



# Forecasts Hazy for State Marijuana Revenue

Unknown price and demand, lack of historical data leave planners with limited information

# The Pew Charitable Trusts

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*This report was updated to correct the general sales tax rate for legalized recreational marijuana in Maine.*

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## Overview

Revenue from “sin taxes” is notoriously volatile and difficult to predict, even when the taxes—such as those on cigarettes, liquor, or gambling—have been around for decades. Although consumption of or participation in these “sins” can change dramatically, analysts at least have historical data from across the nation to guide forecasts.

But now that 10 states and the District of Columbia have legalized recreational marijuana, officials are grappling with projecting collections from a new sin tax.<sup>1</sup> Forecasting revenue from a product that was illegal just a few years ago, and remains so under federal law and in most states, presents a unique challenge for state budget planning. For example, in Nevada’s first six months of collecting marijuana taxes, revenue came in 40 percent higher than budget officials expected, but in neighboring California revenue was 45 percent below projections in the first six months of collecting marijuana taxes.<sup>2</sup>

And with more states considering legalizing marijuana, forecasting and budgeting difficulties for revenue from recreational marijuana taxes are likely to become widespread. These challenges have consequences: If tax collections come in below forecasted amounts, for example, programs that are funded by these dollars could suffer.

In 2018, The Pew Charitable Trusts released an analysis of state sin taxes that urged caution about reliance on these taxes as longer-term fixes to budget shortfalls. This follow-up report, based on interviews with officials from states where marijuana has been sold and taxed for at least a year, describes how states are forecasting and planning specifically for using revenue from recreational marijuana.

In the interviews, officials reported lacking much of the information they typically depend on when making revenue forecasts. But they said they are applying available resources, learning from each other, and pioneering new approaches. Over time, they hope to identify answers to key questions, including:

- How many people use legal recreational marijuana and how will demand change?
- How will the price for recreational marijuana fluctuate?
- How will the market develop for cultivators, manufacturers, and retailers?
- How will tourism and cross-border sales affect revenue?
- Will revenue growth slow over time?

Given how unpredictable recreational marijuana is as a revenue source, states should adopt prudent policies for budgeting collections. Treating it like other volatile or nonrecurring sources will reduce the chance of a budget imbalance if reality does not meet expectations.

## How states tax marijuana

States are taxing legalized recreational marijuana with a general retail sales tax, a marijuana-specific excise tax, or both. An excise tax is on the sale of a specific good or service. For marijuana, it can be levied on a per-unit basis, such as per ounce or per seed, or be calculated as a percentage of the value of the sale.

In California, for example, when a company purchases marijuana flowers to sell or to manufacture into a cannabis product, the state collects \$9.25 in taxes for each ounce. Then, when the final product is purchased by a consumer, the state collects the general sales tax of 7.25 percent plus an additional 15 percent excise tax. Washington state, by contrast, has no per-unit excise tax, but marijuana sales are taxed at 37 percent on top of its general sales tax. Alaska has no sales tax and does not tax the value of the drug’s sale, but places a per-unit excise tax on it.

Some states also allow local governments to add an additional tax on recreational marijuana to fund their needs. For example, cities and towns in Massachusetts can add up to a 3 percent tax for sales within the community.

Table 1

## Tax Rates on Legalized Recreational Marijuana by State, as of February 2019

State	Cultivator excise tax	Retail excise tax	General sales tax
<b>Alaska*</b>	\$50 per ounce, mature bud and flower \$25 per ounce, immature or abnormal bud \$15 per ounce, remainder of plant \$1 per clone	n/a	n/a
<b>California†</b>	\$9.25 per ounce on flowers \$2.75 per ounce on leaves \$1.29 per ounce on fresh cannabis plant	15 percent	7.25 percent
<b>Colorado‡</b>	15 percent	15 percent	n/a
<b>Maine§</b>	\$335 per pound of flower or mature plant \$94 per pound of trim \$1.50 per immature plant or seedling \$0.30 per seed	10 percent	n/a
<b>Massachusetts¶</b>	n/a	10.75 percent	6.25 percent
<b>Michigan#</b>	n/a	10 percent	6 percent
<b>Nevada**</b>	15 percent	10 percent	6.85 percent
<b>Oregon††</b>	n/a	17 percent	n/a
<b>Washington‡‡</b>	n/a	37 percent	6.5 percent

Note: Maine, Michigan, Vermont, and the District of Columbia have legalized recreational marijuana but do not have active markets. Vermont also has not decided on tax rates. Retail excise taxes are sometimes referred to as retail sales taxes, but apply only to recreational marijuana and are separate from general sales taxes.

\* Alaska Department of Revenue, "Marijuana Tax," accessed Nov. 1, 2018, <http://tax.alaska.gov/programs/programs/index.aspx?60000>

† California Department of Tax and Fee Administration, "Tax Rates—Special Taxes and Fees" <https://www.cdtfa.ca.gov/taxes-and-fees/tax-rates-stfd.htm>

‡ Larson Silbaugh, principal economist, Colorado Legislative Council, memorandum to interested persons, "Marijuana Revenue in the State Budget," Nov. 17, 2017, [https://leg.colorado.gov/sites/default/files/marijuana\\_revenue\\_in\\_the\\_state\\_budget.pdf](https://leg.colorado.gov/sites/default/files/marijuana_revenue_in_the_state_budget.pdf)

§ State of Maine, An Act to Implement a Regulatory Structure for Adult Use Marijuana (2018), <http://www.mainelegislature.org/legis/bills/getPDF.asp?paper=HP1199&item=4&snum=128>

¶ Massachusetts Department of Revenue, Marijuana Retail Taxes (2018), <https://www.mass.gov/regulations/830-CMR-64n11-marijuana-retail-taxes>

# Michigan House Fiscal Agency, "Ballot Proposal 1 of 2018: Marijuana Initiative" (2018), [https://www.house.mi.gov/hfa/PDF/Alpha/Ballot\\_Proposal\\_2018-1\\_Marijuana\\_Initiative.pdf](https://www.house.mi.gov/hfa/PDF/Alpha/Ballot_Proposal_2018-1_Marijuana_Initiative.pdf)

\*\* State of Nevada Department of Taxation, "Marijuana in Nevada," accessed Nov. 1, 2018, <http://marijuana.nv.gov/Businesses/Taxes/>

†† Oregon Department of Revenue, "Recreational Marijuana FAQs: Taxes," accessed Nov. 1, 2018, <https://www.oregon.gov/olcc/marijuana/Pages/FAQs-Taxes.aspx>

‡‡ Tax Foundation, "How High are Recreational Marijuana Taxes in Your State?," accessed Nov. 1, 2018, <https://taxfoundation.org/state-marijuana-taxes-2018/>, and Tax Foundation, "States and Local Sales Tax Rates," accessed May 2, 2019, <https://taxfoundation.org/sales-tax-rates-2019/>

## The challenge of forecasting marijuana revenue

When forecasting revenue from sales of alcohol or cigarettes, forecasters can draw on decades of data. In the case of marijuana, “the biggest issue is lack of data, lack of history,”<sup>3</sup> said Josh Lehner, senior economist with Oregon’s Office of Economic Analysis. In 2017, the state was among the first to conduct an official forecast of marijuana revenue.<sup>4</sup>

“For standard forecasting models, it’s helpful to have more detail about demographics, consumption, and product types. We’re not there, and other states I’ve talked to aren’t there yet either,” Lehner said. However, he and forecasters in other states are pioneering strategies they can refine as they gain experience and more reliable data.

Table 2  
Recreational Marijuana Legalization and Sales Dates

State	Legalization date	Beginning of sales
Colorado	November 2012	January 2014
Washington	November 2012	July 2014
Oregon	November 2014	October 2015
Alaska	November 2014	October 2016
Nevada	November 2016	January 2017
California	November 2016	January 2018
Massachusetts	November 2016	November 2018
Maine	November 2016	Not yet started
Vermont	January 2018	Not yet started
Michigan	November 2018	Not yet started

Source: National Conference of State Legislatures, “Marijuana Laws,” <http://www.ncsl.org/bookstore/state-legislatures-magazine/marijuana-deep-dive.aspx>

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## Marijuana use

Revenue forecasters need estimates on marijuana use in their state, but note that getting reliable information has proved difficult. Ken Alper, who directed the tax division of Alaska’s Department of Revenue until December 2018, said polls about drug use were problematic, in part because they were taken before the drug was legalized and may have underestimated use.<sup>5</sup> “Clearly if some random person calls on the phone and asks, ‘Have you smoked marijuana?’ at a time when it’s illegal, many people are inclined to lie,” Alper said.

It is even trickier to gauge how consumption patterns will change. “Sixty percent of Oregonians say they’ve had a drink in the last month. Twenty percent say they’ve used marijuana. Does marijuana go all the way up there, where the majority of Oregonians say they’ve used it in the past month? That’s the big-picture uncertainty,” said Lehner.<sup>6</sup>



Larson Silbaugh, principal economist with Colorado's Legislative Council, said his office used data from two surveys for its initial forecasts: the annual federal National Survey on Drug Use and Health, which breaks down substance use (including alcohol, tobacco, and illegal drugs) in each state; and a survey of marijuana consumption commissioned by Washington state.<sup>7</sup>

Without knowing how applicable these sources were, Silbaugh said his team aimed to make the best estimates that it could.<sup>8</sup> In fact, early forecasts in Colorado were on the mark: The state estimated that it would bring in \$67 million from recreational marijuana excise taxes in fiscal year 2015, the first full year of sales, and collections totaled \$66.1 million.<sup>9</sup>

## Changes in demand

Recreational cannabis products have diversified beyond the raw, cut plant to include oils, extracts, and edibles—the popularity of which has varied by state. In Washington,<sup>10</sup> for example, consumption has shifted toward extracts, but Colorado has seen strong growth in concentrates and edibles.<sup>11</sup> Just as forecasters consider changing demands for beer, wine, and spirits when projecting revenue from alcohol taxes, they are trying to do so with marijuana. But given how new these products are, analysts have little available data with which to gauge trends.

Another challenging calculation is to what extent and how quickly consumers will transition from the black market to the legal one. Forecasters note that legal market prices tend to be higher because licensed businesses must pay taxes, fees, and the cost of testing to ensure consumer safety. The California Cannabis Advisory Committee, for example, found that the state's legal marijuana market does not present an attractive alternative to the black market, in large part due to higher prices.<sup>12</sup> Not knowing how to account for the competition with the black market may be one reason why California's legal market hasn't met revenue expectations.

Colorado's Department of Revenue has contracted with the University of Colorado to assess the extent to which the black market is competing with the legal market.<sup>13</sup> Nevada is closely monitoring the experiences of Colorado and Washington to learn about black market conversion, said Kile Porter, deputy executive director of Nevada's Department of Taxation.<sup>14</sup>

Another challenge is estimating a potential transition from the largely untaxed medical market. In Colorado, Silbaugh said his office thought most medical users would switch to the legal recreational market.<sup>15</sup> But it found that the reverse was true: at least initially, some recreational users bought medical marijuana instead, likely to avoid the taxes on recreational products.<sup>16</sup>

## The price of cannabis

Since most states that collect taxes on recreational marijuana set tax rates based on the price of the drug, understanding how much it sells for is critical for forecasting revenue. States that were among the earliest to legalize marijuana were particularly disadvantaged when it came to forecasting prices, while later-adopting states had the advantage of being able to examine the earlier states' data.

Colorado, one of the first states to legalize the drug, used medical marijuana prices as an approximation of what recreational products would cost in the legal market; California heard from early-adopting states that prices tend to spike at the start when supply is relatively scarce, then gradually decline as more product becomes available.<sup>17</sup> One challenge for forecasters is determining whether this trend will continue and, if so, how far prices will drop and how quickly they will stabilize.

Price changes, in turn, affect tax revenue. When prices fall, for example, state revenue will shrink unless there is an offsetting boost in sales. Research on how price changes influence demand for marijuana is still developing. “Lower prices should entice more consumption, but it’s not necessarily a one-to-one tradeoff,” said Oregon’s Josh Lehner.<sup>18</sup>

## Market friction

In Colorado, economist Silbaugh acknowledged that one of his biggest miscalculations when preparing his first few forecasts was underestimating the amount of time the market would take to run smoothly, including how quickly businesses would be licensed and operating.<sup>19</sup> In Alaska, meanwhile, Ken Alper noted that his state did not consider that it takes three to four months for seeds to mature.<sup>20</sup>

Irena Asmundson, chief economist with California’s Department of Finance, said it took some time for local governments to put necessary regulations in place and license businesses.<sup>21</sup> To the north, Oregon was initially swamped with applications from potential marijuana producers, which created a bottleneck. State economist Lehner noted that it is still unclear how many producers may one day be in the market—whether through expansion, consolidation, or exiting the market—and how market churn will affect revenues, if at all.<sup>22</sup>

Originally, Colorado required marijuana growers to sell most of their product themselves. In 2018, the state loosened this restriction in an effort to open up the market, which has helped drive down marijuana’s wholesale price and lowered excise tax revenue, according to Silbaugh.<sup>23</sup> Nevada’s regulations, in contrast, have increasingly encouraged the grower and the seller to be part of the same company, a trend the state Department of Taxation is closely monitoring.<sup>24</sup>

## Sales across borders

Other complications when trying to gauge collections are competition from neighboring states and the slice of revenue generated by visitors. In tourism-heavy Alaska and Nevada, sightseers contribute to surging recreational marijuana sales. Alaska’s capital, Juneau, welcomes multiple cruise ships each day and has three recreational marijuana stores. But the state still needs more data showing to what extent tourists will drive future revenue growth from this new product. Nevada’s Porter said revenue data so far indicate that higher-than-anticipated visitor demand contributed to collections for the first fiscal year exceeding forecasts.<sup>25</sup>

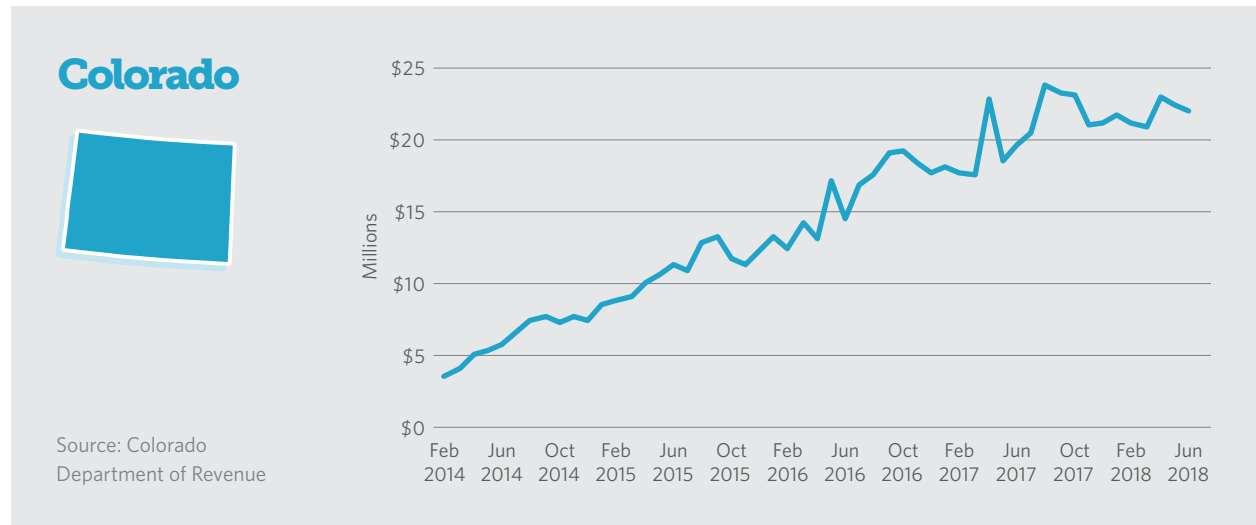
Colorado’s Larson Silbaugh noted that his state does not anticipate much competition across state borders because the region’s large cities are spread out and neighboring states are unlikely to legalize. On the other hand, Oregon and Washington likely have competing markets, especially because Washington’s retail operations were up and running first. States such as Massachusetts and Vermont may also need to consider cross-border issues.

## Long-term growth

Excise tax collections from marijuana have been booming in the five states with available data. In Washington, marijuana accounted for more revenue (\$361 million) than liquor (\$314 million) or cigarettes (\$357 million) in fiscal year 2018.<sup>26</sup> In Alaska, revenue spiked from \$2 million to \$11 million in a single year.<sup>27</sup>

All five states saw a strong early boost in tax collections. However, forecasters expect this growth to slow, as early indications show in Colorado and Washington. Figure 2 shows the year-over-year percentage changes in revenue in the two states with the oldest recreational marijuana markets. Growth is high at the start and then declines steeply. To avoid projecting unrealistically high long-term growth, Colorado’s Silbaugh has built an assumption into the state’s forecasting model that revenue will not continue to rise at past rates.<sup>28</sup>

Figure 1  
**Legalized Recreational Marijuana Tax Revenue**  
 Monthly collections continue to grow as markets develop

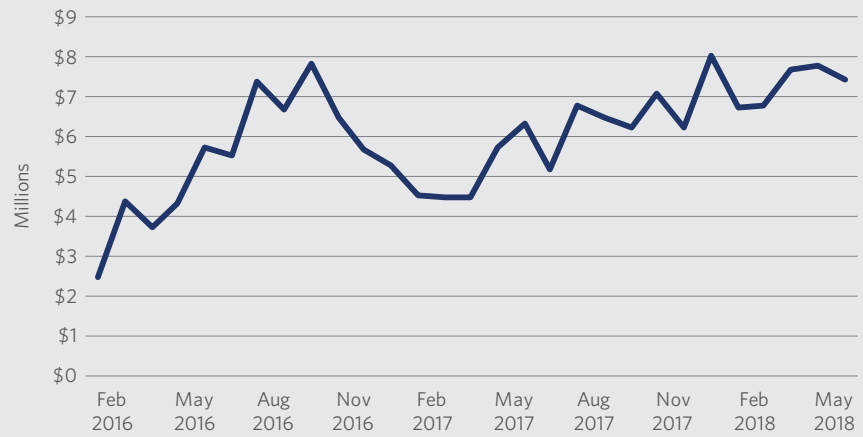




## Oregon



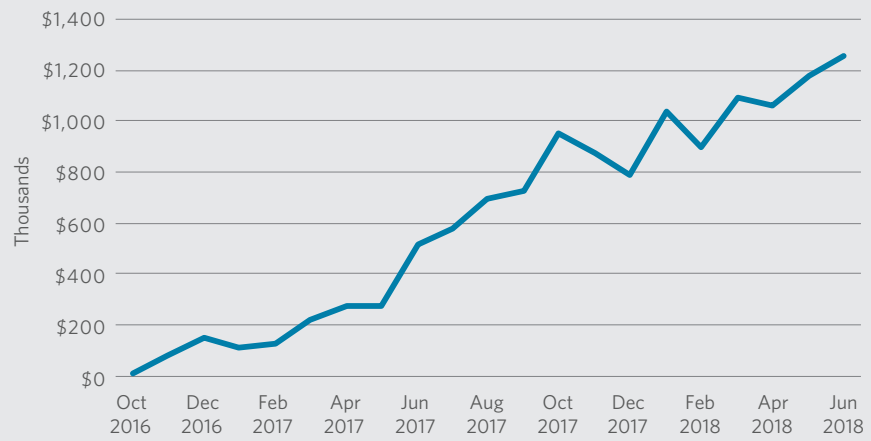
Source: Oregon Department of Revenue



## Alaska



Source: Alaska Department of Revenue



## Nevada



Note: Nevada's figures do not include revenue from the state's general sales tax on marijuana products.

Source: Nevada Department of Revenue

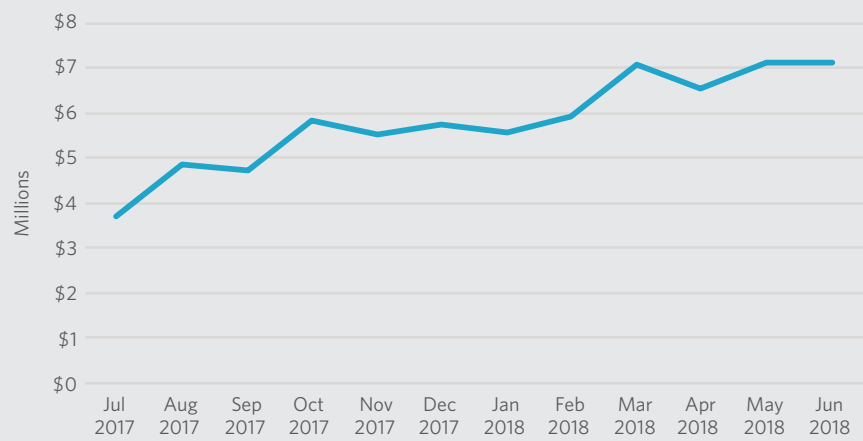
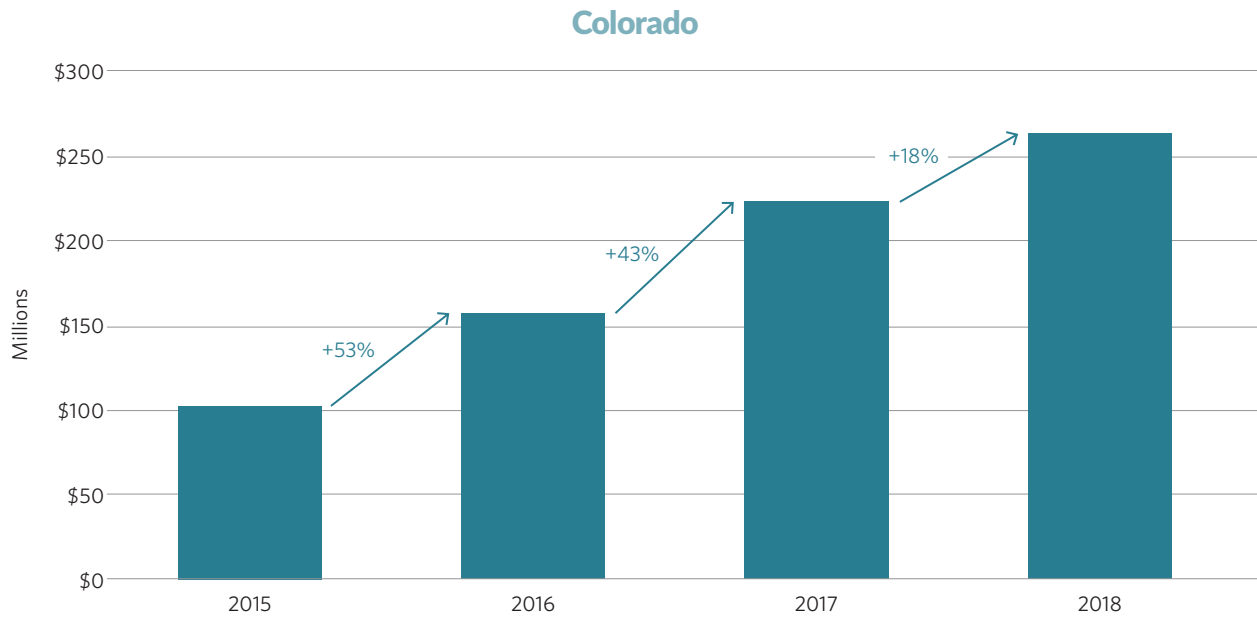


Figure 2

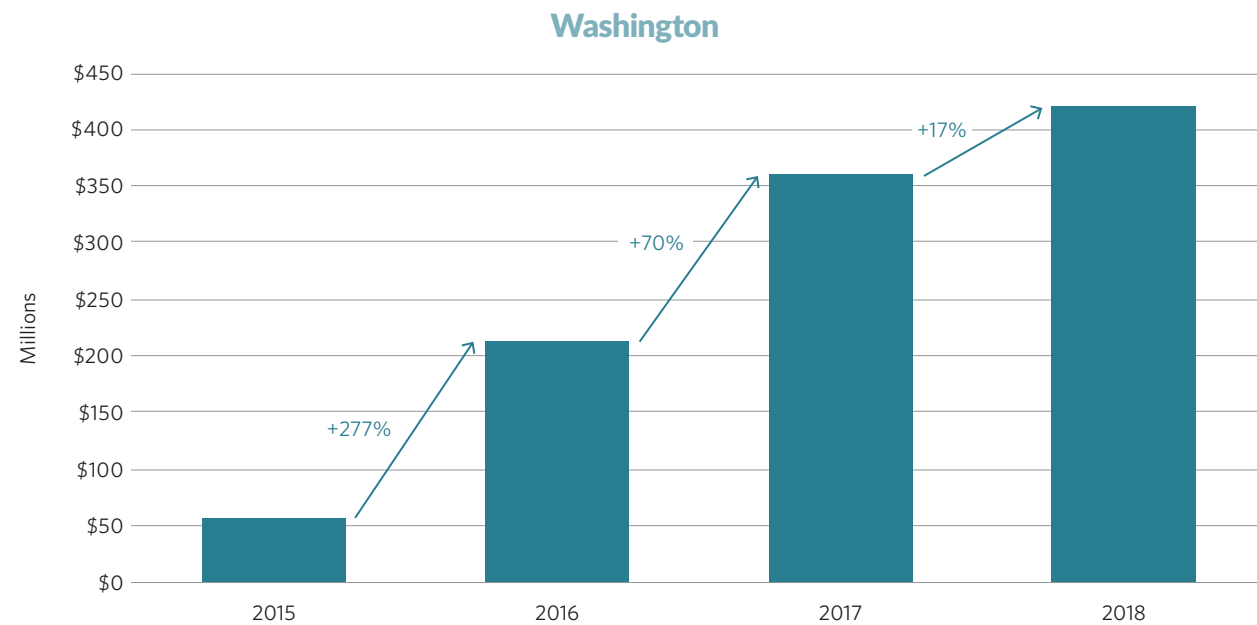
## Strong Early Growth in Revenue Slows as Markets Mature

Tax collections from legalized recreational marijuana, FY 2015-2018



Source: Colorado Department of Revenue

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Source: Washington Department of Revenue

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## Insuring against uncertainty

Given the rapid growth in revenue from marijuana taxes, policymakers may be tempted to use the additional cash to fund ongoing spending initiatives. But the hurdles of forecasting recreational marijuana revenue will persist. Given how unpredictable the marijuana market is, states should exercise caution in budget planning to ensure that the money strengthens, rather than weakens, their long-term fiscal position.

One strategy is to collect the money before spending it. States typically use forecasts of how much revenue they will collect during the next year to develop budgets. Recognizing the uncertainty with marijuana revenue, Colorado and California collect the taxes in a separate fund and then use the money for the following year. “We have new revenue, we should spend it, but we don’t know how volatile it’s going to be,” Colorado’s Silbaugh said. “We don’t want to have to make agencies give money back if there’s not enough, or rescind appropriations, so we’ll just budget it in the year after it’s collected.”<sup>29</sup>

Another option is to use revenue from marijuana taxes to shore up savings. Nevada contributes the proceeds from its retail tax to its rainy day fund. However, nearly every state that taxes the drug is directing at least some revenue toward recurring costs (see Appendix). Washington, for example, relies on the revenue for health care programs.

Policymakers should be careful not to assume that revenue growth from such a new and volatile market will be sustainable, especially since some sin taxes, such as cigarettes, have provided diminishing revenue over time.

## Conclusion

Supporters of legalizing recreational marijuana expected a new revenue source for states, but market uncertainties continue to challenge revenue forecasters and policymakers. The difficulty in forecasting revenue is compounded by the fact that states have only recently begun to understand the recreational marijuana market: the level of consumer demand for recreational marijuana products, the types of users and how much they might pay for the drug, and competition with the black market. States have learned some lessons but continue to grapple with unknowns.

While forecasters and budget staff gain more information, state officials can avoid budget shortfalls and keep program funding stable by being prudent in how they use these new collections. States should be careful to distinguish between marijuana revenue’s short-term growth and long-term sustainability. While these new dollars can fill immediate budget needs, they may prove unreliable for ongoing spending demands. Policymakers should look to other, more familiar sin taxes for lessons on how to manage marijuana tax revenue most effectively.

## Appendix

Table A.1

### Tax Revenue Distributions by State, as of FY 2019

State	Distribution
<b>Alaska</b>	50 percent to Recidivism Reduction Fund, split between the departments of public safety, health and social services, and corrections 25 percent to health education 25 percent to general fund*
<b>California</b>	\$10 million to \$50 million to Community Reinvestment Grant Program \$10 million to public universities to evaluate effects of ballot measure and \$2 million to study medical cannabis \$3 million to California Highway Patrol Remaining revenue: 60 percent to Youth Education, Prevention, Early Intervention and Treatment Account 20 percent to Environmental Restoration and Protection Account 20 percent to State and Local Government Law Enforcement Account†
<b>Colorado</b>	90 percent of special sales tax to general fund (72 percent to the Marijuana Cash Fund and 13 percent to the state public school fund, 15 percent retained) 10 percent of special sales tax to local governments that allow retail sales First \$40 million or 90 percent of excise tax to Building Excellent Schools Today fund Remainder to public school fund‡
<b>Maine</b>	Excise and sales tax to general fund Once a month, 12 percent of general fund marijuana sales and excise tax revenue is transferred to the Adult Use Marijuana Public Health and Safety Funds
<b>Massachusetts</b>	Excise tax revenue goes to the Marijuana Regulation Fund Local option revenue goes to the municipality Sales tax revenue follows conventional sales tax allocation rules: 16 percent to Massachusetts Bay Transportation Authority 16 percent to School Modernization and Reconstruction Trust 68 percent to Commonwealth General Fund†
<b>Michigan</b>	Amount needed to cover costs of implementation, administration, and enforcement, then: \$20 million to clinical trials studying efficacy of marijuana in treating veterans 30 percent of remaining to municipalities and counties with retail sales 35 percent to School Aid Fund 35 percent to transportation fund#
<b>Nevada</b>	Excise tax revenue to fund administrative costs; \$5 million to local governments, remainder to Distributive School Account Retail tax revenue to rainy day fund**
<b>Oregon</b>	40 percent to education 20 percent to mental health treatment or alcohol and drug abuse prevention, early intervention, and treatment 15 percent to state law enforcement 10 percent to cities 10 percent to counties 5 percent to drug abuse prevention, early intervention, and treatment††

Continued on next page

State	Distribution
Vermont	Undecided; Marijuana Advisory Commission proposed using current statutory guidelines to allocate sales and local option tax (sales tax goes to education fund; local option goes to administrative fees, towns with local option tax, and state PILOT special fund) <sup>‡‡</sup>
Washington	Majority to health-related programs, including the Department of Health, the basic health plan trust account, and the state health care authority; remainder to general fund and local governments <sup>§§</sup>

- \* Shannon Ballard, “Marijuana Money: How the State is Spending its Cannabis Cash,” KTVA, Dec. 7, 2018, <https://www.ktva.com/story/39609294/marijuana-money-how-the-state-is-spending-its-cannabis-cash>
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- § State of Maine, An Act to Implement a Regulatory Structure for Adult Use Marijuana (2018), <http://www.mainelegislature.org/legis/bills/getPDF.asp?paper=HP1199&item=4&snum=128>
- || Massachusetts Legislature, An Act to Ensure Safe Access to Marijuana (2017), <https://malegislature.gov/Laws/SessionLaws/Acts/2017/Chapter55>; Massachusetts Cannabis Advisory Board, “Overview of 2017 Law: Basic Summary,” <https://www.mass.gov/files/documents/2017/11/08/CannabisAdvisoryBoardOverviewof2017LawBasicSummary.pdf>
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- ‡‡ Governor’s Marijuana Advisory Commission, “Findings and Recommendations for Taxing and Regulating Adult-Use Marijuana in Vermont” (2018), [https://marijuanacommission.vermont.gov/sites/mc/files/doc\\_library/TR%20Report%20to%20MAC-Oct%202018-Draft.pdf](https://marijuanacommission.vermont.gov/sites/mc/files/doc_library/TR%20Report%20to%20MAC-Oct%202018-Draft.pdf)
- §§ Lance Carey, senior economist, Washington State Economic and Revenue Forecast Council, email to Alexandria Zhang, officer, The Pew Charitable Trusts, Oct. 29, 2018

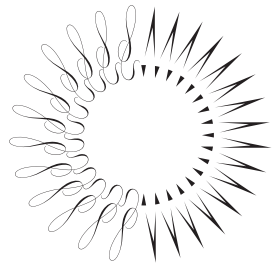
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## Endnotes

- 1 An 11th state, Illinois, legalized recreational marijuana in June 2019 but will not begin sales until Jan. 1, 2020.
- 2 State of Nevada Department of Taxation, "June Marijuana Revenue Statistics," news release, Aug. 28, 2018, <https://tax.nv.gov/uploadedFiles/taxnv.gov/Content/TaxLibrary/News-Release-June-Marijuana.pdf>; Legislative Analyst's Office, "California Economy and Taxes: Cannabis Tax Revenue Update," Nov. 15, 2018, <https://lao.ca.gov/LAOEconTax/Article/Detail/326>.
- 3 Josh Lehner (senior economist, Oregon Office of Economic Analysis), interview with The Pew Charitable Trusts, Sept. 25, 2018.
- 4 Oregon started with an "early sales" period from October 2015 through 2016 and did not do its first official forecast until May 2017.
- 5 Ken Alper (tax division director, Alaska Department of Revenue), interview with The Pew Charitable Trusts, Sept. 5, 2018.
- 6 Lehner interview.
- 7 Larson Silbaugh (principal economist, Colorado Legislative Council), interview with The Pew Charitable Trusts, Aug. 31, 2018.
- 8 Silbaugh interview.
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- 10 Lance Carey (senior economist, Washington State Economic and Revenue Forecast Council), interview with The Pew Charitable Trusts, Sept. 26, 2018.
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- 13 Silbaugh interview.
- 14 Kile Porter (deputy executive director, Nevada Department of Taxation), interview with The Pew Charitable Trusts, Sept. 13, 2018.
- 15 Silbaugh interview.
- 16 Silbaugh interview.
- 17 Irena Asmundson (chief economist, California Department of Finance), interview with The Pew Charitable Trusts, Aug. 29, 2018.
- 18 Lehner interview.
- 19 Silbaugh interview.
- 20 Alper interview.
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- 23 Silbaugh interview.
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- 28 Silbaugh interview.
- 29 Silbaugh interview.







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