

APPENDIX A

Protocol for Determining Date of Legal Recreational Cannabis Sales

Date of legal recreational use

1. Used the National Conference of State Legislatures (NCSL) “State Medical Marijuana Laws” to identify (1) states where recreational use was approved prior to 2018 and (2) the policy mechanism (and year) that led to legal use.
 - a. Ex. Ballot measure 2 (2014) in Alaska; Amendment 64 (2012) in Colorado
2. Conducted a Google search for five states that legalized before 2018 that includes name of the state and “first day of recreational marijuana sales”.
 - a. E.g., “Colorado first day of recreational marijuana sales”.
3. Identified two sources that reported the exact date recreational cannabis sales began in the entire state. Sources included news articles and government websites. Next, these links were archived using the Wayback Machine and the archived links were saved.

APPENDIX B

Table 1B. Summary Statistics for Prevalence of Use in Intervention and Comparison Sites Pre- and Post-Treatment: 12-17

State	Pre-treatment years	Post-treatment years	Average Prevalence of Use: Intervention			Average Prevalence of Use: Controls		
			Pre-treatment	Post-treatment Period	Percentage-Point Change	Pre-treatment	Post-treatment	Percentage-Point Change
Alaska	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	17.0%	17.1%	0.1	15.3%	13.2%	-2.1
Colorado	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	18.2%	17.7%	-0.5	16.7%	15.6%	-1.1
Nevada	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	15.8%	15.6%	-0.2	15.7%	13.3%	-2.4
Oregon	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	17.6%	17.3%	-0.3	14.2%	12.4%	-1.8
Washington	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	15.7%	15.3%	-0.4	16.5%	14.4%	-2.1

APPENDIX B (continued)

Table 2B. Summary Statistics for Prevalence of Use in Intervention and Comparisons Sites Pre- and Post-Treatment: 18-25

State	Pre-treatment years	Post-treatment years	Average Prevalence of Use: Intervention			Average Prevalence of Use: Controls		
			Pre-treatment	Post-treatment	Percentage-Point Change	Pre-treatment	Post-treatment	Percentage-Point Change
Alaska	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	36.7%	40.4%	3.7	28.9%	32.2%	3.3
Colorado	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	37.4%	47.0%	9.6	34.9%	38.4%	3.5
Nevada	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	28.8%	39.7%	10.9	31.3%	30.3%	-1.0
Oregon	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	36.3%	43.7%	7.4	31.6%	33.8%	2.2
Washington	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	34.5%	38.6%	4.1	32.6%	35.2%	2.6

APPENDIX B (continued)

Table 3B. Summary Statistics for Prevalence of Use in Intervention and Comparisons Sites Pre- and Post-Treatment: 26 and Older

State	Pre-treatment years	Post-treatment years	Average Prevalence of Use: Intervention			Average Prevalence of Use: Controls		
			Pre-treatment	Post-treatment	Percentage-Point Change	Pre-treatment	Post-treatment	Percentage-Point Change
Alaska	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	13.9%	22.0%	8.1	9.8%	18.1%	8.3
Colorado	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	10.9%	20.9%	10.0	9.3%	13.4%	4.1
Nevada	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	8.9%	18.2%	9.3	8.8%	15.0%	6.2
Oregon	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	11.3%	20.4%	9.1	8.9%	12.9%	4.0
Washington	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	10.0%	17.6%	7.6	8.6%	12.4%	3.8

APPENDIX B (continued)

Table 4B. Summary Statistics for Initiation of Cannabis Use in Intervention and Comparisons Sites Pre- and Post-Treatment: 12-17

State	Pre-treatment years	Post-treatment years	Average Initiation of Use: Intervention			Average Initiation of Use: Controls		
			Pre-treatment	Post-treatment	Percentage-Point Change	Pre-treatment	Post-treatment	Percentage-Point Change
Alaska	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	6.9%	7.4%	0.5	6.6%	7.7%	1.1
Colorado	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	8.2%	8.3%	0.10	6.7%	5.9%	-0.8
Nevada	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	6.7%	6.8%	0.10	6.5%	5.7%	-0.8
Oregon	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	7.1%	6.8%	-0.3	6.2%	5.3%	-0.9
Washington	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	6.2%	5.9%	-0.3	6.7%	6.0%	-0.7

APPENDIX B (continued)

Table 5B. Summary Statistics for Initiation of Cannabis Use in Intervention and Comparisons Sites Pre- and Post-Treatment: 18-25

State	Pre-treatment years	Post-treatment years	Average Initiation of Use: Intervention			Average Initiation of Use: Controls		
			Pre-treatment	Post-treatment	Percentage-Point Change	Pre-treatment	Post-treatment	Percentage-Point Change
Alaska	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	8.2%	9.5%	1.3	8.3%	7.4%	-0.9
Colorado	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	8.7%	13.8%	5.1	8.7%	9.5%	0.8
Nevada	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	6.9%	9.6%	2.7	8.3%	7.1%	-1.2
Oregon	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	8.3%	11.0%	2.7	7.5%	8.5%	1.0
Washington	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	7.7%	9.7%	2.0	7.4%	8.4%	1.0

APPENDIX B (continued)

Table 6B. Summary Statistics for Initiation of Cannabis Use in Intervention and Comparisons Sites Pre- and Post-Treatment: 26 and Older

State	Pre-treatment years	Post-treatment years	Average Initiation of Use: Intervention			Average Initiation of Use: Controls		
			Pre-treatment	Post-treatment	Percentage-Point Change	Pre-treatment	Post-treatment	Percentage-Point Change
Alaska	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	0.3%	1.2%	0.9	0.2%	0.7%	0.5
Colorado	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	0.2%	0.8%	0.6	0.2%	0.4%	0.2
Nevada	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013, 2014-2015	2016-2017, 2018-2019	0.2%	0.8%	0.6	0.2%	0.7%	0.5
Oregon	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	0.2%	0.7%	0.5	0.2%	0.5%	0.3
Washington	2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, 2012-2013	2014-2015, 2016-2017	0.2%	0.7%	0.5	0.2%	0.5%	0.3

APPENDIX C

Table 1C. Differences in Auxiliary Predictors Between Each State and its Synthetic Control for Prevalence of Use Models

	Alaska	Synthetic Alaska	Colorado	Synthetic Colorado	Nevada	Synthetic Nevada	Oregon	Synthetic Oregon	Washington	Synthetic Washington
12-17, (%)										
Prevalence of past-month illicit drug use	4.5%	4.6%	5.0%	4.9%	4.9%	5.0%	5.1%	4.8%	4.9%	4.8%
Prevalence of past-month binge drinking	8.8%	10.6%	10.1%	10.1%	9.2%	9.8%	9.5%	9.5%	9.1%	9.9%
Prevalence of past-month tobacco product use	13.6%	12.9%	13.7%	12.5%	11.6%	12.0%	12.7%	11.6%	11.6%	12.0%
Less than a high school education	8.3%	9.5%	9.8%	11.9%	15.4%	11.8%	10.6%	13.5%	10.0%	10.6%
High school degree	27.3%	27.8%	22.1%	27.3%	28.7%	26.9%	24.6%	25.7%	23.6%	27.5%
Associate's degree or some college	36.8%	32.0%	31.0%	29.5%	33.5%	31.8%	35.1%	31.7%	34.6%	30.2%
Bachelor's degree or more	27.5%	30.5%	37.0%	31.1%	22.4%	29.4%	29.7%	29.0%	31.9%	30.6%
Percent Black	3.5%	1.8%	4.0%	7.0%	8.2%	4.6%	1.8%	8.8%	3.6%	3.2%
Percent White	66.9%	80.9%	84%	79.1%	71.4%	78.6%	85.2%	75.7%	78.5%	71.7%
Percent Asian	5.4%	7.1%	2.8%	2.6%	7.4%	5.5%	3.8%	4.0%	7.3%	9.9%
Percent Hispanic (any race)	5.9%	8.0%	20.8%	20.7%	26.9%	17.9%	11.9%	23.3%	11.5%	14.7%

Prevalence of past-month illicit drug use	2.9%	2.7%	3.2%	3.2%	3.3%	3.2%	3.3%	3.1%	3.1%	3.1%
Prevalence of past-month binge drinking	22.1%	21.2%	23.7%	23.7%	23.5%	22.2%	20.1%	23.6%	20.1%	23.2%
Prevalence of past-month tobacco product use	30.2%	27.9%	27.3%	27.7%	30.3%	27.5%	28.0%	27.9%	25.8%	27.0%
Less than a high school education	8.3%	9.6%	9.8%	12.0%	15.4%	13.2%	10.6%	12.5%	10.0%	12.1%
High school degree	27.3%	31.3%	22.1%	27.9%	28.7%	26.0%	24.6%	26.7%	23.6%	26.8%
Associate's degree or some college	36.8%	30.9%	31.0%	33.6%	33.5%	33.6%	35.1%	32.3%	34.6%	32.7%
Bachelor's degree or more	27.5%	28.2%	37.0%	28.6%	22.4%	27.2%	29.7%	28.5%	31.9%	28.5%
Percent Black	3.5%	1.6%	4.0%	2.1%	8.2%	3.6%	1.8%	3.6%	3.6%	3.2%
Percent White	66.9%	81.7%	84.0%	3.9%	71.4%	81.2%	85.2%	79.6%	78.5%	72.1%
Percent Asian	5.4%	6.9%	2.8%	3.9%	7.4%	3.0%	3.8%	4.1%	7.3%	8.7%
Percent Hispanic (any race)	5.9%	6.8%	20.8%	15.2%	26.9%	24.7%	11.9%	18.2%	11.5%	17.6%

APPENDIX C (continued)

Table 2C. Differences in Auxiliary Predictors Between Each State and its Synthetic Control for Initiation of Cannabis Use Models

	Alaska	Synthetic Alaska	Colorado	Synthetic Colorado	Nevada	Synthetic Nevada	Oregon	Synthetic Oregon	Washington	Synthetic Washington
<u>12-17, (%)</u>										
Prevalence of past-month illicit drug use	4.5%	4.8%	5.0%	4.7%	4.9%	5.1%	5.1%	5.0%	4.9%	4.8%
Prevalence of past-month binge drinking	8.8%	10.9%	10.1%	9.4%	9.2%	10.0%	9.5%	9.4%	9.1%	9.7%
Prevalence of past-month tobacco product use	13.6%	13.4%	13.7%	12.3%	11.6%	12.2%	12.7%	12.2%	11.6%	11.6%
Less than a high school education	8.3%	10.0%	9.8%	10.8%	15.4%	12.0%	10.6%	13.1%	10.0%	10.5%
High school degree	27.3%	27.7%	22.1%	27.3%	28.7%	26.1%	24.6%	27.8%	23.6%	27.3%
Associate's degree or some college	36.8%	32.8%	31.0%	30.9%	33.5%	32.5%	35.1%	32.4%	34.6%	30.8%
Bachelor's degree or more	27.3%	29.4%	37.0%	27.9%	22.4%	28.4%	29.7%	26.7%	31.9%	31.3%
Percent Black	3.5%	1.9%	4.0%	6.4%	8.2%	3.4%	1.8%	6.5%	3.6%	5.3%
Percent White	66.9%	80.4%	84.0%	67.4%	71.4%	79.0%	85.2%	75.8%	78.5%	70.1%
Percent Asian	5.4%	6.2%	2.8%	8.1%	7.4%	4.6%	3.8%	5.4%	7.3%	11.1%
Percent Hispanic (any race)	5.9%	10.4%	20.8%	16.3%	26.9%	19.9%	11.9%	20.2%	11.5%	12.5%
<u>18-25, (%)</u>										
Prevalence of past-month illicit drug use	8.0%	8.2%	9.7%	9.2%	8.7%	8.3%	9.5%	8.2%	9.1%	8.1%

Prevalence of past-month binge drinking	39.7%	40.7%	46.4%	47.7%	38.8%	40.0%	41.1%	44.3%	41.1%	44.3%
Prevalence of past-month tobacco product use	46.0%	40.0%	46.1%	45.4%	40.9%	39.2%	42.6%	43.4%	42.2%	43.6%
Less than a high school education	8.3%	13.9%	9.8%	10.6%	15.4%	14.3%	10.6%	11.0%	10.0%	10.9%
High school degree	27.3%	24.9%	22.1%	28.0%	28.7%	24.5%	24.6%	27.2%	23.6%	27.3%
Associate's degree or some college	36.8%	34.2%	31.0%	30.8%	33.5%	34.3%	35.1%	31.3%	34.6%	31.2%
Bachelor's degree or more	27.5%	27.0%	37.0%	31.6%	22.4%	26.9%	29.7%	29.6%	31.9%	29.4%
Percent Black	3.5%	3.9%	4.0%	6.0%	8.2%	4.2%	1.8%	8.2%	3.6%	9.2%
Percent White	79.2%	79.9%	84.0%	85.4%	71.4%	79.2%	85.2%	79.7%	78.5%	78.8%
Percent Asian	5.4%	2.6%	2.8%	3.2%	7.4%	2.8%	3.8%	3.3%	7.3%	3.5%
Percent Hispanic (any race)	5.9%	28.0%	20.8%	10.2%	26.9%	29.9%	11.9%	13.7%	11.5%	13.0%
<u>26 and older, (%)</u>										
Prevalence of past-month illicit drug use	2.9%	2.7%	3.2%	3.1%	3.3%	3.0%	3.3%	3.1%	3.1%	3.1%
Prevalence of past-month binge drinking	22.1%	21.9%	23.7%	22.5%	23.5%	22.2%	20.1%	23.1%	20.1%	22.8%
Prevalence of past-month tobacco product use	30.2%	23.9%	27.3%	27.2%	30.3%	25.8%	28.0%	28.2%	25.8%	27.6%
Less than a high school education	8.3%	9.0%	9.8%	12.4%	15.4%	11.3%	10.6%	12.4%	10.0%	12.5%
High school degree	27.3%	28.6%	22.1%	26.0%	28.7%	27.1%	24.6%	27.4%	23.6%	26.0%

Associate's degree or some college	36.8%	30.7%	31.0%	32.9%	33.5%	32.0%	35.1%	34.0%	34.6%	33.5%
Bachelor's degree or more	27.5%	31.6%	37.0%	28.6%	22.4%	29.9%	29.7%	27.4%	31.9%	28.0%
Percent Black	3.5%	1.5%	4.0%	3.2%	8.2%	2.7%	1.8%	3.1%	3.6%	3.2%
Percent White	66.9%	54.7%	84.0%	83.4%	71.4%	72.9%	85.2%	82.3%	78.5%	82.7%
Percent Asian	5.4%	22.8%	2.8%	2.5%	7.4%	10.1%	3.8%	2.1%	7.3%	2.4%
Percent Hispanic (any race)	5.9%	6.5%	20.8%	21.7%	26.9%	16.4%	11.9%	21.9%	11.5%	22.1%

APPENDIX D

Table 1D. Non-Treated State Weights Used to Construct the Synthetic Controls for Prevalence of Use: 12-17.

	Alaska	Colorado	Nevada	Oregon	Washington
Arizona	0.16	0.07	0.52	0.53	0.12
Delaware	0.00	0.00	0.09	0.00	0.00
Hawaii	0.14	0.00	0.08	0.01	0.21
Illinois	0.00	0.00	0.00	0.45	0.00
Maryland	0.00	0.19	0.00	0.00	0.05
New Hampshire	0.46	0.40	0.31	0.00	0.45
New Mexico	0.00	0.34	0.00	0.00	0.16
North Dakota	0.24	0.00	0.00	0.00	0.00
Rhode Island	0.00	0.00	0.00	0.01	0.00

Table 2D. Non-Treated State Weights Used to Construct the Synthetic Controls for Prevalence of Use: 18-25.

	Alaska	Colorado	Nevada	Oregon	Washington
Arizona	0.00	0.59	0.33	0.55	0.47
Arkansas	0.00	0.00	0.00	0.00	0.00
Florida	0.19	0.00	0.40	0.00	0.00
Hawaii	0.08	0.00	0.12	0.02	0.00
Illinois	0.00	0.00	0.00	0.00	0.19
Minnesota	0.42	0.00	0.00	0.00	0.00
Montana	0.00	0.00	0.00	0.37	0.00
New Hampshire	0.00	0.03	0.00	0.02	0.34
North Dakota	0.12	0.00	0.00	0.00	0.00
Oklahoma	0.19	0.00	0.15	0.00	0.00
Vermont	0.00	0.39	0.00	0.04	0.00

Table 3D. Non-Treated State Weights Used to Construct the Synthetic Controls for Prevalence of Use: 26 and Older.

	Alaska	Colorado	Nevada	Oregon	Washington
Arizona	0.14	0.44	0.81	0.47	0.45
Hawaii	0.15	0.06	0.01	0.05	0.18
Maine	0.59	0.00	0.12	0.00	0.00
Minnesota	0.00	0.00	0.00	0.00	0.00
Montana	0.12	0.15	0.06	0.26	0.23
Rhode Island	0.00	0.30	0.00	0.22	0.14
Vermont	0.00	0.06	0.00	0.00	0.00

APPENDIX D (Continued)

Table 4D. Non-Treated State Weights Used to Construct the Synthetic Controls for Initiation of Cannabis Use: 12-17

	Alaska	Colorado	Nevada	Oregon	Washington
Arizona	0.25	0.21	0.61	0.61	0.28
Delaware	0.00	0.00	0.02	0.00	0.00
Hawaii	0.12	0.13	0.06	0.08	0.23
Illinois	0.00	0.19	0.00	0.02	0.00
Maryland	0.00	0.05	0.00	0.00	0.11
Montana	0.20	0.00	0.10	0.00	0.00
New Hampshire	0.26	0.13	0.20	0.00	0.38
New Mexico	0.00	0.20	0.00	0.00	0.00
New York	0.00	0.00	0.00	0.00	0.00
North Dakota	0.17	0.00	0.00	0.00	0.00
Ohio	0.00	0.03	0.00	0.29	0.00
Rhode Island	0.00	0.05	0.00	0.00	0.00

Table 5D. Non-Treated State Weights Used to Construct the Synthetic Controls for Initiation of Cannabis Use: 18-25

	Alaska	Colorado	Nevada	Oregon	Washington
Arizona	0.93	0.18	1.00	0.33	0.29
Delaware	0.00	0.12	0.00	0.23	0.27
Minnesota	0.00	0.30	0.00	0.35	0.41
Montana	0.07	0.00	0.00	0.00	0.00
New Hampshire	0.00	0.29	0.00	0.07	0.02
Rhode Island	0.00	0.12	0.00	0.00	0.00
Vermont	0.00	0.00	0.00	0.01	0.00

Table 6D. Non-Treated State Weights Used to Construct the Synthetic Controls for Initiation of Cannabis Use: 26 and Older

	Alaska	Colorado	Nevada	Oregon	Washington
Arizona	0.00	0.68	0.45	0.70	0.71
Hawaii	0.57	0.00	0.21	0.00	0.00
Montana	0.00	0.07	0.00	0.30	0.17
New Hampshire	0.43	0.24	0.34	0.00	0.12
New Mexico	0.00	0.01	0.00	0.00	0.00