drug addiction treatment and prevention, as well as expanding access to health care in Maryland.
- The tax increase will also save 33 lives and prevent 370 violent acts and 13,301 cases of alcohol dependence or abuse in the State every year.
- Comparison of current retail prices for alcohol in Maryland and surrounding states with current state excise tax rates indicates that the tax rates have little relationship to current prices, except a very slight impact on the lowest-priced beverages.
- The tax increase will lead to a modest 6.6 percent average increase in the price of alcohol, and will cost drinkers who do not drink in a risky way an average of $10.83 per year. The research literature on cross-border shopping suggests that this increase will have an insignificant impact on the State's ability to raise the anticipated revenue.

I. Introduction

Maryland last raised its excise tax on distilled spirits when Eisenhower was president, and its beer and wine taxes during the Nixon administration. The taxes brought a total of $29.2 million into state coffers in 2009.[2] By comparison, in 1956 (the year after the liquor tax was last raised) the distilled spirits tax alone earned the state $51.3 million in today's dollars; in 1973 (the year after the state raised beer and wine taxes) beer and wine taxes brought in $52 million in today's dollars.[3, 4]

According to scientific peer-reviewed literature, alcohol excise tax increases save lives, reduce health care costs, create and preserve jobs, and prevent alcohol-related health problems.[1] These tax increases are a win-win for the State: they prevent and reduce drinking and death among young people as well as among heavy drinkers, and they bring in additional revenues which can be used to create and preserve jobs and services.

The Toll of Alcohol-Related Harm in Maryland

There is strong evidence to support the health and economics-related arguments for decreasing alcohol use, which is responsible for 1,278 deaths and 7,470 violent crimes each year in Maryland.[5] Approximately 343,000 Marylanders (7.4 percent of the population age 12 and above) fit the criteria for alcohol abuse or dependence in 2007-2008. Approximately 326,000 people in the State need, but have not received, treatment for alcohol use.[6]

Alcohol is the leading drug problem among youth in the state of Maryland, responsible for 1 of 3 deaths of persons between the ages of 15 and 20.[5, 7] From 2007 to 2008, slightly more than one in four (28.1 percent) Marylanders ages 12 to 20 drank alcohol in the past month, and one in six (17.9 percent) reported binge drinking.[6] Among Maryland high school students in grades 9 through 12, 37 percent reported drinking in the past month, 24.5 percent began drinking before age 13, and 19.4 percent were binge drinkers.[8] Approximately 100 young people between the ages of 12 and 20 die in the state every year because of alcohol use, most commonly because of alcohol-related homicides, motor vehicle crashes, and suicides.[9] In 2007, underage drinkers consumed 13 percent of all alcohol sold in Maryland, accounting for $424 million in sales. Sales to underage drinkers provided profits of $208 million to the alcohol industry.[10]

Why an Alcohol Tax

Scientific reviews have overwhelmingly endorsed the effectiveness of increasing alcohol taxes in reducing alcohol consumption and related problems. As we described in our earlier paper, the most recent meta-analysis of 110 studies covering more than 1,000 estimates of the effects of price and tax on alcohol consumption concluded that, like other commodities, alcohol sales increase when prices fall, and decrease when prices (or taxes) increase.[11] A more recent study further estimated that doubling the federal alcohol tax would reduce alcohol-related mortality by an average of 35 percent, traffic deaths by 11 percent, sexually transmitted disease by 6 percent, violence by 2 percent, and crime by 1.4 percent.[12]

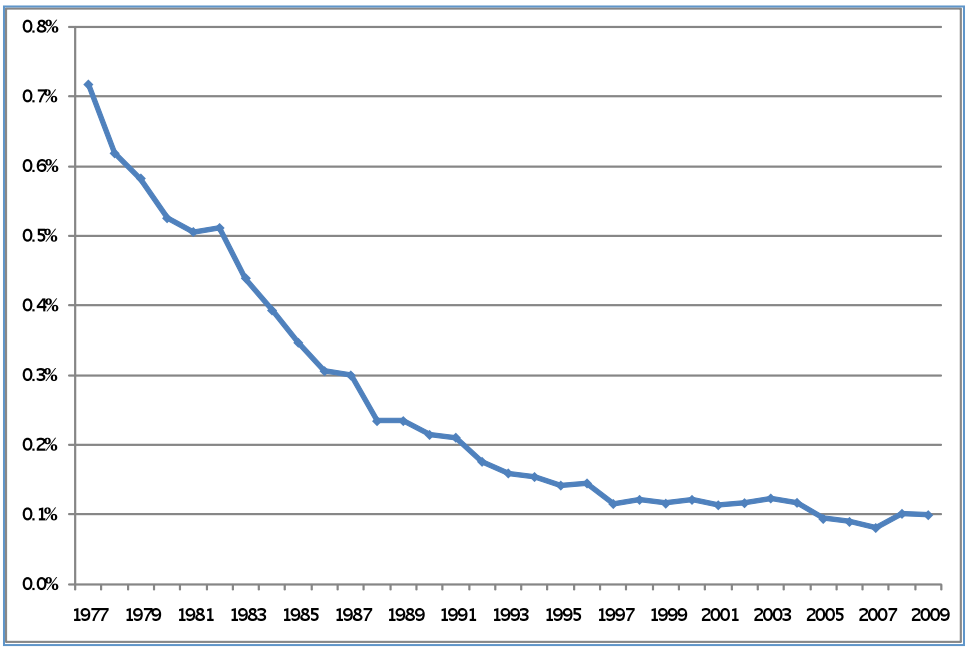
The Centers for Disease Control and Prevention also recently recommended, based on their review of the scientific literature, "increasing the unit price of alcohol by raising taxes based on strong evidence of effectiveness for reducing excessive alcohol consumption and related harms." CDC further found higher alcohol prices or taxes consistently related to fewer motor vehicle crashes and fatalities; less alcohol-impaired driving; fewer deaths from liver cirrhosis; lower all-cause mortality; and less violence, sexually-transmitted diseases, and alcohol dependence.[13]

Alcohol Taxes and Inflation

Inflation has consistently eroded the value of alcohol tax increases. For example, the federal tax on beer was set at $9 per barrel in 1951. Congress increased the rate to $18 per barrel in 1991. However, had the tax kept pace with inflation, the rate in 2007 would have been more than $71 per barrel. Similarly, the federal excise tax on liquor was set at $10.50 per proof gallon in 1951, and increased to $12.50 per proof gallon in 1991; the inflation-adjusted tax rate based on the 1951 tax would be $82.87 per gallon in 2007.

If Maryland's beer tax had kept pace with inflation since it was last raised in 1972, it would be $0.38 per gallon today; in fact it is just 0.09 per gallon, or less than a penny per drink. Similarly, the tax on wine would be $1.68 per gallon, rather than the $0.40 that it is today – and the tax on distilled spirits would be $9.50 per gallon, rather than just $1.50 (or less than two cents a drink). The contribution of the alcohol tax to state revenues has fallen steadily over the past 30 years (Figure 1).

Figure 1. Alcohol Tax Revenues as a Percentage of total Maryland State Revenue[14]



N.B. Calculations use total state revenues, not including local governments' revenues.

Overview of the Report

This report expands on an earlier paper describing the potential benefits of alcohol excise tax increases for the State of Maryland.[1] In this paper we update our earlier estimates of revenue and health benefits of a dime per drink increase in Maryland's alcohol excise tax, and describe in greater depth the economic and productivity benefits that are likely to accrue to the State as a result of such an increase. Finally, we assess the likelihood and impact of cross-border shopping if the State were to adopt a dime per drink increase in the alcohol excise tax.

II. Economic Effects of an Alcohol Excise Tax Increase

A dime per drink increase in Maryland's alcohol excise tax would have minimal economic effects on the majority of the population. Analysis of the Behavioral Risk Factor Surveillance System (BRFSS) survey for 2008, administered by the Centers for Disease Control and Prevention (CDC), shows that lower risk drinkers will pay on average $10.83 per year for the new tax. Drinkers at highest risk will be most affected: individuals engaging in all four risky drinking behaviors measured by CDC would pay an average of $158.02 in new taxes.[15*] This difference underscores the effectiveness of alcohol taxation in addressing excessive drinking and its consequences. Because 44 percent of Marylanders do not drink and 31 percent drink at lower risk, the bulk of the tax will be paid by the 25 percent of Marylanders drinking at higher risk.[16] As we showed in our earlier paper, the tax is not regressive since binge drinkers in Maryland are more likely than others to earn more than $75,000 per year.[17]

Background: The Costs of Harmful Use of Alcohol

The production and consumption of alcohol generates employment and tax revenues for governments. However, the economic benefits of the industry pale in comparison to the economic damage created by harmful use of alcohol. Studies documenting the economic effects of excessive alcohol consumption have used a broad range of categories of costs. Much of the difference in terms of the overall estimates in the studies reviewed in this report is due to the inclusion or exclusion of different categories of costs, rather than to different methodologies in tracking costs. Some studies include *indirect* costs – including lost work time and productivity – as well as the *direct* costs related to medical care and the judicial and penal systems.[18] For example, fetal alcohol syndrome disorders alone have been estimated to cost the state of Maryland $141.6 million per year.[19] Indirect costs include lost productivity – generally measured as lost wages – from death, illness, institutionalization, and crime.[18]

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[*] We are indebted to Dr. Timothy Naimi and James Daley of the Boston University School of Public Health for this analysis. In the BRFSS survey, high risk drinkers are defined as persons reporting any of the following risk factors in the past 30 days: binge drinking, heavy drinking, drinking above the U.S. dietary guidelines, or impaired driving. Lower risk drinkers are those who report none of these risk factors. The definition of binge drinking is consuming more than four drinks for females or five drinks for males on an occasion. The CDC defines heavy drinking as consuming an average of more than two drinks per day for men or one drink per day for women. Drinking above the dietary guidelines is defined as males having more than two drinks per occasion and females having more than one drink per occasion. Impaired driving is defined as an affirmative answer to the question, "In the past 30 days, have you ever driven after you've had perhaps too much to drink?"

The last comprehensive study of the costs associated with alcohol use in the United States was an extrapolation from the 1992 study shown below in Table 1; it found a total of $184 billion in costs for the U.S. in 1998, increasing at an annual rate of 3.8 percent. Health care spending accounted for $18.8 billion. If costs had increased at the same 3.8 percent rate since 1998, these estimates would be equivalent to $277 billion in total costs in 2009, or approximately $924 per person for the U.S. population.[20] In Maryland, with 5.7 million people, this is equal to $5.3 billion.[21] Even if the effect of a tax increase were distributed proportionately among all drinkers, the results of the dime a drink tax would be a reduced loss in the State of $225.2 million; since in fact the increase will have the greatest impact on the riskiest drinkers, this figure is likely an underestimate.

Table 1 summarizes the results of key studies calculating the costs of alcohol abuse in the United States. As the table shows, there is quite a bit of consistency in the total estimates – ranging from $601 to $1,222 per person per year in 2010 dollars.

Table 1. The Costs of Alcohol Abuse in the United States (in millions)

Type of Costs	Setting and Year					
	U.S. 1985	U.S. 1988	U.S. 1990	U.S. 1992	California 2005	Oregon 2006
Indirect Costs						
Premature deaths						$619
Illness and institutionalization						$1,486
From crime and to victims of crime						$171
Productivity losses at work					$25,300	
Subtotal Indirect Costs	$54,865		$75,937	$106,574	$25,300	$2,276
Direct Costs						
Alcohol abuse services						$157
Medical care					$5,400	$396
Crimes and criminal justice					$7,800	$109
Social welfare program administration						$8
Motor vehicle crashes						$271
Fires						$26
Fetal alcohol syndrome	$1,611					
Subtotal Direct Costs	$15,474		$22,683	$41,446	$13,200	$967
Total Costs	$70,338	$85,800	$98,620	$148,020	$38,500	$3,243
Equivalent in 2010 U.S. Dollars	$142,975	$157,150	$165,029	$230,746	$43,115	$3,518
Percentage of Costs that are Indirect	78.0%		77.0%	72.0%	58.7%	70.2%
Population (millions)	237.9	244.5	249.5	255.0	35.3	3.7
Per-capita Costs in 2010 U.S. Dollars	$601	$643	$662	$905	$1,222	$956

Sources for the data used in the table are as follows: U.S. 1985[22]; U.S. 1988[23]; U.S. 1990[24]; U.S. 1992[25]; Oregon 2006[26]; California 2005[27 28 29]; population data[21 30]; inflation data.[31]

As detailed in Table 1 above, harmful use of alcohol costs between $601 and $1,222 per capita in the United States annually. In Maryland, this amounts to a range of $3.5 billion to $7.1 billion per year in 2010 dollars.[32]

The costs in Table 1 do not include the actual expenditure on alcohol. In the U.S. in 1999, $34.4 billion in expenditures on alcohol ($45.2 billion in 2010 dollars) were attributable to adult excessive drinking.[33] Even without these expenditures, however, the costs of harmful use of alcohol to society are very high – as Table 1 shows. If every person in society were required to directly pay between $600 and $1,200 every year for a particular social problem, it is very likely that that problem would receive immediate attention. Yet because the economic costs of alcohol abuse are not distributed equally – and because many of these costs are borne by government or by the affected individuals – most members of society do not perceive the full cost. For example, there were an estimated 117 cases of fetal alcohol syndrome in Maryland in 2009, each of which costs an estimated $2.9 million to care for over a lifetime.[19]

Underage Drinking

Underage drinking is particularly damaging, in terms of both negative health effects and economic damages. In the U.S., the total costs caused by underage drinking were estimated to be $68.0 billion in 2007.[34, 35] Even excluding indirect costs, the direct costs of underage drinking incurred through medical care and loss of work cost the United States $22.3 billion each year.[36] In Maryland in 2007, the total direct costs related to underage drinking were calculated to be $1.6 billion overall, and $981 per year for each youth under age 21 in the State (in 2010 dollars).[32] The leading categories of costs related to underage drinking (in 2010 dollars) are youth violence linked to alcohol abuse ($1.1 billion); traffic crashes ($181 million); high-risk sex ($80 million); property crime ($63.9 million); and injuries ($46.7 million).[10]

Modeling the Effects of a Tax Increase

Consumption

Empirical evidence suggests that producers pass alcohol excise taxes on to consumers at a ratio ranging from 1 to as much as 2 – in other words, a 10 cent increase in tax leads to a 10-20 cent increase in price.[37, 38] These price increases strongly influence alcohol consumption. A recent review of 110 studies containing 1,003 estimates of the relationship between alcohol consumption and the tax and price of alcohol concluded that, like other commodities, alcohol sales increase when prices fall, and decrease when prices (or taxes) increase.[11] The same review also concluded that alcohol prices influence heavy drinking as well as alcohol consumption in general.

Evidence also indicates that alcohol tax increases will lead to reductions in the quantity and frequency of drinking among youth, who are among the most price-sensitive consumers.[39-41] This is why the National Research Council and Institute of Medicine made increasing excise taxes a central recommendation of their landmark report to Congress, *Reducing Underage Drinking: A Collective Responsibility*.[42]

The amount that consumption will decline as a result of tax increases depends on how *price elastic* alcohol consumption is in response to prices. Table 2, below, shows price elasticities for alcohol based on estimates from different sources. A price elasticity of –0.50 means that consumption declines by 5 percent for every 10 percent increase in the price of alcohol.

Table 2. Summary of Elasticities [11, 41, 43-48]

Study and Setting	Beer	Wine	Distilled Spirits	Wine and Distilled Spirits	Moderate	Binge Drinking	Harmful Drinking
Wette et al 1993 – New Zealand	-1.1			-1.1			
Kenkel 1993 – U.S. Drunk Driving							-0.74 to -0.8
Laixuthai and Chaloupka 1993 – U.S.						-0.18 to -0.07	
NIAAA 2000 – U.S. Review	-1.5						
Cook 2007 – U.S. Review	-0.74	-0.49	-1.47				
Meier et al 2008 –England					-0.23 to -0.52	-0.30 to -0.61	-0.41 to -0.7
Wagenaar et al 2009 – Metaanalysis	-0.46	-0.69	-0.8			-0.28	
Community Guide 2010 – U.S. Review	-0.5	-0.64	-0.79				

Table 3, below, shows the 2009 levels of alcohol taxes, consumption, and revenues in Maryland. Maryland's excise tax is equivalent to less than a penny per beer, and between one and two cents per glass of wine or drink of distilled spirits. Our estimates show that more than 2.2 billion drinks were consumed in the State in 2009 – or approximately 400 drinks per capita annually. The State received $29.3 million in tax revenue from this consumption.

Table 3: Drinks Consumed and Tax Revenues, Maryland, 2008-2009 [2]

Type of Alcohol	Number of Drinks 2008	Number of Drinks 2009	Difference	Consumption Increase 2008 to 2009
Beer	1,111,867,733	1,115,305,837	3,438,104	0.31%
Wine	292,286,950	334,180,544	41,893,594	14.33%
Distilled spirits	734,716,630	815,457,963	80,741,332	10.99%
Totals	2,138,871,314	2,264,944,344	126,073,029	5.89%

Table 4, below, summarizes the projected results of a dime per drink increase, in terms of tax and price increases. Even though the tax increase would be large in percentage terms, the tax would still represent a small percentage of the price to the consumer, between 6.1 and 8.1 percent of the final price. This discrepancy is due to the fact that

Maryland's alcohol tax has been diminished by inflation, as described in the Introduction.

Table 4: Modeling Results – Tax and Price

Type of Alcohol	Current Number of Drinks	Current price per drink	New tax per gallon	New tax per drink	New price per drink	Tax as a % of Price	Price increase
Beer	1,115,305,837	$1.6834	$1.1567	$0.1084	$1.7834	6.08%	5.94%
Wine	334,180,544	$1.5052	$2.9600	$0.1156	$1.6052	7.20%	6.64%
Distilled Spirits	815,457,963	$1.3509	$10.0333	$0.1176	$1.4509	8.10%	7.40%
Totals	**2,264,944,344**						**6.57%**

Table 5 presents the results in terms of alcohol consumption and tax revenues. For these calculations we use elasticities of -0.50 for beer, -0.64 for wine, and -0.80 for spirits (see Table 2, above). An excise tax increase of a dime per drink would lead to $215.6 million in additional revenues for the State, and would result in an overall decrease of 4.25 percent in alcohol consumption.

Table 5. Modeling Results – Consumption and Revenues

	Price increase	Elasticity	Consumption decrease	New Number of Drinks	New Tax Revenue	Increase in Annual Revenues
Beer	5.94%	–0.50	–2.97%	1,082,178,598	$117,348,742	$107,938,349
Wine	6.64%	–0.64	–4.25%	319,971,025	$36,996,650	$31,775,079
Distilled spirits	7.40%	–0.80	–5.92%	767,165,381	$90,201,867	$75,867,645
Totals			**–4.25%**	**2,169,315,004**	**$244,547,259**	**$215,581,073**

Revenue Impact

A dime per drink alcohol excise tax increase in the alcohol tax would have multiple economic benefits for the State. As shown in Table 5, the State would receive an estimated $215.6 million in additional tax revenue annually. Under legislation currently envisioned, these funds could be used to pay for health care expansion, increased support for persons with developmental disabilities, an addiction treatment and prevention fund, and will provide additional revenues for the State General Fund (see Table 6, below). All of these activities would likely preserve and generate jobs in Maryland.

Impact on Productivity

The figures above do not take account of the productivity improvement that will occur as a result of decreased alcohol consumption. This productivity arises from reduced alcohol-related disability, illness, institutionalization, and crime.[18] There is abundant evidence that alcohol consumption has both direct and indirect negative effects on workplace productivity. A study of Swedish men over the time period from 1935 to 2002 found that each additional liter of consumption of alcohol per year was accompanied by a 13 percent increase in workplace absence due to illness.[49] In Britain, the costs of workplace absence due to alcohol consumption were estimated to be £779 million in 1993,[50] equivalent to $1.9 billion in 2010 U.S. dollars, or $33 per U.K. inhabitant in 1993.[51] Similarly, the annual cost of alcohol-related lost productivity in New Zealand was estimated to be $57 million in 1995, for a population of 3.4 million – equivalent to $24 per inhabitant.[52]

In the United States, a 1999 study of U.S. employees found that 23 percent drank at work at least once during the past 12 months.[53] A separate study that year based on a sample of 6,540 U.S. employees reported that five percent had used alcohol in the workplace during the preceding 30 days.[54] Similarly, a 2006 study based on a randomized national sample of employed adults in the U.S. found that on an average workday, 1.7 percent of workers are under the direct influence of alcohol, and 9.2 percent are affected by a hangover.[55] Overall, the lost productivity of workers affected by alcohol dependence was estimated to be $36.6 billion in 1990,[56] equivalent to $61.3 billion in 2010 dollars,[57] or $198 per U.S. inhabitant.[58]

Harmful use of alcohol costs the state of Maryland and its residents between $3.5 billion and $7.1 billion annually in 2010 dollars (see Table 1, above). Between 70 and 78 percent of these costs are indirect costs, including: lost earnings due to increased crime; lost earnings due to alcohol-related illnesses; and losses due to workplace injuries. These effects are not measured with certainty. A study of the effect of price and availability of alcohol on nonfatal workplace injuries shows that a 25 percent increase in the beer tax in the United States 1992 would have reduced the number of days of work lost annually due to nonfatal workplace injuries by 4.6 million, thereby reducing the costs of lost productivity by $491 million, equivalent to $765 million in 2010 dollars.[31, 59]

A study using the National Longitudinal Survey of Youth (NLSY) for the time period 1979–1994 found that a one percent increase in the price of alcohol is estimated to raise earnings of young adults 0.21 percent in the short-run and 0.45 percent in the long-run – meaning that the 6.57 percent in price that would result from a dime per drink increase in the Maryland state alcohol excise tax would raise wages for young adults by 1.38 percent in the short-run and 2.96 percent in the long-run.[60]

Employers pay a significant portion of the costs of alcohol abuse. According to analysis by Ensuring Solutions to Alcohol Problems, a group funded by The Pew Charitable Trusts and based at the George Washington University, an average company in Maryland with 100 employees would have seven problem drinkers in its workforce. The same firm would lose one working day per month because of drinking-related problems, and would incur alcohol-related medical treatment costs of $60,573 per year.[61]

Other consequences of harmful use of alcohol are also very expensive. For adolescents and young adults, high levels of alcohol consumption have a negative impact on academic achievement, and therefore future wage-earning potential. For students in college, the average number of drinks consumed has been shown to be negatively correlated with hours studying.[62] A recent study in the United Kingdom, published in *The Lancet*, finds that alcohol is the most harmful drug consumed in terms of its effects on the individuals consuming it and on others – more damaging than heroin, crack cocaine, or methamphetamines.[63]

Studies have shown that there is a clear relationship between drinking and workplace absenteeism, and doing poor work.[54] Poor workplace performance is caused both by drinking on the job and drinking outside of working hours.[53] This "hangover effect" has been clearly documented for airplane pilots by testing their performance with flight simulators: 8 hours after drinking, pilots were found still significantly impaired in terms of their performance, and many were still impaired 14 hours after drinking.[64]

One of the arguments that the alcohol industry has advanced to counter tax proposals is that alcohol-specific taxes will hurt economic growth and will cost jobs in states that implement such taxes. The section above shows that the economic losses attributable to alcohol abuse in Maryland exceed the revenues from the proposed tax increase by a factor of more than 10 to 1. Using the simplifying assumption that the relationship between consumption and economic productivity is linear, the 4.25 percent decrease in alcohol consumption resulting from a dime per drink increase in the State's alcohol excise tax would result in an increase in economic productivity in the state equivalent to $131.7 million.

In fact the productivity gains are likely to be higher. Overall productivity losses due to alcohol consumption in the United States were estimated to be $119 billion in 1995 – equivalent to $171 billion in 2010, or $550 per U.S. resident.[65] For Maryland, this amount is equivalent to $3.1 billion annually. An increase of a dime per drink in Maryland's alcohol excise tax would raise an estimated $215.6 million dollars. In other words, the tax would recoup only a small portion of the costs of alcohol abuse. The high cost of alcohol-related damage and lost productivity provides a strong justification for taxation to reduce this impact and recoup a part of these costs.

Impact on Jobs

On the other hand, the alcohol industry points to its importance as an economic driver.[66] According to the industry, a tax increase of any size will lead to job losses across the state. Our review of the peer-reviewed research literature could not locate a credible methodology for estimating job gains or losses from an alcohol excise tax increase. However, in addition to the gains in productivity described above, it is likely that the tax itself will generate both spending and jobs. Table 6 below shows the spending envisioned in the 2011 legislation proposing a dime a drink excise tax increase. Using the revenue estimates calculated in this paper, $4.1 million would go annually into the Health Care Personnel Training Fund; $12.0 million to the State Tobacco Use Prevention and Cessation Fund; $29 million to the Developmental Disability Support Fund; $29 million to the Addiction Treatment, Prevention, and Recovery Support Fund; $29 million to the Mental Health Care Fund; and $66 million to

the Maryland Medicaid Trust Fund, where it would be used to help pay for Medicaid expansion in Maryland. Each of these sources of spending would preserve existing and/or generate additional jobs.

Table 6. Anticipated Expenditures of Alcohol Tax Increase Revenues[†]

Purpose	Percentage	Amount
Estimated annual revenue from the tax increase (2010 dollars)	—	$215,581,073
The amount needed to administer alcohol tax laws goes to an administrative cost account (estimated)	10.0%	$21,558,107
Amount remaining, of which:	—	$194,022,965
Health Care Personnel Training Fund	2.1%	$4,074,482
State Tobacco Use Prevention and Cessation Fund	6.2%	$12,029,424
Developmental Disability Support Fund	15.0%	$29,103,445
Addiction Treatment, Prevention, and Recovery Support Fund	15.0%	$29,103,445
Mental Health Care Fund	15.0%	$29,103,445
Maryland Medicaid Trust Fund	33.95%	$65,870,797
Remainder goes to the State General Fund	2.7%	$5,238,620
Total	100%	$215,581,073

Impact on Health Status

Table 5, above, indicates that the proposed tax dime per drink excise tax increase would reduce the consumption of alcoholic beverages in Maryland by 4.25 percent. This reduction would have a potentially large impact on health outcomes and would likely disproportionately benefit poorer segments of the population. A comprehensive review of the effects of alcohol misuse and the impact of alcohol control policies in the United States finds that a 10 percent increase in the price of alcohol (per ounce of ethanol) would result in a seven percent decrease in the motor vehicle fatality rate, a six percent decrease in suicides, and a 32 percent decrease in cirrhosis cases.[41]

Similarly, a 10 percent increase in beer taxes (rather than prices) has been found to reduce the likelihood of severe child abuse by 2.3 percent.[67, 68] A separate review published in the *American Journal of Public Health* in November 2010, finds that on average in the U.S. a doubling in the federal alcohol tax would result in a 35 percent decrease in alcohol-related mortality on average, as well as an 11 percent decrease in

[†] From draft of Lorraine Sheehan Health and Community Services Act of 2011 by Senator Madaleno, Maryland State Senate, November 30, 2010.

mortality from traffic crashes; a six percent increase in sexually-transmitted diseases; a two percent decrease in violence; and a 1.4 percent decrease in crime.[12]

Table 7 below presents available evidence concerning mortality, health conditions, and crimes that are known to be related to alcohol misuse. Assuming that the decreases in consumption were evenly distributed across the population, an increase in the state alcohol excise tax of a dime per drink would annually prevent an estimated eight traffic deaths, seven homicides, and 18 deaths from liver disease and cirrhosis in the State of Maryland. In addition, each year the tax increases would prevent an estimated 12 forcible rapes; 281 cases of aggravated assault; 18 robberies; 59 cases of severe violence against children; 17 cases of Fetal Alcohol Syndrome; and 13,301 cases of alcohol dependence (Table 7).

Table 7. Modeling Results – Reductions in Mortality, Illness, and Violence

Condition	Total Number	Percent Related to Alcohol Consumption	Total Related to Alcohol Consumption	Expected Reduction with Tax Increase
Mortality				
Traffic Deaths	547	35%	191	8
Homicides	547	30%	164	7
Deaths from Liver Disease and Cirrhosis	459	91%	418	18
Illness and Injury				
Forcible Rapes	1,178	23%	271	12
Aggravated Assault	22,011	30%	6,603	281
Robbery	14,375	3%	431	18
Severe Violence against Children	10,751	13%	1,398	59
Fetal Alcohol Syndrome	390	100%	390	17
Alcohol Dependence or Abuse	313,000	100%	313,000	13,301

Sources for Table 6: Traffic Deaths[69]; homicides[70]; cirrhosis and liver disease deaths[71-73]; forcible rapes[70]; aggravated assault [70]; robbery[70]; reports of severe violence against children[67, 68, 74, 75]; fetal alcohol syndrome (conservative estimate of percent of total births in Maryland [76] that have fetal alcohol syndrome[77]); alcohol dependence or abuse[70]

In reality, the decreases in mortality and morbidity would likely be significantly greater than the estimates in Table 7– because the impact of the tax would not be evenly distributed, and would affect problem drinkers more than it would affect occasional drinkers. As described above, harmful use of alcohol costs the State of Maryland between $3.5 and $7.1 billion annually. Even if the effect of a tax increase were distributed proportionately among all drinkers, an increase of a dime per drink will

gain the State $215.6 million in additional tax revenues. In fact, after accounting for the health benefits of the tax increase, the savings would be far more.

Economic Impact of Premature Mortality

In addition, although it is both difficult and controversial to put dollar figures on the value of a human life, economists do often estimate the productivity loss associated with mortality. The value of life is most commonly calculated using estimates of the quality of life, wage premiums for risky jobs, willingness to pay for safety measures, and individual behavior related to safety and prevention measures.[78] The values used in peer-reviewed studies generally range from $3.1 million to $6.8 million.[79] Following Table 6, above, the proposed tax increase would prevent an estimated 33 deaths annually in Maryland – equivalent to a range of $102 million to $224 million in terms of the value of human life saved.

III. Cross-Border Sales and an Excise Tax Increase

For state legislators, one concern related to alcohol tax increases is that, rather than lowering consumption, taxes will rather shift purchases across state lines. In this section, we address this concern in two ways. First, we report on the findings of a systematic review of the research literature regarding alcohol prices, excise tax rates and cross-border shopping in the United States. Second, we compare average price data of alcoholic beverages bought in grocery and liquor stores in Maryland and the five neighboring states to assess the degree of correlation between current retail prices and excise tax rates.

Systematic Review of the Research Literature

We conducted a systematic review of the social science and public health research literature to assess the state of the science on cross-border purchasing of alcohol, and to determine the relevance of that science to the Maryland situation. Details of the methods used in the systematic review are included in Appendix B. The review yielded a total of 12 relevant studies.

There are two critical questions to ask of this literature. First, do studies of data available over time from the United States suggest that cross-border shopping has a significant impact on alcohol excise tax revenues; and second, if the impact is significant, how significant is it, i.e. how much does it impair a state's ability to increase revenues through an alcohol excise tax increase?

Analysis of Maryland's recent tobacco tax increase found that cross-border effects would lower the increase in tobacco tax revenues resulting from the tax increase from 34 percent to 31 percent.[80] However, at least one study found the tobacco experience to be a poor model for cross-border shopping for liquor, since there is no ready equivalent in tobacco for a drinker's option to switch to beer or wine.[81] Studies that have looked at individual beverage categories as well as alcoholic beverages as a whole suggest that the effect of cross-border shopping on the alcohol trade is even less than the small effects found for tobacco.

The overall finding in the literature is that excise taxes may play a role in price differentials that lead to cross-border shopping in some parts of a state, but the net impact of this role is not large, and does not imperil the ability of the State to raise new revenues by increasing alcohol excise taxes.[82-85] There are many factors besides excise taxes that can contribute to cross-border shopping. According to the research literature, these include tourism, the presence of gaming establishments, the presence of universities, and religion.[83, 86, 87] Maryland is a diverse state with numerous tourist attractions, the beginnings of a gaming industry, and a host of universities. These will all blunt the effects of cross-border differences in alcohol prices due to an increase in the state's alcohol excise tax.

Efforts to estimate the effects of excise tax differentials on cross-border shopping have yielded contradictory results. A study of the impact of border-crossing on revenues from alcoholic beverages in all 50 states from 1989 to 1993 found that differences in excise tax rates caused declines in beer revenues due to cross-border shopping in some jurisdictions, but had little or no effect on liquor revenues. For Maryland, cross-border shopping led to a change in beer revenues of less than one percent.[82] On the other hand, another study analyzed spirits and beer revenues from the 50 states from 1990 to 2004, and found no effect on beer sales and a small effect on liquor sales, but not large enough to affect the State's ability to raise revenues from an excise tax increase.[84] Similarly, another study looked at revenues in the 48 continental states in 1950, 1960, 1970, 1980, 1990 and 1995, and concluded that the percentage of the population living near a state border was a statistically significant determinant of state liquor prices, but not of beer prices.[88] These are all modeling studies. The one study of a specific instance, an average 6.1 percent increase in the price of distilled spirits in Iowa after privatization of liquor sales there, found that according to consumer self-reports, only three percent of past-year drinkers increased cross-border shopping and none (0 percent) of past-month drinkers increased cross-border shopping.[89]

Comparing Retail Prices to Excise Tax Rates

Another way of assessing the impact of an alcohol excise tax increase on cross-border shopping for alcohol is to examine the relationship between current excise tax rates in Maryland and the five contiguous states, and current retail prices for beer, wine and liquor in those states. To do this, we purchased average retail sales data in Maryland, Delaware, Pennsylvania, West Virginia, Virginia, and Washington, D.C. for the 25 top-selling spirits and wine brands, and the top 24 selling beer brands in 2009 from SymphonyIRI InfoScan, a commercial provider of data gathered from retail price scanners. Because Pennsylvania and Virginia do not permit sale of distilled spirits in either grocery or private liquor stores, we were unable to obtain data on spirits prices for these two states; similarly, we also could not get data on wine prices in Pennsylvania. Alcohol excise tax data for July 2009 were sourced from the Tax Foundation.[90]

Table 8 shows a subset of the retail price data and the excise tax rates. An "eyeball analysis" of the table shows a great diversity of pricing of various beverages in Maryland and the surrounding states, and little relationship between excise tax rates and retail prices. For instance, Delaware has the highest liquor excise tax rate of the four states for which data were available, but the second lowest average retail price for

liquor. Virginia's tax for beer is the highest of the six states, but its average retail price is the third lowest. Examples of pricing for specific brands are similarly disconnected from the excise tax rates.

Table 8. 2009 Retail Prices of Alcohol Products in Maryland and Neighboring States[‡]

Category	Delaware	Maryland	Pennsylvania	Virginia	Washington DC	West Virginia
Liquor Excise Tax	**$5.46**	**$1.50**			**$1.50**	**$1.85**
Liquor (overall average)	**$21.11**	**$21.36**	---	**$10.96**	**$22.40**	**$15.52**
Examples (all 1.75 liters):						
Liquor A (Gin)	$32.17	$31.23	---	n/a	$41.59	$39.86
Liquor B (Whiskey)	$19.02	$18.91	---	n/a	$29.99	$27.51
Liquor C (Whiskey)	$37.11	$37.47	---	n/a	$43.67	$42.93
Wine Excise Tax	**$0.97**	**$0.40**		**$1.51**	**$0.30**	**$1.00**
Wine (overall average)	**$10.73**	**$10.18**	**$5.92**	**$9.93**	**$10.02**	**$9.33**
Examples (all 1.5 liters):						
Wine A (White Zinfandel)	$7.52	$8.15	---	$8.87	$8.76	$10.17
Wine B (Chardonnay)	$10.96	$11.75	---	$12.06	$13.19	$14.36
Wine C (Chardonnay)	$8.54	$11.05	---	$10.40	$9.75	$11.69
Beer Excise Tax	**$0.16**	**$0.09**	**$0.08**	**$0.2565**	**$0.09**	**$0.18**
Beer (overall average)	**$12.00**	**$9.34**	**$6.71**	**$8.61**	**$9.21**	**$8.58**
Examples (all 144 oz = 12 beers):						
Beer A	$13.19	$13.78	$17.88	$14.46	$14.36	$15.58
Beer B	$7.41	$7.23	$9.07	$6.47	$7.80	$8.08
Beer C	$9.01	$9.68	$9.90	$9.12	$9.69	$9.80

To make sense of these data, we subjected the prices for the entire set of 74 brands to further analysis. Our hypothesis was that the same alcohol brand selling in a jurisdiction with a higher alcohol tax rate would sell at a higher retail price. We used two methods of testing this hypothesis. First, we simply compared average retail prices for each retail brand in each alcohol category pair-wise between jurisdictions (Delaware vs. Pennsylvania, Delaware vs. West Virginia, etc.) and counted the number of times the price in the jurisdiction with a higher alcohol tax rate was higher than the price in the jurisdiction with a lower alcohol tax rate. We then converted these counts to a percentage of all pair-wise comparisons. Since there is some research indicating that alcohol excise taxes may be passed through to consumers at higher rates for brands that retail for lower prices,[37] we also analyzed the results by price segment. Results are presented in Table 9.

[‡] Johns Hopkins Bloomberg School of Public Health analysis based on SymphonyIRI Group data.

Table 9: Summary of Pair-wise Price comparisons

Category	Price Segment*	Number of Pairwise Comparisons	Count of Comparisons with Higher Prices	Percentage Confirming Hypothesis
Spirits	All	111	50	45.0%
Spirits	Lower-priced	76	37	48.7%
Spirits	Higher-priced	35	13	37.1%
Beer	All	219	109	49.8%
Beer	Lower-priced	121	64	52.9%
Beer	Higher-priced	98	45	45.9%
Wine	All	222	137	61.7%
Wine	Lower-priced	159	98	61.6%
Wine	Higher-priced	63	39	61.9%

* Lower priced brands were those in the bottom 75% price-percentile of the brands analyzed. Higher-priced brands were those in the top 25% price-percentile. Johns Hopkins Bloomberg School of Public Health analysis based on SymphonyIRI Group data.

The results were quite mixed, with 45 percent of spirits, 50 percent of beer, and 62 percent of wine selling for higher average retail prices in jurisdictions with higher alcohol excise tax rates. For the spirits and beer categories, where there was considerable price variation, we did see a higher percentage of lower-priced brands selling at higher retail prices in jurisdictions with higher alcohol excise tax rates when compared to higher-priced brands. We did not see this difference in the wine category, where almost all the top-selling brands were lower-priced wines selling in three- to five-liter containers.

Our second analysis examined the correlation between average retail prices and alcohol excise tax rates in each jurisdiction. We grouped all brands together with the category average and calculated the correlation between price and tax rate. We repeated the analysis for lower- and higher-priced brands within each category. Since vodka brands made up a large portion of the spirits category, we also examined 11 vodka brands separately. Results are presented in Table 10.

Table 10: Correlation of Average Retail Prices with Alcohol Excise Tax Rate

Alcohol Type	Segment	Correlation *	N
Spirits	Category average for all 25 brands	–0.084	96
	11 Vodka Brands	–0.105	36
	Lower priced brands	–0.094	64
	Higher priced brands	–0.156	28
Beer	Category average for all 24 brands	0.038	119
	Lower priced brands	0.12	71
	Higher priced brands	–0.221	42
Wine	Category average for all 25 brands	0.202	129
	Lower priced brands	0.242	89
	Higher priced brands	0.142	35

* Spearman's rank correlation. Numbers close to zero indicate no relationship between prices and tax rates. Positive numbers indicate prices are higher with higher tax rates. Negative numbers indicate prices are lower with higher tax rates. Johns Hopkins Bloomberg School of Public Health analysis based on SymphonyIRI Group data.

Within the spirits category, there is almost no relationship between average retail prices and alcohol excise tax rate – all of the correlations are close to zero. We find a slightly larger negative correlation (-0.156) for higher-priced spirits brands, suggesting that alcohol excise tax rates may not be passed through for these brands. Overall, the spirits category is made up of products that sell for an average of more than $20 per 1.75 liter bottle. It may be that at these higher selling prices, there is little relationship between the alcohol excise tax rate and the average retail price.

Overall, the beer category also shows no relationship between alcohol tax rate and average selling price. However, when dividing the analysis between lower- and higher-priced brands, we found a small positive relationship for lower-priced brands and a small negative relationship for higher-priced brands. Finally, the wine category showed a very small positive relationship between average retail sales prices and alcohol excise taxes for all segments. This is consistent with our findings above and may reflect the fact that overall, the wine brands analyzed are lower-priced products.

To summarize, this analysis found mixed results in analyzing the relationship between alcohol excise tax rates and average retail selling prices. The higher the price of the beverage, the less likely we were to find a relationship between alcohol tax rates and retail prices. The wine category (which is the smallest segment of the Maryland market), consisted of mostly lower-priced brands selling in large containers, and showed a small positive association between taxes and prices. This positive

relationship was apparent in both our pairwise-comparison analysis and our correlation analysis. For the spirits category, we found no relationship overall between tax rates and prices. These results were consistent in both our analysis methods. These results may reflect the fact that spirits sell for higher prices overall and retailers are more likely to absorb the excise tax rate in the retail price. While the beer category overall showed no relationship between taxes and prices, we found a small positive correlation between taxes and prices for lower-priced brands when we stratified the analysis by price.

Our analysis was limited by our inability to control for other factors that may be reflected in the alcohol brand retail-selling price such as differences in retail space costs and labor costs. Within the limitations of our analysis, it appears that the relationship between alcohol tax rates in a jurisdiction and average retail selling prices for alcohol brands is dependent on the average selling price of the product, with lower-priced products slightly more likely to sell at higher retail prices in jurisdictions with higher alcohol tax rates, but these correlations are still very small.

A dime per drink increase in Maryland's state alcohol excise tax rate would result in an average price increase of 6.6 percent for alcohol products in the State (see Table 1, above). Based on our review of the research literature as well as our examination of the current relationship between alcohol excise taxes and retail prices in Maryland and bordering states, the limited magnitude of this price increase is highly unlikely to substantially shift the balance of alcohol sales between Maryland and its neighboring states.

V. Conclusion

The proposed dime per drink increase in the alcoholic beverage excise tax rates in Maryland will raise substantial revenues for the State, enhance productivity and preserve and create jobs statewide, and result in fewer negative consequences of alcohol use and resulting costs to the State. The riskiest drinkers, who are most likely to come from the highest income bracket, will pay the bulk of the tax. This group includes heavy drinkers, binge drinkers, and those who drink and drive. The dime per drink tax will result in a modest 6.6 percent average increase in the price of alcoholic beverages, and a 4.25 percent drop in alcohol consumption. Empirical evidence from other states and our own analysis of current prices and tax rates in Maryland and neighboring states suggest that this price increase will have an insignificant impact on cross-border shopping for alcohol.

Appendix A: State Alcohol Taxes (current as of February 1, 2010)

	Spirits Tax	Table Wine Tax	Beer Tax
Alabama	$18.78 (a)	$1.70	$1.05
Alaska	$12.80	$2.50	$1.07
Arizona	$3.00	$0.84	$0.16
Arkansas	$2.58	$0.77	$0.21
California	$3.30	$0.20	$0.20
Colorado	$2.28	$0.28	$0.08
Connecticut	$4.50	$0.60	$0.20
Delaware	$5.46	$0.97	$0.16
D.C.	$1.50	$0.30	$0.09
Florida	$6.50	$2.25	$0.48
Georgia	$3.79	$1.51	$1.01
Hawaii	$5.98	$1.38	$0.93
Idaho	$10.96 (a)	$0.45	$0.15
Illinois	$8.55	$1.39	$0.231
Indiana	$2.68	$0.47	$0.115
Iowa	$12.47 (a)	$1.75	$0.19
Kansas	$2.50	$0.30	$0.18
Kentucky	$6.46	$0.50	$0.08
Louisiana	$2.50	$0.11	$0.32
Maine	$5.21 (a)	$0.60	$0.35
Maryland	$1.50	$0.40	$0.09
Massachusetts	$4.05	$0.55	$0.11
Michigan	$10.91 (a)	$0.51	$0.20
Minnesota	$5.03	$0.30	$0.15
Mississippi	$6.75 (a)	$0.427	$0.427
Missouri	$2.00	$0.42	$0.06
Montana	$8.62 (a)	$1.06	$0.14
Nebraska	$3.75	$0.95	$0.31
Nevada	$3.60	$0.70	$0.16
New Hampshire	(c)	(b)	$0.30
New Jersey	$5.50	$0.875	$0.12
New Mexico	$6.06	$1.70	$0.41
New York	$6.44	$0.30	$0.14
N. Carolina	$13.39 (a)	$2.34	$0.9971
N. Dakota	$2.50	$0.50	$0.16
Ohio	$9.04 (a)	$0.32	$0.18
Oklahoma	$5.56	$0.72	$0.40
Oregon	$24.63 (a)	$0.67	$0.0839
Pennsylvania	$6.54 (a)	(b)	$0.08
Rhode Island	$3.75	$0.60	$0.11
S. Carolina	$5.42	$1.08	$0.77
S. Dakota	$3.93	$0.93 (s)	$0.27
Tennessee	$4.40	$1.21	$0.14
Texas	$2.40	$0.204	$0.20
Utah	$11.41 (a)	(b)	$0.41
Vermont	$0.68 (a)	$0.55	$0.265
Virginia	$20.13 (a)	$1.51	$0.2565
Washington	$26.45 (a)	$0.87	$0.26
West Virginia	$1.85 (a)	$1.00	$0.18
Wisconsin	$3.25	$0.25	$0.06
Wyoming	(c)	(b)	$0.019

(a) States where the state government controls all sales. The implied excise tax rate is calculated using methodology designed by the Distilled Spirits Council of the United States (DISCUS).

(b) All wine sales are through state-run stores. Revenue in these states is generated from various taxes, fees and net profits.

(c) Control state where the implied excise tax rate as calculated by DISCUS is less than zero.

Sources: State revenue departments, Distilled Spirits Council of the U.S., Commerce Clearing House, and Tax Foundation.

Appendix B: Systematic Review Methodology

We searched MEDLINE, Cochrane Library, and EBSCOhost Integrated Search (encompassing EconLit, Health Source, MEDLINE, PsycARTICLES, and PsycINFO databases), supplemented with examinations of reference lists of identified papers as well as searches of Google Scholar, without time limits. MEDLINE search terms included: Alcoholic beverages[MeSH] AND United States[MeSH] AND Border[All Fields]; Alcoholic beverages[MeSH] AND Border[All Fields] AND Taxes[MeSH]; Alcoholic beverages[MeSH] AND Border[All Fields] AND Commerce[MeSH]; Alcoholic Beverages/economics[MeSH] AND Border[All Fields]. MEDLINE search results were limited to those studies conducted on humans and published in English. EBSCOhost Integrated Search, utilizing SmartText Searching, included three sets of terms: "Cross border alcohol purchasing," "Cross border liquor purchasing," and "Cross border beer purchasing." The Cochrane Library did not contain any reviews pertinent to the subject under scrutiny.

The initial MEDLINE search (Alcoholic beverages and Border and United States) yielded 5 results; subsequent searches (Alcoholic beverages and Border and Taxes), (Alcoholic beverages and Border and Commerce) and (Alcoholic Beverages/Economics and Border) yielded 3, 5, and 7 results, respectively. EBSCOhost search of "Cross border alcohol purchasing" generated 674 results, "Cross border liquor purchasing" yielded 175 results, and "Cross border beer purchasing" produced 503 results.

All the identified studies were pre-screened for relevance to the topic. The reviewer rejected articles if the title and abstract were not related to cross border alcohol purchasing, interstate alcohol price or tax differentials, if they were published before 1980, or if they focused on international rather than domestic U.S. state borders. If it was unclear whether the article could be rejected, the full article was obtained and screened. Two reviewers assessed relevant studies to determine inclusion. Study results were synthesized using a qualitative narrative approach because of a lack of consistency of measured outcomes. This screening process yielded a total of 11 pertinent studies. The literature was then searched again for related studies by all included authors, resulting in identification of one follow-up article. Thus, our analysis included a total of 12 studies.

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