Recreational Marijuana Laws and Drinking Behavior: Effects by Age and Income

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Abstract

In 2012 Washington and Colorado became the first two states to legalize recreational marijuana. Since then, 13 more states have followed which leads to questions of how these policy changes are affecting health. This study examines the effects of recreational marijuana laws on alcohol consumption in adults. Using data from 2002-2019 for all 50 states and Washington D.C., I find evidence of increases in the average number of drinks per day and the probability of binge drinking associated with the enactment of an RML. I find that these increases are largest for younger adults, however, differential effects based on income are not observed. This study adds to the ongoing debate on whether alcohol and marijuana are substitutes or complements. Overall, this study provides evidence of complementary consumption of alcohol and marijuana however the relationship between these two drugs is not likely to be explained by RMLs alone. Results in this study may present more accurate estimates when compared to prior research as a result of more recent data and controls on recreational and medical dispensaries.

**Introduction**

In November of 2020, Arizona, Montana, New Jersey, and South Dakota all voted to legalize the recreational use of marijuana. These states are following a growing trend of marijuana law liberalization. California was the first state to legalize medical marijuana in 1996. Colorado and Washington were the first states to enact a recreational marijuana law (RML) in 2012. As of December 2020, there are 11 states with legal recreational marijuana and 4 states where recreational use will become legal in 2021 or 2022. Additionally, there are 37 states that have passed medical marijuana laws (MMLs). Most recently on December 4, 2020, the United States House of Representatives voted to decriminalize marijuana on the federal level.

Marijuana, alcohol and tobacco are the three most common recreational drugs. It is thus natural to ask how changes in one of these markets affects demand in the others. The present study focuses on the impact that RMLs specifically, have on alcohol consumption. If marijuana and alcohol are substitutes, we may see a decrease in alcohol consumption associated with RML passage. However, if they are complements, demand for alcohol would increase after RML passage. Increases in alcohol consumption as a result of marijuana policy could be harmful to the country. It is estimated that the United States lost over $200 billion dollars to excessive drinking in 2006 alone (Bouchery et al.; 2011)

The present study uses state-level data on adults from 2002-2019 to examine the effects of recreational marijuana laws on the number of drinks per day and the prevalence of binge drinking. I examine effects for the full sample as well as dividing the sample by age (18-34, 35-64, 65+) and income. Using a difference-in-difference model with a complementary event study, I find evidence that RML passage is associated with an increase in alcohol consumption across all ages and incomes. These increases are largest for those age 18-34 while increases appear to be similar across income groups.

I contribute to the literature in several ways. First, I conduct my analysis with the most recent data from 2019 to analyze the effects of RMLs. Many states have passed RMLs in the past few years and many past studies were unable to include them in their analysis. Secondly, I use controls for the existence of recreational and medical dispensaries to better estimate the effect of RMLs specifically a step that much of the prior research involving alcohol and RMLs has not taken. Combined these factors may lead to a more accurate estimate of the relationship between RMLs and alcohol use, an area of research which has not yet produced conclusive results. Lastly, I provide new analysis on the differential impacts of RMLs on alcohol use by income and age.

**Background and Literature Review**

Marijuana has been the focus of much legislation throughout the history of the United States. In 1970 the Controlled Substances Act was passed. This labelled marijuana as a schedule I drug which means it has a high potential for abuse and low accepted medical use. In the decades that followed some states began to decriminalize marijuana use and possession and they reduced penalties. In 1996 California became the first state to pass a medical marijuana law (MML). Accepted medical uses of marijuana include treatment of chronic pain, insomnia, and anxiety (Reinarman, Nunberg, Lanthier, & Heddleston; 2011). In 2012, Colorado and Washington became the first states to legalize recreational marijuana. Most recently, on December 4, 2020 the United States House of Representatives voted to decriminalize marijuana and take it off Schedule I status. As of December 2020, 37 states have passed an MML and 15 states have passed an RML.

Prior research has found that this liberalization of marijuana policy has increased marijuana use in adults. Cerda et al. (2019) used national data from 2008-2016 and found that past month marijuana use and cannabis use disorder increased in those 26 or older after the enactment of an RML. Pacula, Powell, Heaton, and Sevigny (2015) find no effect of MMLs on recreational marijuana use. However, when examining heterogeneity in marijuana policy they find that states that allow for medical dispensaries see more recreational marijuana use. Thus, dispensaries likely play an important role in changing demand in relation to the crafting of marijuana policy

The relationship between alcohol and marijuana use/policy is not clear and findings have varied over time. One of the earliest studies on the topic found evidence of substitution. Using data on high school seniors in 43 states from 1980-1989 DiNardo and Lemieux (2001) found that increases in the legal drinking age resulted in increases in marijuana use. However, others have found evidence that marijuana and alcohol are complements. Pacula (1998) found that individual beer and marijuana consumption decreases as beer prices increase. Williams, Pacula, Chaloupka, and Wechsler (2004) found a negative relationship between the cost of illicit marijuana and the demand for marijuana and alcohol among college students.

More recently, some authors have examined how demand for alcohol changes once young adults reach the legal drinking age. Being able to legally drink should reduce one of the costs of alcohol use. A decrease in marijuana consumption at the legal drinking age would suggests substitution while an increase in marijuana use would suggest complementarity. Results using this method are mixed. Yörük & Yörük (2011, 2013) find evidence of increased marijuana use at the legal drinking age suggesting complementarity while others find evidence of decreased use suggesting substitution (Crost & Guerrero, 2012; Crost & Rees, 2013).

A meta-analysis by Guttmannova et al. (2016) found evidence of substitution and complimentary effects for medical marijuana policies. Regarding RMLs, Washington and Colorado were the only two states with significant recreational markets at the time of writing. However, Washington state liquor laws underwent a serious change in late 2011 that increased alcohol sales making it difficult to separate out the effects of Washington’s RML on alcohol use.

Alley, Kerr, and Bae (2019) examined substance use in U.S. college students age 18-26 from 2008-2018 and found a 6% decrease in the probability of an individual binge drinking associated with the existence of an RML in data from 2008-2018. However, this analysis did not control for dispensaries which may affect results. Properly controlling for dispensaries as well as using more recent data in the present study may allow for new findings of the effects of RMLs on alcohol consumption. To that point, Wen, Hockenberry, and Cummings (2015) found evidence of increased binge drinking in response to MMLs and this study used dispensary controls. It is possible that dispensaries moderate the relationship between marijuana legalization and alcohol consumption. Thus, in controlling for dispensaries in my analysis I may see an increase in alcohol consumption after the enactment of an RML.

**Methods**

*Data*

The primary source of data for this study is the Behavioral Risk Factor Surveillance System (BRFSS) annual survey data from 2002-2019. This data is collected by all 50 states, the District of Columbia, American Samoa, Palau, Puerto Rico, the U.S. Virgin Islands, and Guam. However, this analysis will only focus on the 50 states and D.C. The data is compiled by the CDC into one national dataset for each year. BRFSS contains hundreds of variables on a variety of health measures. Most importantly for this study it contains data on the average number of alcoholic drinks an individual has per day in the past month and whether or not they have engaged in binge drinking in the past thirty days. An alcoholic drink is defined as a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. Binge drinking which will be treated as a dummy variable in this study is defined as 5 or more drinks for males and 4 or more drinks for females during one occasion.

BRFSS started collecting data in 1984 although it didn’t collect from all 50 states until 1993. This survey was conducted exclusively through landline phone calls until 2011 when cell phone surveys began being included. Participants 18 years of age or older are reached through random digit dialing and are not compensated. BRFSS uses advanced weighting techniques to ensure that its data is representative of the state it’s surveying.

Data on medical and recreational marijuana laws as well as legal and operational dispensaries were obtained from Powell et al. (2018). This dataset contains data for every year in each state. It has four separate variables for whether or not a state had a medical marijuana law, recreational marijuana law, legal and operational medical marijuana dispensary, and legal and operational recreational marijuana dispensary. Frequently, there is a gap between the legalization of the dispensaries and the opening of the first dispensary. Thus, the existence of a legal and operational dispensary is used instead of the existence of a dispensary law.

To adjust incomes for inflation, I use data from the St. Louis Federal Reserve: “Inflation, consumer prices for the United States” (FRED, 2020). Additionally, yearly state-level data on distilled spirit, beer, and wine excise tax rates was retrieved from Tax Policy Center (2020) who gathered the data from multiple sources.

BRFSS only started providing data on marijuana use 2017 so this study will not be able to directly observe marijuana use and its context (recreational or medicinal). However, these controls on dispensaries, medical marijuana laws and other factors that vary by state and year should control for many effects not related to recreational marijuana laws and allow a causal interpretation of any results found. Prior research showing that RMLs result in increased adult use of marijuana allows the assumption that changes in alcohol consumption will come as a response to the increase in quantity of marijuana demanded.

*Econometric Method*

This paper follows the model from Sabia, Swigert, and Young (2015) used to analyze the effects of medical marijuana on bodyweight. Here we will be evaluating recreational marijuana’s effect on drinking behavior. The model is:

*Y*ist = *β*0 + *β*1RMLst + *β*2*X*st + *β*3*Z*ist + *v*s + ωt + εist (1)

where *Y*ist is a measurement of the outcome variables (average drinks per day and binge drinking prevalence) for an individual *i* in state *s* in year *t*. RML is whether or not a state *s* had a recreational marijuana law for a given year *t*. *X*st presents state-varying time controls (such as medical marijuana laws, the presence of marijuana dispensaries, and state alcohol taxes). *Z*ist are individual level controls such as gender, marital status, education, income race, etc. State fixed effects are given by *v*s and year fixed effects are given by ωt. The coefficient of interest is *β*1 and it provides an estimate of the effect of a recreational marijuana law on the average number of alcoholic drinks per day or the probability that one engages in binge drinking. All standard errors are clustered by state.

This paper will also feature an event study to assess the lagged effects of an RML and to observe any trends before its passage. This event study follows the model set forth by Powell, Pacula, and Jacobson (2018). There are seven indicators: 6 or more years before RML adoption, 5-4 years before RML adoption, 3-2 years before RML adoption, 1 year before RML adoption, year of RML adoption, 1-2 years after RML adoption, 3-4 years after RML adoption, and 5 or more years after RML adoption. The model is as follows:

*Y*ist = *β*0 + *β*1⋅*I*st(*t* *≤* -6) + *β*2⋅*I*st(*t* = -4, -5) + *β*3⋅*I*st(*t* = -2, -3) + *β*4⋅*I*st(*t* = 0) + *β*5⋅*I*st(*t* = 1, 2) + *β*6⋅*I*st(*t* = 3, 4) + *β*7⋅*I*st(*t* ≥ 5) + *β*8*X*st + *β*9*Z*ist + *v*s + ωt + εist (2)

Where *t* is the year relative to a state’s adoption of an RML (negative numbers indicate time before an RML and positive numbers indicate time after an RML). Thus, *I*st(*t* = -2, -3) takes on a value of 1 when an observation is recorded 2 or 3 years before the passage of an RML in a respondent’s state. The year before RML adoption serves as the baseline to observe changes in alcohol consumption. *I*(*t* = -1) is not included in the model as doing so would produce perfect multicollinearity. All other variables are the same as in Equation 1.

In theory the coefficients *β*1, *β*2,and *β*3 should not be distinguishable from zero as we would not expect changes in alcohol consumption until after an RML is passed at which point I would expect positive coefficients for *β*4, *β*5, *β*6,and *β*7 indicating the average number of drinks and the probability of binge drinking is greater the year of RML adoption and 1-2 years, 3-4 years and 5 or more years after RML adoption when compared to the year before RML adoption.

I will also conduct these analyses for the full sample and by categories of age and income. Age will be separated into three categories: 18-34, 35-64, and 65 or older. BRFSS provides income data in the following categories: less than $10,000, $10,000 - $15,000, $15,000 - $20,000, $20,000 - $25,000, $25,000 - $35,000, $35,000 - $50,000, $50,000 - $75,000, and more than $75,000. To adjust for inflation from 2002 to 2019, I created a new income variable that was equal to the lower bound of the income category that an individual belonged to. Then, I adjust for inflation using chained 2002 dollars. Finally, I separate this inflation adjusted income into three categories: below $25,000, $25,000 - $50,000, and over $50,000.

I expect to see larger increases in alcohol consumption for younger age groups consistent with the higher rates of alcohol and marijuana use in these groups. I also expect to see larger increases in alcohol consumption for those of higher income. Low income individuals may be more likely to choose to substitute alcohol for marijuana once marijuana becomes legal in order to save money.

***R*esults**

Table 1 presents summary statistics for the entire population. These are broken down further by income in Table 2 and age in Table 3. Note that in this sample the average number of drinks per day is 1.3 and the percent of the sample that binge drinks is 12.2%. The average number of drinks and probability of binge drinking is lowest for the lowest income bracket and higher for the middle-income bracket. Average drinks per day and binge drinking is highest in those age 18-34, higher than average in those 35-64, and lowest in those 65 or older. Overall, about 5% of the sample had an RML in place during the year of the interview.

Table 4 presents the results of the difference-in-difference estimation outlined in Equation 1 above for the entire population. There is a positive effect of the passing of an RML on the number of drinks per day and the prevalence of binge drinking. I find an increase of .06 drinks per day (*p* = .045) associated with the passage of an RML. I find an increase of .9 % (p = .003) in the probability of binge drinking associated with the passage of an RML.

Table 5 presents the results of the event study for RML passage outlined in Equation 2 above. For the average number of drinks per day there is a marginally significant increase (*p* = .061) in the in the year of RML adoption. This increase is highly significant in the periods 1-2 years and 3-4 years after adoption (p < .001) where an RML is associated with an increase of 0.22 drinks per day. The coefficient shrinks at 5 years after adoption and is only marginally significant (p = .057).

I also find a significant increase in binge drinking starting associated with RML adoption. This increase is significant (p < .001) the year of 1-2 years after and 3-4 years after RML adoption where the effect of an RML peaks at a 2.8% increase in the probability of binge drinking. However, five years after adoption this increase in binge drinking shrinks and is no longer significant. Plots of these event studies can be found in Figures 1 and 2.

Table 6 and Figures 3-5 present the results of the event study for RML’s effect on drinks per day separated by income level. For those of low income, a significant increase in drinks per day is observed starting the year of adoption (*p* < .001). This increase become larger but also less significant in later periods. Additionally, two of the pre-RML periods show significant increases in drinks per day so these results are not clear. There is also no clear effect of RML adoption on drinks per day in middle income individuals. For those of high income, a significant increase is observed starting in the year of RML adoption (*p* = .012). This increase becomes largest in the period 3-4 years after adoption where an RML is associated with an increase of 0.26 drinks per day (*p* < .001). This coefficient shrinks but is still highly significant (*p* = .007) 5 or more years after RML adoption.

Table 7 and Figures 6-8 present the results of the event study for RML’s effect on binge drinking separated by income level. For those of low income, the results are similar to those for average drinks per day. Significant increases are observed in the pre and post periods when compared to the baseline of the year before RML adoption. This increase is largest 3-4 years after RML adoption when an RML is associated with an increase of 3.5% drinks per day (*p* < .001). Again, the coefficient shrinks and is no longer significant 5 or more years after adoption. For middle-income individuals we see similar results. Significant positive associations with binge drinking are observed before and after RML adoption. This association is largest 1-2 years after adoption when binge drinking increases by 3.6%. This increase becomes smaller over time and is no longer significant 5 or more years after adoption. For those of high income, a highly significant increase in binge drinking (p < .001) is observed in the year of adoption. At 3-4 years after RML adoption there is a 2.2% increase in binge drinking (*p* = .027), however at 5 or more years after RML adoption the effect shrinks and is no longer significant.

Table 8 and Figures 9-11 present the results of the event study for RML’s effect on drinks per day separated by age level. For those age 18-34, a clear association between RMLs and average drinks is observed. A highly significant increase in drinks per day is observed for all three periods after RML adoption (p < .001). The effect is largest 3-4 years after RML adoption when an RML is associated with an increase of 0.41 drinks per day. For those age 35-64, a significant increase is seen 1-2 and 3-4 years after adoption (*p* < .01). An increase of 0.13 drinks per day is observed 3-4 years after RML adoption. Similar to past results, no increase is observed 5 or more years after adoption. For those age 65 and older, a highly significant increase in drinks per day is observed in the year of RML adoption (p < .001). This increase remains significant for all post-RML periods (*p* < .05) and the largest increase is 0.11 drinks per day observed 1-2 years after RML adoption. It is worth noting, the period 4-5 years before adoption is also associated with an increase in drinks per day which limits the interpretability.

Finally, Table 9 and Figures 12-14 present the results of the event study for RML’s effect on binge drinking separated by age level. For those age 18-34, a highly significant increase in drinks per day is observed starting in the year of RML adoption and continuing through 4 years after adoption (*p* < .001). This effect is largest 1-2 years after adoption where an RML is associated with a 4.0% increase in binge drinking. At 5 or more years after adoption, the effect is smaller and no longer significant. It is worth noting that the period 6 or more years before adoption also appears as significant. For those age 35-64 a highly significant increase is observed in the year of adoption (*p* = .001), 1-2 years after adoption (*p* = .005), and 4-5 years after adoption (*p* < .001). This increase loses its significance 5+ years after adoption. An increase in binge drinking of 2.9% is the largest effect and is observed 3-4 years after adoption. For those age 65 or older, the only significant increase in binge drinking is 0.9% (p = .041). and is observed 3-4 years after adoption.

**Discussion**

My findings present evidence of RML adoption leading to an increase in alcohol consumption. This effect is observed in both the number of drinks per day and the prevalence of binge drinking. In most cases these effects become noticeable starting 1-2 years after RML adoption and reach their peak 3-4 years after adoption. However, in many cases the increase in alcohol consumption is no longer significant 5 or more years after RML adoption. In some cases, this is because of a wider confidence interval on the coefficient. However, in other cases the coefficient shrinks. This raises the question of whether increases in alcohol consumption are a long-term effect of RML adoption of just a short-term response in the first few years of the recreational market opening.

Event analysis studies did not always show clear increases alcohol consumption exclusively related to RMLs. Often, periods before the passage of an RML would appear as significant. However, looking at the overall trend in the analysis. The majority of the pre-RML periods were not significantly different from zero and the majority of the post-RML periods showed significant positive increases in alcohol consumption.

When examining the effects by income, increases in average drinks per day are observed for low and high-income individuals, although larger increases are seen for high income individuals. Binge drinking increased for all income groups. This study does not provide strong evidence of differential impacts of RML on alcohol consumption. When separated by age, I find increases in the number of drinks per day and the prevalence of binge drinking after RML adoption for all age groups. Younger age groups see larger increases in average drinks per day and binge drinking.

Observed increases in alcoholic drinks per day were small. Previous research by Wen, Hockenberry, and Cummings (2015) found an increase of 0.9 drinks per day associated with MMLs. In the full sample I found that an RML was associated with an increase of .06 drinks per day. Unfortunately, these authors examined the number of binge drinking days and not whether or not an individual binge drinks. So, my results are not comparable for that metric. However, my results do contrast those of Alley, Kerr, and Bae (2019) who found a 6% decrease in the probability of binge drinking for those age 18-26 associated with RML passage. Earlier I posited that my controlling for dispensaries where they did not could change the relationship of RMLs and marijuana and it appears that it might have.

This study provides evidence of alcohol and recreational marijuana as complimentary goods. In most cases, increases in alcohol consumption are observed after RML adoption and in no cases is a significant decrease seen. I claim that alcohol and marijuana are complimentary goods with caution though. The existence of an RML is just one factor that could be associated with the total cost of marijuana. While RMLs should increase demand for marijuana it may be the case that the existence of dispensaries overshadows the effects of RMLs as this determines ease of access to marijuana. Indeed, although recreational marijuana dispensaries were merely a control in this study and not mean to be the subject of analysis, they frequently appear to have a significant negative effect on alcohol consumption. It is likely that the relationship between marijuana policy and alcohol consumption is more nuanced.

**Conclusion**

The goal of this study was to explore the relationship between recreational marijuana laws and alcohol consumption as measured by the average number of alcoholic drinks per day and the probability of binge drinking. I incorporated important controls for recreational and medical dispensaries and used updated data on all 50 states and Washington D.C. to attempt to clarify previous mixed findings on the relationship between marijuana and alcohol. Additionally, I explored effects by income and age in a way that had not been done previously.

Overall, this study provides evidence that RMLs increase the average number of drinks per day for an individual and their probability of binge drinking. These increases are observed across income levels and age groups. Increases are larger for those age 18-34 when compared to older individuals. In total, this would suggest complementarity between alcohol and marijuana although this is not certain as other factors like dispensaries may be more helpful in explaining this relationship. Regardless, of the nature of the relationship between marijuana and alcohol, policymakers should expect to see increases in alcohol consumption associated with the passage of an RML. Marijuana policy has effects that extend far beyond marijuana usage. Prior studies have found connections to crime, opioid use, and here we see evidence of increased alcohol consumption. Second order effects such as these must be considered as more states consider drafting marijuana legislation.

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**Table 1: Descriptive Statistics- Full Sample**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Observations | Mean | Std. Dev. |  |  |
| Drinks per day | 5762525 | 1.314 | 2.103 |  |  |
| Binge Drinking | 6975238 | .122 | .327 |  |  |
| RML effective | 7278883 | .048 | .212 |  |  |
| 6+ years before RML adoption | 7278883 | .103 | .304 |  |  |
| 4-5 years before RML adoption | 7278883 | .03 | .17 |  |  |
| 2-3 years before RML adoption | 7278883 | .026 | .159 |  |  |
| Year of RML adoption | 7278883 | .012 | .108 |  |  |
| 1-2 years after RML adoption | 7278883 | .02 | .141 |  |  |
| 3-4 years after RML adoption | 7278883 | .01 | .101 |  |  |
| 5+ years after RML adoption | 7278883 | .006 | .08 |  |  |
| MML effective | 7278883 | .368 | .478 |  |  |
| Recreational marijuana dispensary | 7278883 | .03 | .168 |  |  |
| Medical marijuana dispensary | 7278883 | .181 | .378 |  |  |
| Hispanic | 7224765 | .066 | .248 |  |  |
| White | 7278883 | .782 | .413 |  |  |
| Black | 7278883 | .079 | .27 |  |  |
| Married | 7278883 | .536 | .499 |  |  |
| Has children in household | 7235418 | .285 | .451 |  |  |
| College | 7251384 | .347 | .476 |  |  |
| Highschool | 7251384 | .911 | .284 |  |  |
| Income over $50,000 | 6181541 | .442 | .497 |  |  |
| Unemployed | 7278883 | .046 | .21 |  |  |
| Student | 7278883 | .023 | .149 |  |  |
| Unable to Work | 7278883 | .069 | .253 |  |  |
|  | | | | | |

**Table 2: Descriptive statistics: Income < $25,000 (2002 Dollars)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | N | mean | sd |
| Drinks per day | 1869824 | 1.182 | 2.343 |
| Binge Drinking | 2422124 | .102 | .303 |
| RML effective | 2513667 | .041 | .196 |
| 6+ years before RML adoption | 2513667 | .102 | .302 |
| 4-5 years before RML adoption | 2513667 | .028 | .165 |
| 2-3 years before RML adoption | 2513667 | .023 | .151 |
| 1 Year before RML adoption | 2513667 | 0 | 0 |
| Year of RML adoption | 2513667 | .01 | .102 |
| 1-2 years after RML adoption | 2513667 | .018 | .132 |
| 3-4 years after RML adoption | 2513667 | .008 | .089 |
| 5+ years after RML adoption | 2513667 | .005 | .073 |
| MML effective | 2513667 | .342 | .471 |
| Recreational marijuana dispensary | 2513667 | .025 | .154 |
| Medical marijuana dispensary open | 2513667 | .167 | .366 |
| Hispanic | 2495716 | .1 | .301 |
| White | 2513667 | .702 | .457 |
| Black | 2513667 | .117 | .321 |
| Married | 2513667 | .317 | .465 |
| Has children in household | 2509641 | .244 | .43 |
| College | 2508999 | .157 | .364 |
| Highschool | 2508999 | .835 | .372 |
| Unemployed | 2513667 | .078 | .268 |
| Student | 2513667 | .029 | .167 |
| Unable to Work | 2513667 | .14 | .347 |

**Income $25,000-$50,000 (2002 Dollars)**

|  |  |  |  |
| --- | --- | --- | --- |
| Drinks per day | 1592242 | 1.425 | 2.052 |
| Binge Drinking | 1894246 | .135 | .342 |
| RML effective | 1944272 | .04 | .194 |
| 6+ years before RML adoption | 1944272 | .115 | .319 |
| 4-5 years before RML adoption | 1944272 | .03 | .171 |
| 2-3 years before RML adoption | 1944272 | .026 | .158 |
| 1 Year before RML adoption | 1944272 | 0 | 0 |
| Year of RML adoption | 1944272 | .01 | .102 |
| 1-2 years after RML adoption | 1944272 | .017 | .128 |
| 3-4 years after RML adoption | 1944272 | .009 | .094 |
| 5+ years after RML adoption | 1944272 | .005 | .068 |
| MML effective | 1944272 | .351 | .473 |
| Recreational marijuana dispensary | 1944272 | .025 | .154 |
| Medical marijuana dispensary open | 1944272 | .155 | .354 |
| Hispanic | 1936771 | .047 | .212 |
| White | 1944272 | .829 | .377 |
| Black | 1944272 | .063 | .243 |
| Married | 1944272 | .615 | .487 |
| Has children in household | 1940925 | .297 | .457 |
| College | 1942863 | .38 | .485 |
| Highschool | 1942863 | .967 | .179 |
| Unemployed | 1944272 | .029 | .167 |
| Student | 1944272 | .015 | .122 |
| Unable to Work | 1944272 | .024 | .153 |

**Income > 50,000 (2002 Dollars)**

|  |  |  |  |
| --- | --- | --- | --- |
| Drinks per day | 2300459 | 1.344 | 1.917 |
| Binge Drinking | 2658868 | .129 | .336 |
| RML effective | 2820944 | .06 | .235 |
| 6+ years before RML adoption | 2820944 | .096 | .295 |
| 4-5 years before RML adoption | 2820944 | .031 | .173 |
| 2-3 years before RML adoption | 2820944 | .028 | .165 |
| 1 Year before RML adoption | 2820944 | 0 | 0 |
| Year of RML adoption | 2820944 | .014 | .117 |
| 1-2 years after RML adoption | 2820944 | .025 | .156 |
| 3-4 years after RML adoption | 2820944 | .013 | .115 |
| 5+ years after RML adoption | 2820944 | .008 | .092 |
| MML effective | 2820944 | .402 | .486 |
| Recreational marijuana dispensary | 2820944 | .038 | .189 |
| Medical marijuana dispensary open | 2820944 | .212 | .401 |
| Hispanic | 2792278 | .048 | .213 |
| White | 2820944 | .821 | .383 |
| Black | 2820944 | .056 | .23 |
| Married | 2820944 | .677 | .468 |
| Has children in household | 2784852 | .313 | .464 |
| College | 2799522 | .495 | .5 |
| Highschool | 2799522 | .942 | .234 |
| Unemployed | 2820944 | .03 | .17 |
| Student | 2820944 | .022 | .148 |
| Unable to Work | 2820944 | .036 | .187 |

**Table 3: Descriptive statistics: Age 18-34**

|  |  |  |  |
| --- | --- | --- | --- |
|  | N | mean | sd |
| Drinks per day | 929973 | 1.969 | 2.846 |
| Binge Drinking | 1078284 | .248 | .432 |
| RML effective | 1130869 | .052 | .22 |
| 6+ years before RML adoption | 1130869 | .108 | .31 |
| 4-5 years before RML adoption | 1130869 | .028 | .166 |
| 2-3 years before RML adoption | 1130869 | .024 | .154 |
| 1 Year before RML adoption | 1130869 | 0 | 0 |
| Year of RML adoption | 1130869 | .013 | .112 |
| 1-2 years after RML adoption | 1130869 | .022 | .147 |
| 3-4 years after RML adoption | 1130869 | .011 | .105 |
| 5+ years after RML adoption | 1130869 | .007 | .083 |
| MML effective | 1130869 | .364 | .477 |
| Recreational marijuana dispensary | 1130869 | .034 | .18 |
| Medical marijuana dispensary open | 1130869 | .183 | .38 |
| Hispanic | 1124895 | .133 | .34 |
| White | 1130869 | .665 | .472 |
| Black | 1130869 | .098 | .297 |
| Married | 1130869 | .397 | .489 |
| Has children in household | 1122614 | .548 | .498 |
| College | 1127759 | .32 | .466 |
| Highschool | 1127759 | .912 | .283 |
| Income over $50,000 | 967891 | .398 | .49 |
| Unemployed | 1130869 | .078 | .268 |
| Student | 1130869 | .124 | .329 |
| Unable to Work | 1130869 | .026 | .158 |

**Table 3: Descriptive statistics: Age 35-64**

|  |  |  |  |
| --- | --- | --- | --- |
| Drinks per day | 3086158 | 1.403 | 2.059 |
| Binge Drinking | 3714889 | .134 | .34 |
| RML effective | 3872428 | .044 | .204 |
| 6+ years before RML adoption | 3872428 | .112 | .315 |
| 4-5 years before RML adoption | 3872428 | .031 | .173 |
| 2-3 years before RML adoption | 3872428 | .026 | .159 |
| 1 Year before RML adoption | 3872428 | 0 | 0 |
| Year of RML adoption | 3872428 | .011 | .105 |
| 1-2 years after RML adoption | 3872428 | .019 | .136 |
| 3-4 years after RML adoption | 3872428 | .01 | .097 |
| 5+ years after RML adoption | 3872428 | .006 | .075 |
| MML effective | 3872428 | .364 | .477 |
| Recreational marijuana dispensary | 3872428 | .028 | .162 |
| Medical marijuana dispensary open | 3872428 | .171 | .37 |
| Hispanic | 3845272 | .067 | .25 |
| White | 3872428 | .775 | .417 |
| Black | 3872428 | .084 | .277 |
| Married | 3872428 | .615 | .487 |
| Has children in household | 3845419 | .358 | .479 |
| College | 3857871 | .383 | .486 |
| Highschool | 3857871 | .928 | .258 |
| Income over $50,000 | 3421844 | .529 | .499 |
| Unemployed | 3872428 | .056 | .231 |
| Student | 3872428 | .006 | .078 |
| Unable to Work | 3872428 | .096 | .294 |

**Table 3: Descriptive statistics: Age 65+**

|  |  |  |  |
| --- | --- | --- | --- |
| Drinks per day | 1746394 | .807 | 1.512 |
| Binge Drinking | 2182065 | .038 | .192 |
| RML effective | 2275586 | .052 | .221 |
| 6+ years before RML adoption | 2275586 | .086 | .281 |
| 4-5 years before RML adoption | 2275586 | .029 | .167 |
| 2-3 years before RML adoption | 2275586 | .027 | .161 |
| 1 Year before RML adoption | 2275586 | 0 | 0 |
| Year of RML adoption | 2275586 | .012 | .111 |
| 1-2 years after RML adoption | 2275586 | .022 | .146 |
| 3-4 years after RML adoption | 2275586 | .011 | .105 |
| 5+ years after RML adoption | 2275586 | .007 | .086 |
| MML effective | 2275586 | .376 | .481 |
| Recreational marijuana dispensary | 2275586 | .032 | .173 |
| Medical marijuana dispensary open | 2275586 | .196 | .39 |
| Hispanic | 2254598 | .03 | .172 |
| White | 2275586 | .852 | .355 |
| Black | 2275586 | .061 | .239 |
| Married | 2275586 | .471 | .499 |
| Has children in household | 2267385 | .031 | .173 |
| College | 2265754 | .3 | .458 |
| Highschool | 2265754 | .883 | .322 |
| Income over $50,000 | 1791806 | .301 | .459 |
| Unemployed | 2275586 | .013 | .112 |
| Student | 2275586 | .001 | .029 |
| Unable to Work | 2275586 | .044 | .205 |

|  |  |  |
| --- | --- | --- |
|  | (1) | (2) |
| **Table 4** | Drinks per day | Binge Drinking |
|  |  |  |
| RML effective | 0.0618\*\* | 0.0090\*\*\* |
|  | (0.0297) | (0.0028) |
| MML effective | 0.0112 | -0.0038 |
|  | (0.0260) | (0.0023) |
| Medical marijuana dispensary | 0.0210 | -0.0027 |
|  | (0.0267) | (0.0028) |
| Recreational marijuana dispensary | -0.0751\* | -0.0118\*\*\* |
|  | (0.0384) | (0.0029) |
| Hispanic | 0.4135\*\*\* | 0.0440\*\*\* |
|  | (0.0510) | (0.0053) |
| White | 0.3350\*\*\* | 0.0700\*\*\* |
|  | (0.0323) | (0.0044) |
| Black | -0.0168 | 0.0076 |
|  | (0.0395) | (0.0048) |
| Married | -0.2457\*\*\* | -0.0390\*\*\* |
|  | (0.0145) | (0.0008) |
| Has children in household | -0.1401\*\*\* | -0.0325\*\*\* |
|  | (0.0085) | (0.0017) |
| College | -0.1693\*\*\* | -0.0061\*\* |
|  | (0.0212) | (0.0024) |
| Highschool | -0.0000 | 0.0117\*\*\* |
|  | (0.0222) | (0.0023) |
| Income | 0.0325\*\*\* | 0.0090\*\*\* |
|  | (0.0057) | (0.0012) |
| Unemployed | -0.0169 | -0.0166\*\*\* |
|  | (0.0186) | (0.0018) |
| Student | -0.5138\*\*\* | -0.0762\*\*\* |
|  | (0.0270) | (0.0040) |
| Unable to Work | -0.4212\*\*\* | -0.0577\*\*\* |
|  | (0.0235) | (0.0019) |
| Male | 0.8527\*\*\* | 0.1061\*\*\* |
|  | (0.0284) | (0.0031) |
| Age | -0.2645\*\*\* | -0.0504\*\*\* |
|  | (0.0054) | (0.0014) |
| Constant | 1.8738\*\*\* | 0.2440\*\*\* |
|  | (0.0726) | (0.0068) |
|  |  |  |
| Observations | 3,834,320 | 4,584,061 |
| R-squared | 0.0985 | 0.0804 |

Standard errors in parentheses are clustered at the state level. \* p < 0.10 \*\* p < 0.05. \*\*\* p < 0.01.

|  |  |  |
| --- | --- | --- |
|  | (1) | (2) |
| **Table 5** | Drinks per day | Binge Drinking |
|  |  |  |
| 6+ years before RML adoption | 0.0276 | 0.0073\*\*\* |
|  | (0.0605) | (0.0023) |
| 4-5 years before RML adoption | -0.0076 | 0.0091\* |
|  | (0.0363) | (0.0045) |
| 2-3 years before RML adoption | 0.0226 | 0.0005 |
|  | (0.0324) | (0.0028) |
| Year of RML adoption | 0.0453\* | 0.0098\*\*\* |
|  | (0.0234) | (0.0018) |
| 1-2 years after RML adoption | 0.1929\*\*\* | 0.0260\*\*\* |
|  | (0.0222) | (0.0046) |
| 3-4 years after RML adoption | 0.2206\*\*\* | 0.0275\*\*\* |
|  | (0.0318) | (0.0045) |
| 5+ years after RML adoption | 0.1340\* | 0.0136 |
|  | (0.0680) | (0.0091) |
| MML effective | 0.0075 | -0.0049\* |
|  | (0.0279) | (0.0026) |
| Medical marijuana dispensary | 0.0226 | -0.0020 |
|  | (0.0277) | (0.0028) |
| Recreational marijuana dispensary | -0.1903\*\*\* | -0.0231\*\*\* |
|  | (0.0361) | (0.0037) |
| Hispanic | 0.4130\*\*\* | 0.0439\*\*\* |
|  | (0.0508) | (0.0053) |
| White | 0.3345\*\*\* | 0.0699\*\*\* |
|  | (0.0321) | (0.0044) |
| Black | -0.0173 | 0.0075 |
|  | (0.0393) | (0.0048) |
| Married | -0.2456\*\*\* | -0.0390\*\*\* |
|  | (0.0146) | (0.0008) |
| Has children in household | -0.1402\*\*\* | -0.0326\*\*\* |
|  | (0.0085) | (0.0017) |
| College | -0.1694\*\*\* | -0.0061\*\* |
|  | (0.0212) | (0.0024) |
| Highschool | -0.0000 | 0.0117\*\*\* |
|  | (0.0222) | (0.0023) |
| Income | 0.0326\*\*\* | 0.0090\*\*\* |
|  | (0.0058) | (0.0012) |
| Unemployed | -0.0169 | -0.0166\*\*\* |
|  | (0.0186) | (0.0018) |
| Student | -0.5138\*\*\* | -0.0762\*\*\* |
|  | (0.0270) | (0.0040) |
| Unable to Work | -0.4213\*\*\* | -0.0577\*\*\* |
|  | (0.0233) | (0.0019) |
| Male | 0.8527\*\*\* | 0.1061\*\*\* |
|  | (0.0284) | (0.0031) |
| Age | -0.2645\*\*\* | -0.0504\*\*\* |
|  | (0.0054) | (0.0014) |
|  | (0.0160) | (0.0022) |
| Constant | 1.8711\*\*\* | 0.2432\*\*\* |
|  | (0.0724) | (0.0070) |
|  |  |  |
| Observations | 3,834,320 | 4,584,061 |
| R-squared | 0.0985 | 0.0804 |

Standard errors in parentheses are clustered at the state level. \* p < 0.10 \*\* p < 0.05. \*\*\* p < 0.01.



|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| **Table 6** | Average Drink  Low Income | Average Drinks  Middle Income | Average Drinks  High Income |
|  |  |  |  |
| 6+ years before RML adoption | 0.1659\*\*\* | 0.0052 | -0.0810 |
|  | (0.0560) | (0.0683) | (0.0505) |
| 4-5 years before RML adoption | -0.0305 | -0.0459 | 0.0526 |
|  | (0.0312) | (0.0482) | (0.0524) |
| 2-3 years before RML adoption | 0.0835\*\* | -0.0368 | 0.0227 |
|  | (0.0331) | (0.0326) | (0.0516) |
| Year of RML adoption | 0.1102\*\*\* | -0.0951\*\* | 0.0614\*\* |
|  | (0.0284) | (0.0432) | (0.0231) |
| 1-2 years after RML adoption | 0.1284\*\* | 0.1260 | 0.2164\*\*\* |
|  | (0.0592) | (0.1049) | (0.0327) |
| 3-4 years after RML adoption | 0.1634\* | 0.0433 | 0.2603\*\*\* |
|  | (0.0934) | (0.1236) | (0.0283) |
| 5+ years after RML adoption | 0.0193 | -0.0322 | 0.1996\*\*\* |
|  | (0.1105) | (0.1180) | (0.0691) |
| MML effective | 0.0252 | -0.0655\*\* | 0.0177 |
|  | (0.0478) | (0.0317) | (0.0301) |
| Medical marijuana dispensary | 0.0134 | 0.0277 | -0.0009 |
|  | (0.0447) | (0.0362) | (0.0224) |
| Recreational marijuana dispensary | -0.0969 | -0.1681\* | -0.2023\*\*\* |
|  | (0.0724) | (0.0832) | (0.0436) |
| Hispanic | 0.3468\*\*\* | 0.5593\*\*\* | 0.3643\*\*\* |
|  | (0.0455) | (0.0594) | (0.0642) |
| White | 0.2385\*\*\* | 0.3220\*\*\* | 0.4043\*\*\* |
|  | (0.0366) | (0.0358) | (0.0362) |
| Black | -0.0109 | -0.0685 | -0.0321 |
|  | (0.0464) | (0.0424) | (0.0453) |
| Married | -0.3054\*\*\* | -0.3908\*\*\* | -0.1601\*\*\* |
|  | (0.0223) | (0.0172) | (0.0124) |
| Has children in household | -0.1417\*\*\* | -0.1089\*\*\* | -0.1408\*\*\* |
|  | (0.0144) | (0.0164) | (0.0111) |
| College | -0.1408\*\*\* | -0.2495\*\*\* | -0.1521\*\*\* |
|  | (0.0238) | (0.0187) | (0.0213) |
| Highschool | -0.0765\*\*\* | -0.1967\*\*\* | 0.1520\*\*\* |
|  | (0.0170) | (0.0479) | (0.0433) |
| Unemployed | -0.0009 | 0.0814\*\* | -0.0630\*\* |
|  | (0.0277) | (0.0394) | (0.0270) |
| Student | -0.3692\*\*\* | -0.5684\*\*\* | -0.5498\*\*\* |
|  | (0.0431) | (0.0443) | (0.0536) |
| Unable to Work | -0.3390\*\*\* | -0.3445\*\*\* | -0.4712\*\*\* |
|  | (0.0255) | (0.0456) | (0.0276) |
| Male | 1.0064\*\*\* | 0.8134\*\*\* | 0.7348\*\*\* |
|  | (0.0512) | (0.0288) | (0.0263) |
| Age | -0.2758\*\*\* | -0.2682\*\*\* | -0.2441\*\*\* |
|  | (0.0079) | (0.0047) | (0.0078) |
| Constant | 1.8376\*\*\* | 2.4506\*\*\* | 1.7459\*\*\* |
|  | (0.1024) | (0.0729) | (0.0856) |
|  |  |  |  |
| Observations | 1,227,052 | 1,040,669 | 1,566,599 |
| R-squared | 0.1147 | 0.1037 | 0.0876 |

Standard errors in parentheses are clustered at the state level. \* p < 0.10 \*\* p < 0.05. \*\*\* p < 0.01.



|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| **Table 7** | Binge drinking  Low Income | Binge drinking  Mid Income | Binge drinking  High Income |
|  |  |  |  |
| 6+ years before RML adoption | 0.0118\*\*\* | 0.0094\*\* | 0.0033 |
|  | (0.0030) | (0.0042) | (0.0039) |
| 4-5 years before RML adoption | 0.0082\* | 0.0112\*\* | 0.0098\* |
|  | (0.0046) | (0.0050) | (0.0054) |
| 2-3 years before RML adoption | 0.0066 | -0.0014 | -0.0010 |
|  | (0.0041) | (0.0045) | (0.0040) |
| Year of RML adoption | 0.0138\*\*\* | 0.0010 | 0.0123\*\*\* |
|  | (0.0048) | (0.0041) | (0.0030) |
| 1-2 years after RML adoption | 0.0278\*\*\* | 0.0356\*\*\* | 0.0200\*\* |
|  | (0.0040) | (0.0092) | (0.0084) |
| 3-4 years after RML adoption | 0.0354\*\*\* | 0.0265\*\* | 0.0220\*\* |
|  | (0.0048) | (0.0118) | (0.0095) |
| 5+ years after RML adoption | 0.0117 | 0.0103 | 0.0151 |
|  | (0.0120) | (0.0105) | (0.0126) |
| MML effective | -0.0034 | -0.0075\*\* | -0.0041 |
|  | (0.0032) | (0.0031) | (0.0037) |
| Medical marijuana dispensary | -0.0009 | -0.0012 | -0.0036 |
|  | (0.0028) | (0.0037) | (0.0036) |
| Recreational marijuana dispensary | -0.0239\*\*\* | -0.0357\*\*\* | -0.0155\*\* |
|  | (0.0039) | (0.0109) | (0.0073) |
| Hispanic | 0.0251\*\*\* | 0.0554\*\*\* | 0.0568\*\*\* |
|  | (0.0061) | (0.0064) | (0.0062) |
| White | 0.0411\*\*\* | 0.0641\*\*\* | 0.0915\*\*\* |
|  | (0.0045) | (0.0049) | (0.0043) |
| Black | 0.0097\*\* | -0.0087 | 0.0014 |
|  | (0.0048) | (0.0079) | (0.0040) |
| Married | -0.0430\*\*\* | -0.0612\*\*\* | -0.0267\*\*\* |
|  | (0.0022) | (0.0018) | (0.0017) |
| Has children in household | -0.0346\*\*\* | -0.0377\*\*\* | -0.0306\*\*\* |
|  | (0.0019) | (0.0026) | (0.0026) |
| College | 0.0000 | -0.0214\*\*\* | -0.0073\*\* |
|  | (0.0018) | (0.0025) | (0.0031) |
| Highschool | -0.0011 | -0.0034 | 0.0361\*\*\* |
|  | (0.0019) | (0.0054) | (0.0036) |
| Unemployed | -0.0051 | -0.0008 | -0.0346\*\*\* |
|  | (0.0031) | (0.0067) | (0.0034) |
| Student | -0.0329\*\*\* | -0.0967\*\*\* | -0.0985\*\*\* |
|  | (0.0071) | (0.0064) | (0.0054) |
| Unable to Work | -0.0525\*\*\* | -0.0583\*\*\* | -0.0584\*\*\* |
|  | (0.0015) | (0.0037) | (0.0020) |
| Male | 0.1082\*\*\* | 0.1098\*\*\* | 0.0994\*\*\* |
|  | (0.0060) | (0.0033) | (0.0033) |
| Age | -0.0441\*\*\* | -0.0549\*\*\* | -0.0539\*\*\* |
|  | (0.0012) | (0.0014) | (0.0017) |
| Constant | 0.2438\*\*\* | 0.3222\*\*\* | 0.2483\*\*\* |
|  | (0.0095) | (0.0082) | (0.0080) |
|  |  |  |  |
| Observations | 1,569,163 | 1,224,146 | 1,790,752 |
| R-squared | 0.0826 | 0.0892 | 0.0769 |

Standard errors in parentheses are clustered at the state level. \* p < 0.10 \*\* p < 0.05. \*\*\* p < 0.01.



|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| **Table 8** | Average Drinks  Young Age | Average Drinks  Middle Age | Average Drinks  Old Age |
|  |  |  |  |
| 6+ years before RML adoption | 0.0552 | 0.0032 | 0.0111 |
|  | (0.0915) | (0.0510) | (0.0286) |
| 4-5 years before RML adoption | -0.0357 | -0.0364 | 0.1044\*\*\* |
|  | (0.0456) | (0.0365) | (0.0377) |
| 2-3 years before RML adoption | 0.0780 | -0.0180 | 0.0275\* |
|  | (0.0695) | (0.0254) | (0.0143) |
| Year of RML adoption | 0.0504\* | 0.0348 | 0.0476\*\*\* |
|  | (0.0264) | (0.0399) | (0.0120) |
| 1-2 years after RML adoption | 0.3736\*\*\* | 0.0996\*\*\* | 0.1133\*\*\* |
|  | (0.0745) | (0.0333) | (0.0307) |
| 3-4 years after RML adoption | 0.4088\*\*\* | 0.1343\*\*\* | 0.1077\*\* |
|  | (0.0737) | (0.0325) | (0.0425) |
| 5+ years after RML adoption | 0.3229\*\*\* | 0.0104 | 0.1047\*\* |
|  | (0.1115) | (0.0735) | (0.0467) |
| MML effective | -0.1001 | 0.0564\*\* | -0.0055 |
|  | (0.0600) | (0.0236) | (0.0218) |
| Medical marijuana dispensary | 0.0568 | -0.0041 | 0.0071 |
|  | (0.0508) | (0.0238) | (0.0197) |
| Recreational marijuana dispensary | -0.3551\*\*\* | -0.1155\*\* | -0.1163\*\* |
|  | (0.0505) | (0.0458) | (0.0466) |
| Hispanic | 0.4080\*\*\* | 0.4270\*\*\* | 0.2256\*\*\* |
|  | (0.0575) | (0.0540) | (0.0657) |
| White | 0.3773\*\*\* | 0.3165\*\*\* | 0.2080\*\*\* |
|  | (0.0476) | (0.0318) | (0.0517) |
| Black | -0.2068\*\*\* | 0.0539 | 0.0426 |
|  | (0.0462) | (0.0391) | (0.0539) |
| Married | -0.4654\*\*\* | -0.3033\*\*\* | -0.0152\*\* |
|  | (0.0393) | (0.0251) | (0.0060) |
| Has children in household | -0.2428\*\*\* | 0.1064\*\*\* | -0.0425\* |
|  | (0.0260) | (0.0147) | (0.0222) |
| College | -0.2332\*\*\* | -0.2352\*\*\* | 0.0649\*\*\* |
|  | (0.0298) | (0.0204) | (0.0170) |
| Highschool | -0.0344 | -0.0600\* | 0.1657\*\*\* |
|  | (0.0433) | (0.0300) | (0.0155) |
| Unemployed | -0.1116\*\*\* | 0.0189 | 0.1551\*\*\* |
|  | (0.0276) | (0.0136) | (0.0533) |
| Student | -0.4346\*\*\* | -0.1095\*\*\* | -0.0041 |
|  | (0.0249) | (0.0204) | (0.0846) |
| Unable to Work | -0.5592\*\*\* | -0.5318\*\*\* | -0.2039\*\*\* |
|  | (0.0446) | (0.0355) | (0.0223) |
| Male | 1.0778\*\*\* | 0.8096\*\*\* | 0.4681\*\*\* |
|  | (0.0335) | (0.0301) | (0.0120) |
| Income | -0.0439\*\*\* | 0.0730\*\*\* | 0.0551\*\*\* |
|  | (0.0125) | (0.0048) | (0.0072) |
| Constant | 1.6044\*\*\* | 0.8416\*\*\* | -0.0062 |
|  | (0.1155) | (0.0744) | (0.0642) |
|  |  |  |  |
| Observations | 621,626 | 2,036,565 | 1,176,129 |
| R-squared | 0.0861 | 0.0712 | 0.0704 |

Standard errors in parentheses are clustered at the state level. \* p < 0.10 \*\* p < 0.05. \*\*\* p < 0.01.



|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| **Table 9** | Binge drinking  Young Age | Binge drinking  Middle Age | Binge drinking  Elderly |
|  |  |  |  |
| 6+ years before RML adoption | 0.0169\*\*\* | 0.0055\* | -0.0017 |
|  | (0.0052) | (0.0029) | (0.0017) |
| 4-5 years before RML adoption | 0.0149\* | 0.0076\* | 0.0013 |
|  | (0.0075) | (0.0040) | (0.0021) |
| 2-3 years before RML adoption | 0.0088 | -0.0044 | -0.0008 |
|  | (0.0057) | (0.0027) | (0.0018) |
| Year of RML adoption | 0.0127\*\*\* | 0.0117\*\*\* | -0.0015 |
|  | (0.0028) | (0.0031) | (0.0017) |
| 1-2 years after RML adoption | 0.0403\*\*\* | 0.0238\*\*\* | 0.0049 |
|  | (0.0102) | (0.0079) | (0.0037) |
| 3-4 years after RML adoption | 0.0358\*\*\* | 0.0290\*\*\* | 0.0087\*\* |
|  | (0.0102) | (0.0061) | (0.0041) |
| 5+ years after RML adoption | 0.0193 | 0.0131 | 0.0047 |
|  | (0.0206) | (0.0085) | (0.0037) |
| MML effective | -0.0087 | -0.0036 | -0.0031\*\* |
|  | (0.0065) | (0.0024) | (0.0014) |
| Medical marijuana dispensary | -0.0016 | -0.0033 | -0.0002 |
|  | (0.0059) | (0.0036) | (0.0015) |
| Recreational marijuana dispensary | -0.0264\*\*\* | -0.0244\*\*\* | -0.0130\*\*\* |
|  | (0.0086) | (0.0053) | (0.0030) |
| Hispanic | 0.0571\*\*\* | 0.0475\*\*\* | 0.0220\*\*\* |
|  | (0.0068) | (0.0061) | (0.0073) |
| White | 0.1070\*\*\* | 0.0634\*\*\* | 0.0134\*\* |
|  | (0.0066) | (0.0048) | (0.0052) |
| Black | -0.0082 | 0.0134\*\* | 0.0111\* |
|  | (0.0052) | (0.0052) | (0.0059) |
| Married | -0.0783\*\*\* | -0.0484\*\*\* | -0.0036\*\*\* |
|  | (0.0045) | (0.0019) | (0.0009) |
| Has children in household | -0.0652\*\*\* | 0.0255\*\*\* | 0.0018 |
|  | (0.0020) | (0.0023) | (0.0022) |
| College | 0.0270\*\*\* | -0.0312\*\*\* | -0.0044\*\*\* |
|  | (0.0041) | (0.0028) | (0.0011) |
| Highschool | 0.0353\*\*\* | 0.0021 | 0.0073\*\*\* |
|  | (0.0039) | (0.0035) | (0.0009) |
| Unemployed | -0.0366\*\*\* | -0.0001 | 0.0108\*\*\* |
|  | (0.0022) | (0.0016) | (0.0038) |
| Student | -0.0639\*\*\* | -0.0263\*\*\* | 0.0030 |
|  | (0.0051) | (0.0030) | (0.0125) |
| Unable to Work | -0.1127\*\*\* | -0.0748\*\*\* | -0.0104\*\*\* |
|  | (0.0034) | (0.0035) | (0.0023) |
| Male | 0.1280\*\*\* | 0.1094\*\*\* | 0.0441\*\*\* |
|  | (0.0031) | (0.0035) | (0.0014) |
| Income | 0.0023 | 0.0166\*\*\* | 0.0021\*\*\* |
|  | (0.0021) | (0.0013) | (0.0005) |
| Constant | 0.1310\*\*\* | 0.0364\*\*\* | -0.0016 |
|  | (0.0106) | (0.0086) | (0.0054) |
|  |  |  |  |
| Observations | 712,971 | 2,425,036 | 1,446,054 |
| R-squared | 0.0657 | 0.0404 | 0.0146 |

Standard errors in parentheses are clustered at the state level. \* p < 0.10 \*\* p < 0.05. \*\*\* p < 0.01.

