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CSTE

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CSTE MARIJUANA SURVEILLANCE

Environmental Scan Report 2018

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Executive Summary

Multiple states have acted to legalize marijuana (cannabis) for non-medical use through voter initiatives, beginning with Colorado and Washington in 2012, followed by Alaska and Oregon in 2014, and California, Maine, Massachusetts and Nevada in 2016. Considering potential public health effects, there is clear need to monitor population-based marijuana use behaviors and related outcomes. The Council of State and Territorial Epidemiologists (CSTE) is a professional organization that works to improve capacity and quality of useful public health data; the Marijuana Subcommittee is a subgroup specifically working to improve practices around marijuana-related public health data. The CSTE Marijuana Subcommittee conducted this study to summarize what states are currently monitoring, and document the experiences and recommendations from legalized states as they implement public health surveillance systems.

Key informant interviews were conducted in mid-2018 with staff leading marijuana surveillance efforts in the first eight states to fully legalize non-medical marijuana to gather more information about their experience and recommendations for other entities. These states also completed an assessment describing what data sources they were using or planned to use to monitor marijuana-related measures, and their capacity for marijuana surveillance.

Most of the legalized states (6 of 8) had some type of legislative requirement to formally report on marijuana-related public health data, but only 4 had legislative requirements to fund marijuana surveillance. The states each indicated using between 12-21 data sources for monitoring. All of the states were using existing surveillance systems to capture information about marijuana use, such as established school-based youth risk behavior surveys that already included marijuana use questions, and several had added marijuana questions their state Behavioral Risk Factor Surveillance System (BRFSS). States were also using other existing datasets to describe marijuana-related health outcomes, most commonly from poison control and syndromic surveillance or emergency department datasets. Six of the legalized states had published at least one public report on marijuana-related data.

Most states said they had little time or funding for conceptualizing and planning surveillance systems prior to legalization and implementation of retail sales. As a result, existing data systems have been a key resource. These leading states have relied extensively on each other for support, particularly during early planning stages. Surveillance data have been critical for monitoring the impact of legislative changes and need for public health responses; several of the states said that data were being actively used to shape and modify state or local policies and inform program planning. Participants also noted that they have had to spend time reviewing literature to identify appropriate health effects to monitor, and that there are gaps in evidence about health effects which complicates data analysis and reporting.

Monitoring public health impacts of marijuana legalizations requires cross-cutting collaborations among numerous partners and structures that may not exist in that jurisdiction. States legalizing marijuana have overcome multiple barriers to quickly mobilize, including leveraging existing data systems and developing partnerships, to efficiently monitor marijuana-related behaviors and health outcomes. The resulting information has proven valuable to policymakers and public health systems. Future entities considering major marijuana policy changes should endeavor to dedicate resources and allow time for effective public health surveillance efforts.

Background

Expanding legalization or liberalization of laws around marijuana has increased the urgency of establishing quality surveillance systems to monitor marijuana use and its impact on the health of individuals and communities. Many states have legalized marijuana possession, use, and sales for medical purposes, or decriminalized possession of small amounts. Colorado and Washington were the first to legalize retail (non-medical, or recreational) marijuana through voter initiatives in 2012, followed by Oregon and Alaska in 2014, and California, Massachusetts, Maine, and Nevada in 2016. Vermont was the first state to legalize by legislation rather than voter initiative, becoming the ninth legalized state in 2018. Federally, marijuana remains illegal and is classified as a Schedule 1 drug – the class of drugs with no recognized medicinal value and high potential for abuse – which places limitations on research.

In 2017, the Council of State and Territorial Epidemiologists (CSTE) Marijuana Subcommittee conducted an *environmental scan*, an assessment to better understand current state-level surveillance activities and reporting requirements, surveillance capacity and needs, and the data sources being used to monitor use and impact on public health. This scan also sought to identify strengths and lessons learned that could be shared among states that have legalized retail or medical marijuana or are contemplating doing so, to identify gaps and needs where CSTE and other public health partners could potentially assist.

Thirty-five states provided information as part of the environmental scan, which was conducted via an on-line questionnaire. All four “early adopters” that had legalized retail sales between 2012 and 2014 responded to the scan (Colorado - CO, Oregon - OR, Washington - WA, and Alaska - AK), as did all four of the “recent adopters” that had legalized sales in 2016 (Massachusetts, Maine, Nevada and California). Thirteen of 22 states (Arkansas, Connecticut, Delaware, Georgia, Hawaii, Michigan, Minnesota, Mississippi, Montana, New Hampshire, New Mexico, North Dakota, Vermont) with legalized medical marijuana sales also responded (68%), as did 14 of 20 states (Alabama, Idaho, Iowa, Kentucky, Nebraska, North Carolina, Oklahoma, South Carolina, South Dakota, Tennessee, Utah, Virginia, Wisconsin, Wyoming) which had no policies on either decriminalization or medical use (70%). Results have been summarized in the 2017 report, but key findings included:

- Most of the early and recent adopter legalized states had mandates or agency commitments to report on marijuana-related data and more than half of medical legalized states had some mandate or commitment to report as well. In contrast, less than 10% of states with no policy had such mandates or commitments.
- Most of the early and recent adopter legalized states had some form of capacity for surveillance in place, such as dedicated staff, funding mandate, or surveillance workgroups. Capacity was lower in medical legalized states, and only one state with no policy had any dedicated capacity.
- All the legalized states were using Behavioral Risk Factor Surveillance Systems (BRFSS), school-based risk behavior surveys, and most were using the Pregnancy Risk Assessment Monitoring System (PRAMS) to monitor marijuana use and related risk factors. Most states with medical legalized marijuana use and states with no policy were also using school-based surveys, but fewer of these were using the optional BRFSS marijuana module and PRAMS.
- Other key data systems being used by many of the legalized retail sales states, but fewer other states, were syndromic surveillance, hospital discharge and poison control center data. Many of the legalized sales states had augmented their surveillance capacity with novel complementary surveillance activities.

In 2018, to further inform the CSTE Marijuana Subcommittee’s plans and activities in supporting effective state-level marijuana surveillance, CSTE commissioned a second assessment project as a followup to the environmental scan. This project was designed to build on the 2017 environmental scan results by collecting more information about surveillance implementation experiences among the eight early and recent adopter states. The purpose was to further understand state-level data collection activities, surveillance capacity, and their gaps and needs related to surveillance of marijuana use and health consequences.

Assessment procedures were designed with the following objectives:

1. Investigate perceptions of how effectively surveillance has been used to inform public policy or public health practice.
 - a. Identify examples of how surveillance or other marijuana data collection has been used in the past, or currently, to inform specific policy decisions or program planning.
 - b. Identify examples of how surveillance or data collection is planned to inform future policy decisions.
 - c. Summarize strengths, weaknesses, and lessons learned by states regarding marijuana-related surveillance or other data collection.
2. Describe the content of surveillance or data reports that have been published by states.
3. Provide recommendations to address marijuana-related data gaps and needs.

Methods

This project integrated three data collection approaches to provide a comprehensive view of surveillance implementation within the first eight states to legalize retail marijuana.

1. Update 2017 Environmental Scan quantitative findings

To develop a comprehensive update of state-level activities in the early and recent adopter states, an Excel spreadsheet was developed for each of the eight states that contained the answers from the 2017 Environmental Scan on the following topics:

1. Reporting mandates
2. Staffing levels
3. Sources of funding
4. Use of existing data sources
5. Use of event-based data collection systems
6. Use of event- or case-based reporting
7. Research activities

The spreadsheet contained a second column for health departments to report the 2018 status of each variable, with the options of “no change”, “yes”, “no”, and “don’t know”. For example, a state that had added a specific data source such as PRAMS in 2018 would respond “yes”, while if a data source had been dropped, the response was “no”. For open-ended questions such as number of FTEs or other data sources, respondents were asked to briefly describe the changes that had occurred (Appendix 1). The form was emailed to state coordinators identified by the CSTE Marijuana Subcommittee in early June 2018. 100% of both the early and late adopter states responded to the request for updates.

2. Review content of published surveillance reports

All reports published by the eight first states to legalize retail marijuana were examined in mid-2018, and key data sources and details of the information collected were abstracted for each report. Abstraction was limited to states with formal published reports or detailed pdf documents on the health department website.

3. Qualitative data on perceptions regarding surveillance use for policy and practice

To investigate perceptions about how effectively surveillance has been used to inform public policy or public health practice, a series of open-ended questions was developed covering the following:

- How marijuana surveillance and data collection were initially conceptualized, planned, and designed to inform policy decisions and whether a formal plan exists
- How the data have been used for policy use, how they are currently being used, and plans for future use
- The elements of the design and data collection perceived to be most important in reporting to policymakers
- The most frequent data requests received from policy makers
- Lessons learned about marijuana surveillance and data collection that they wished to share with other states.

The data collection instrument was developed in consultation with a qualitative researcher and reviewed by the CSTE Marijuana Subcommittee leadership. It was sent in Qualtrics™ format to the same coordinators who were asked to complete the 2018 update of surveillance activities. For those who did not respond within the deadline, the option was provided of a telephone interview. Of the 8 state coordinators, 5 responded to the questions in written format, two were interviewed over the telephone, and one provided partial responses via e-mail.

Qualitative methods were used to analyze the data from the qualitative instrument. Responses were coded and grouped thematically by the CSTE consultant and quotations illustrative of key themes were selected for inclusion.

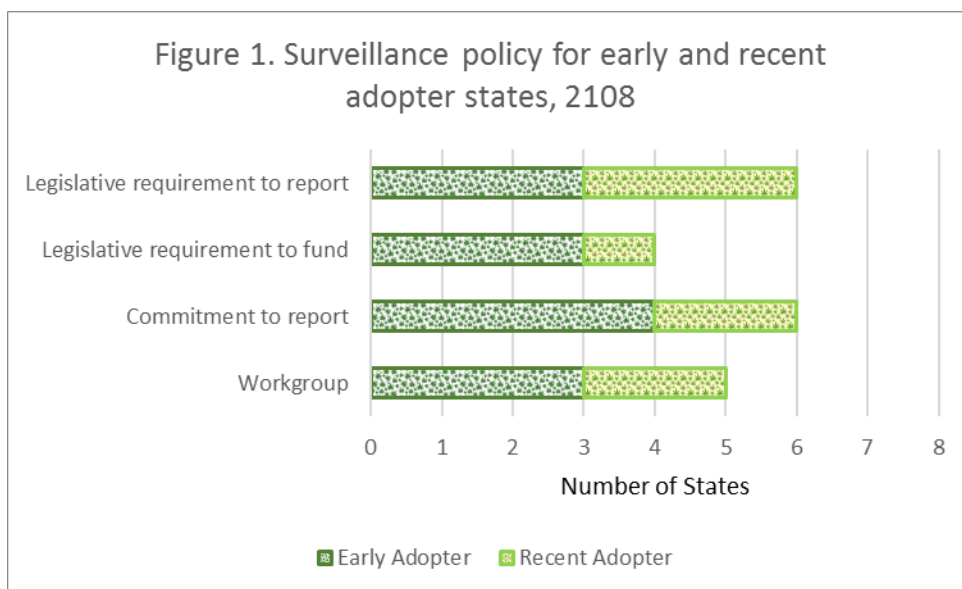
Results

1. Quantitative survey of surveillance capacity

Reporting requirements and commitments

The frequency of legislative requirements for reporting marijuana-related data is shown in Figure 1. Three of the four early adopter states have a legal mandate to report as part of policy or rule-making, as do three of the four recent adopters. Legislative reporting mandates include comprehensive literature or data reviews, baseline or pilot studies, and health impact assessments, although in some states, impact data was limited to sub-populations such as youth. In some of the states, report content was not clearly specified.

Reporting frequency was specified for four of the six. In two, the frequency was annual, in the third it was biennial, and in the fourth there was to be a baseline plus monthly reports of user numbers.



Retail marijuana sales legalized in early adopter states between 2012-2014 (CO, WA, OR, AK); sales legalized in recent adopter states in 2016 (CA, MA, ME, NV).

Requirement to fund marijuana surveillance activities and sources of funds

A total of three early adopter and one recent adopter have a state mandate to fund surveillance activities, although in some cases funding is limited to surveillance for specific groups such as youth. In states with no funding mandate, most have obtained funding to support surveillance activities from a variety of sources including cardholder fees, marijuana taxes/excise tax, medical use trust funds, and program funds. However, funding is not permanent in some of the states.

Other health department commitments to report

In terms of other commitments health departments have made to report, all four of the early adopters had commitments in 2018, up from three in 2017. Among the recent adopters, two of the four had such commitments (Figure 1). In most states, the commitments to report made by the health department or other reporting agency contained a broader and more detailed range of content than the legislative requirements to report.

Working groups

Of the early adopter states, all four initially had working groups to assist in the design of data collection and surveillance and, in some cases, legislatively mandated literature reviews on the health effects of marijuana. However, by 2018, the working group in one was no longer active. Among the recent adopters, two had working groups, but by 2018, only one still had an active working group (Figure 1).

Requirement to fund marijuana surveillance activities and sources of funds

A total of three early adopter and one recent adopter states have a mandate to fund surveillance activities. Sources include cardholder fees, marijuana taxes/excise tax, and an education and treatment fund based on marijuana excise taxes that also mandates surveillance. In some states, however, funding is not permanent. Even if there is no mandate for funding, states have managed to find funding to support surveillance activities, although in some cases, support is limited to surveillance in specific groups such as youth.

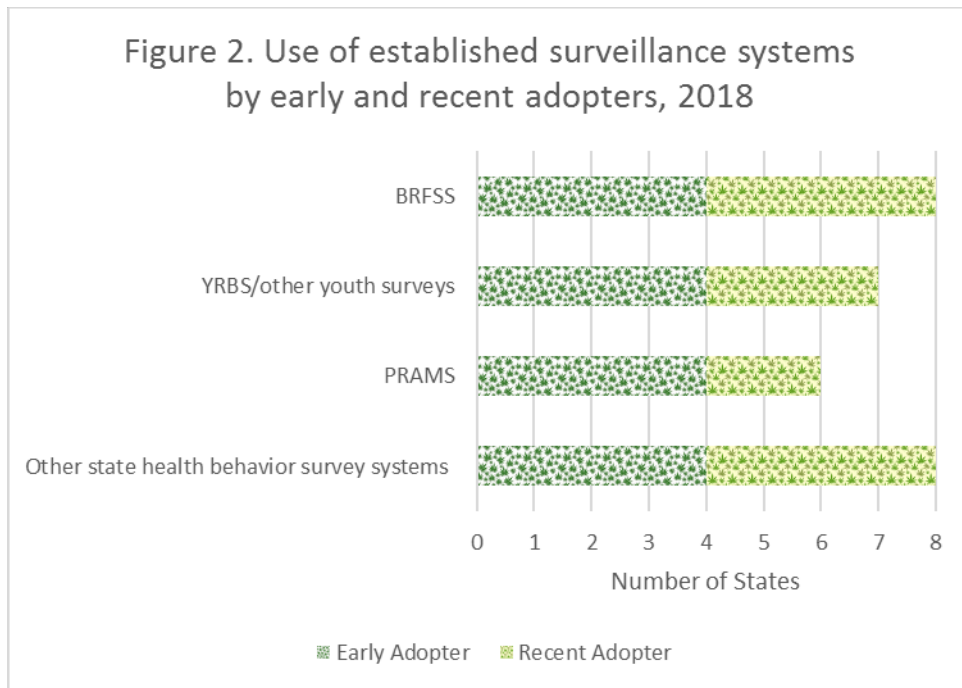
Current positions

In 2018, the number of FTEs per state in the early adopter states ranged from 0.25 to four, while in the recent adopter states, the numbers ranged from zero to two. Six of the 8 had ≤ 1 FTE, and in five of the 8, there was no increase in FTEs between 2017 and 2018.

Data sources

Use of established surveillance systems

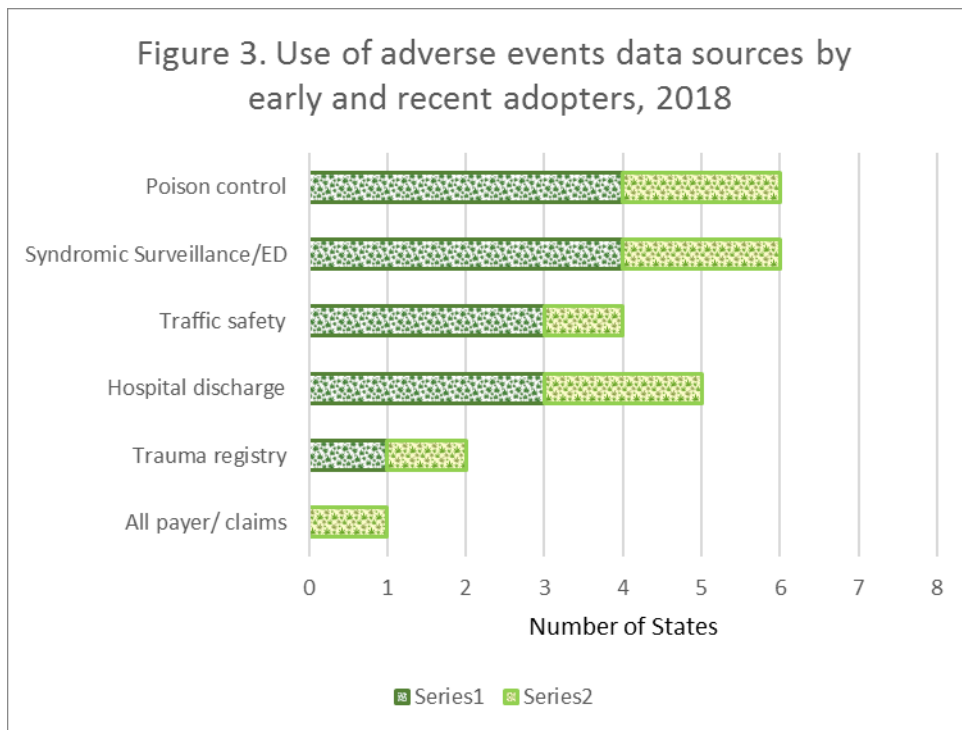
The data sources used by early and recent adopter states are shown in Figure 2. Among the early adopter states, one added PRAMS between 2017 and 2018, one added BRFSS, and one added other state behavioral surveys. Thus, in 2018, all four early adopter states are using the BRFSS, YRBS or their state-sponsored school-based youth risk behavior survey version, PRAMS, and other population-based state behavioral surveys. Among the recent adopter states, all four used the BRFSS and other surveys, while three used YRBS and two used PRAMS. For the three recent adopter states for which data was available in both 2017 and 2018, no changes were noted.



Retail marijuana sales legalized in early adopter states between 2012-2014 (CO, WA, OR, AK); sales legalized in recent adopter states in 2016 (CA, MA, ME, NV).

Use of existing adverse events monitoring systems

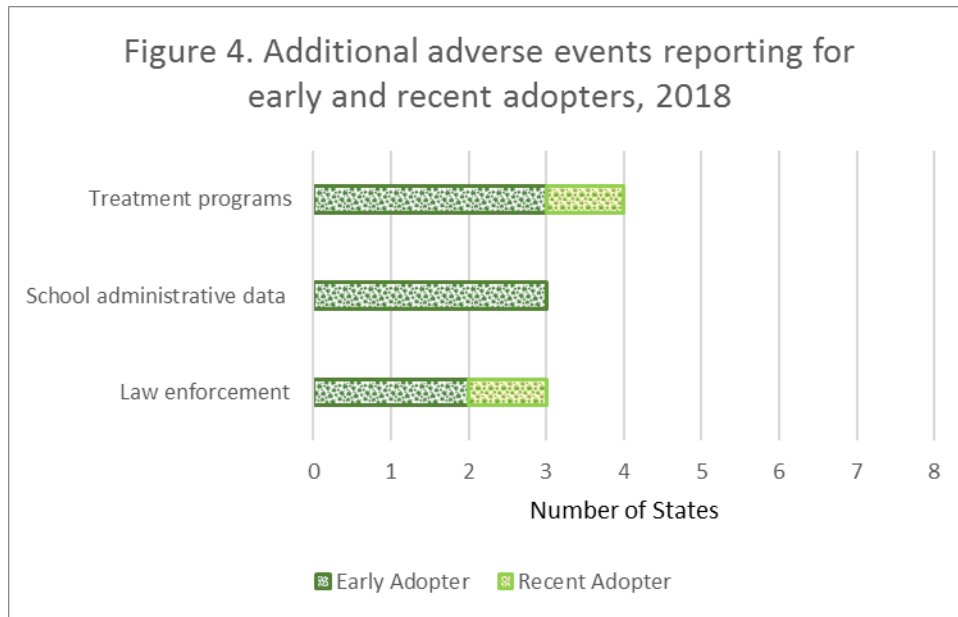
Use of existing systems for measuring morbidity and mortality are shown in Figure 3. Among early adopters, poison control center data and syndromic surveillance/ED visits are used by all four, traffic safety data (primarily the Fatality Analysis Reporting System known as FARS) are used by three, and trauma registries by one. Two of the four recent adopters use poison control, syndromic surveillance/ED visits, and hospital discharge data, while one each use traffic safety, trauma registries, and all payer/claims data. Of note, between 2017 and 2018, one early and one recent adopter dropped all payer/claims data and one of the recent adopters dropped the trauma registry as data sources. For the all payer/claims data, one of the states reported that the data were difficult to use; they also noted difficulties with access and/or data interpretation for traffic safety sources and trauma registries.



Retail marijuana sales legalized in early adopter states between 2012-2014 (CO, WA, OR, AK); sales legalized in recent adopter states in 2016 (CA, MA, ME, NV).

Use of additional adverse events monitoring systems

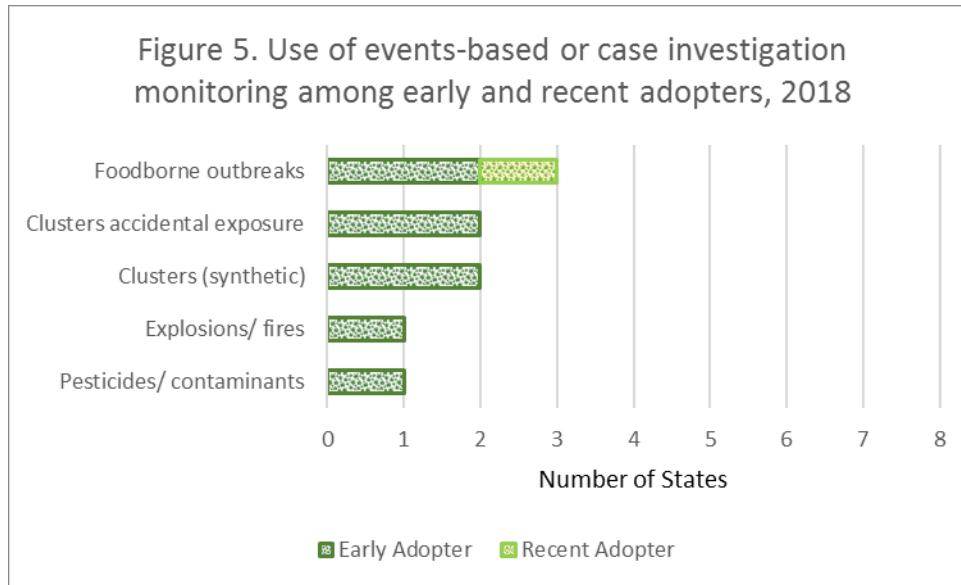
Other systems to monitor adverse events, including marijuana dependence or addiction treatment program admissions, arrests or other criminal justice data from law enforcement sources, and educational system data such as graduation rates, attendance, and discipline incidents, are being used by at least half of the early adopters but are less frequently used by recent adopters. Of the four early adopters, three use treatment program and school data and two use law enforcement data. Among the recent adopters, only one uses treatment program and one uses law enforcement data as part of their surveillance efforts. Use was stable between 2017 and 2018 for early adopters, but one recent adopter added treatment data to the state’s surveillance portfolio.



Retail marijuana sales legalized in early adopter states between 2012-2014 (CO, WA, OR, AK); sales legalized in recent adopter states in 2016 (CA, MA, ME, NV).

Use of event-based or case investigation monitoring systems

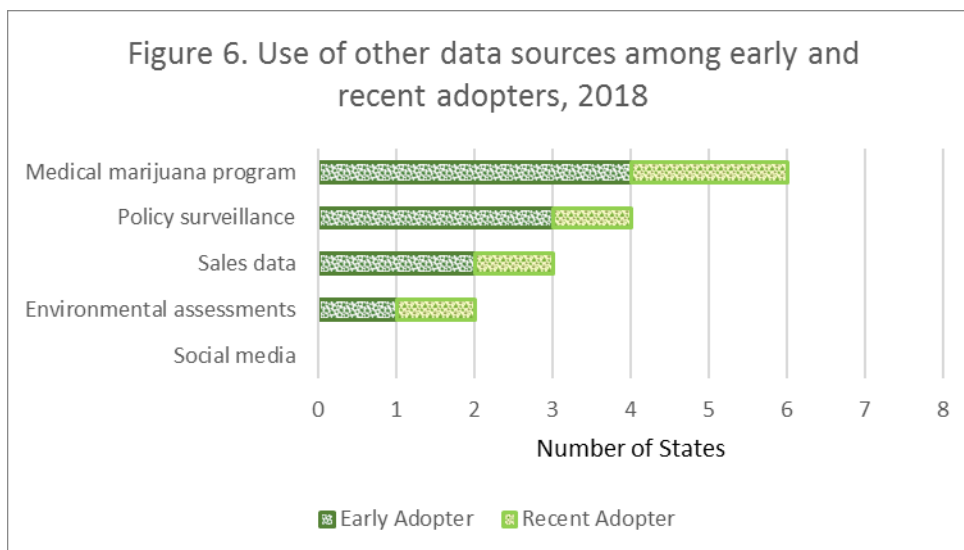
As shown in Figure 5, two or fewer of the four early adopter states and one or fewer of the recent adopter states are conducting surveillance of events such as foodborne outbreaks linked to marijuana edibles, pesticide poisonings, clusters of accidental exposures to marijuana, clusters of poisoning from synthetic products, and explosions or fires associated with unsafe marijuana processing. These numbers are essentially unchanged from 2017, although states in both groups reported that they are considering using at least some of these sources in the future.



Retail marijuana sales legalized in early adopter states between 2012-2014 (CO, WA, OR, AK); sales legalized in recent adopter states in 2016 (CA, MA, ME, NV).

Use of other policy and administrative sources

States were also asked about use of policy and administrative data sources, including patient and provider data for medical marijuana users; policy surveillance of local efforts to regulate or limit marijuana business activity and law enforcement and taxation policies; marijuana sales data; environmental assessments of advertising; and social media monitoring. Results are shown in Figure 6.



Retail marijuana sales legalized in early adopter states between 2012-2014 (CO, WA, OR, AK); sales legalized in recent adopter states in 2016 (CA, MA, ME, NV).

All four early adopters are using medical marijuana program data and three are using policy surveillance data, as shown in Figure 6. Less commonly they use sales data and environmental assessments, and none report using social media. Among the recent adopters, the number of states using these methods ranged from zero for social media to two for medical program data. Some recent adopter states and early adopter states stated that they plan on using some of the sources in the next two years or are considering using them in the future.

Innovative surveillance sources

States are using a variety of additional sources for marijuana surveillance. Some involve existing data sets, including review of death certificates and coroner and medical examiner records, ambulance trip records, and motor vehicle crash data. Others have added questions to state-based data collection systems such as young adult and 5th grade elementary school student surveys, adult and youth tobacco surveys, sexually transmitted infection surveillance, risk factor surveillance of persons living with HIV/AIDS and at risk of HIV/AIDS and online surveys using a vendor-supplied panel of respondents. Another approach has been to call back parents of young children to ascertain practices in the home including marijuana storage. Finally, user surveys have been conducted on-line and in person at sites such as farmers' markets and festivals (one state), by contacting BRFSS respondents who reported marijuana use (one state) or by contacting registered medical marijuana users (one state).

Overall number of sources used

States vary in the number of data sources they are currently using. Among the early adopters, the number in 2018 ranges from 12 to 21, which was down from 13 to 22 in 2017. For the three recent

adopters with data available for both 2018 and 2017, the corresponding range was 6 to 12. The numbers do not tell the entire story, however, since the use of some sources, such as claims/all payer data and trauma registries have been abandoned by one early and one recent adopter state as noted earlier, and other sources have been added.

Surveillance-related research activities

Research topics reported by the eight states included assessing marijuana prevention media reach and effectiveness among adolescents, the health impact associated with local policies and markets, marijuana-associated signs and symptoms reported by poison control centers, patient biomonitoring and use recording, and location and penetration of advertising.

2. Analysis of existing reports

Overall, all the early adopter and two of the four recent adopter states have issued at least one formal report describing marijuana use and/or related outcomes. Three of the early adopter states have each issued two substantive reports, and one of the three has subsequently released three shorter two-page fact sheets. The length of the reports issued to date range from 12 pages to over 300 pages. Contents of published reports are summarized in Table 1.

Table 1. Contents of publicly-available marijuana surveillance reports by adopter status

	Early adopters (2012-14) (CO, WA, OR, AK)	Recent adopters (2016) (CA*, MA, ME, NV*)
Number issuing at least one formal report	CO (2), AK, OR (2) WA (2)	MA, ME
Contents (formal reports only)		
Literature review of health effects	CO	
Description and timeline of legislation	OR, WA	
Surveillance legislative mandate	CO	MA
Number and location of dispensaries; mapping of county-specific laws	OR, WA	
Retail sales data	WA	
Prevalence of youth use and characteristics of users	CO, AK, OR, WA	ME
Prevalence of adult use and characteristics of users	CO, AK, OR, WA	MA, ME
Prevalence of pregnant and lactating women use and characteristics of users	CO, OR	
Marijuana in homes with children	CO	
Youth substance abuse (comparison with tobacco, EtOH)	CO, OR	ME
Adult substance abuse (e.g., comparison with tobacco, binge drinking, use of other drugs)	CO	ME
Medical marijuana user characteristics	OR	MA
Medical marijuana administrative data (e.g., card applications, medical prescribers, producers)	AK, OR	
Youth knowledge and attitudes	CO, AK, OR, WA	ME
Adult knowledge and attitudes	CO, AK, OR, WA	MA, ME
Morbidity, including poison control center, hospital discharge, and syndromic/ED data; unintended consequences	CO, AK, OR, WA	MA
Marijuana-involved crashes/DUI	WA	MA
Mortality (including traffic fatality data)	OR, WA	
Treatment program data	WA	MA, ME
Marijuana-related crimes	OR, WA	ME
School-based data (e.g., expulsions)	WA	
Economic impact		MA

*at the time of this report, no publicly available reports for review were identified from these states

Five of the 6 available reports are marijuana-specific; the remaining report is included in a broader state report on drug abuse. One of the states that had already published two formal reports has recently added an interactive website, and at least one other state has indicated an interest in doing so. Among the recent adopter states that have not yet issued reports, some data can be found on their department websites, although these data are not always current.

3. Qualitative findings on perceptions

Respondents

Coordinators from two of the four early adopter states provided written responses to the open-ended questions, one was interviewed, and one submitted e-mail responses on some of the questions based on input from multiple team members. Coordinators from three of the four recent adopter states provided written responses, and a phone interview was conducted with the fourth.

Surveillance conceptualization, planning, and design

Respondents were asked, “Describe how your state's surveillance or data collection was initially conceptualized, planned, and designed to inform policy decisions. Also, please share if there is a formal plan in place now or not.” According to those contacted, most had little time for conceptualizing, planning, and designing a full system prior to legalization of retail sales. In most, the planning process has happened in a more organic fashion, and few have formalized surveillance plans. A variety of obstacles contributed to the difficulties in conceptualizing, planning, and designing surveillance in several of the states, including the more peripheral role of health considerations in the legalization process, the short time between legalization and implementation, and the lack of initial funding to conduct surveillance planning.

With respect to the more peripheral role of health considerations, legalization of retail marijuana can offer a substantial potential boost to state coffers from taxes on retail sales. In some states, responsibility for implementing the sales and monitoring legal retail marijuana rested with taxation boards or other entities besides the health department. As a result, having a “seat at the table” to ensure that health monitoring was funded and given high priority was neither easy nor automatic.

A second obstacle was a lack of time between legalization and initiation of sales to adequately organize baseline data collection. This was especially true in states that adopted retail sales in the first years before marijuana use questions had been added to national behavioral surveillance systems such as the BRFSS. Lack of such baseline data complicated assessment of the changes in use and attitudes following implementation of legalized retail sales.

A third initial obstacle was the lack of funding for planning, data collection and analysis. In some cases, funding was identified based on taxes from sales that took time to generate. The lack of funding affected the availability of human resources to coordinate planning for data collection among stakeholders, and some of the states did not have additional funding to finance the optional BRFSS marijuana module.

Initial surveillance in most states has been based on existing and readily available national surveillance systems. States have also turned to other ongoing data collection systems in their states, such as poison control centers and the criminal justice system. States with more limited human resources have resorted to the use of opportunistic data, arising from sources such as ad hoc studies done by universities, to provide stimulus and input for public information messages.

Recent adopter states reported the important role that CDC Foundation staff and their peers in other states have played in initially planning their surveillance activities. Surveillance systems are not strictly replicable from state to state because of differences in legislation, the locus of retail marijuana surveillance, and the human and financial resources available. However, the generosity of the early adopter states in sharing materials and providing site visits and advice was mentioned by recent adopters as important in the initial stages of surveillance design.

Data collection, especially in the early adopter states, has expanded over time as additional data are needed to better develop and target public health messages and funding has been obtained. For example, in some of the early adopter states, marijuana surveillance activities now include active data collection on groups such as users that are not readily available from the existing surveillance systems or where data may be available but the number of users in the sample may be too small to draw valid conclusions.

Few of the states have a formal strategic plan since their marijuana surveillance systems continue to rapidly evolve. In terms of planning, however, workgroups appeared to play an important role in some states, at least in the initial planning process. One early adopter state, which does not yet have a strategic plan, reported its approach as focusing on the basic descriptive epidemiology of time, place, and person to describe characteristics and behaviors of use and the consequences of use. Tobacco surveillance is a useful model to identify data systems and approaches, although one respondent emphasized the importance of planning data collection not only on potential adverse effects but also more positive outcomes such as reduced arrests.

Use of data for policy and planning

States were asked to respond to the following two questions: *Describe examples of how surveillance or other marijuana data collection has been used in the past (completed processes) to inform specific policy decisions or program planning for your state* and *Describe examples of how surveillance or other marijuana data collection are currently being used to inform specific policy decisions or program planning for your state*. Because responses to both elicited similar responses, the key ideas are presented together.

In several of the states, respondents reported that data are being actively used to shape and modify policy at state and municipal level, to inform health department planning, to develop and monitor the effectiveness of media campaigns and public health interventions such as school-based programs, and to encourage comprehensive prevention programming. They are also being used to advocate for health department funding for surveillance efforts, and in one state, the development of a reference laboratory. At present, data use is understandably more comprehensive in early adopter states, which now have a substantial body of surveillance data and can now examine trends following legalization.

Among recent adopters, surveillance data, especially that from other states, has also played a role in policy decisions and planning. Unlike some of the early adopter states, which relied on extensive literature reviews to assist their legislatures in policy development, recent adopters have benefitted from the surveillance activities of the early adopters in informing policy and planning in their states.

Surveillance data on use have provided an essential means of monitoring the effectiveness of legislation, information campaigns, and prevention programs. For example, many states have witnessed a decrease in age at initiation of marijuana use among students and some increased acceptance of its use. This has

spurred the development of information campaigns and school-based intervention programs, and in one state, such data was combined with other available data on youth connectedness and after school programming to influence passage of comprehensive marijuana education and treatment fund.

Data on adverse events has also driven policy. Poison control reports of adverse events among children and adults who have consumed edible marijuana have led to legislative action to create safe packaging that is less attractive to children and limit recommended serving and portion sizes.

These data are, and have been, used to monitor the impact of marijuana legalization on trends in marijuana use, develop educational materials and media on the health effects of marijuana, and inform efforts to impact knowledge, attitudes, and beliefs among ... adults. Often, we receive data requests from other states who have legalized marijuana who are wanting to draw comparisons, so having these data readily available to share with partners will allow [our department] to maintain strong partnerships with other states. Finally, having up-to-date and relevant data to share with policy-makers to demonstrate evidence of need for comprehensive prevention programming is vital. – Respondent, early adopter state

Most frequently requested data

States were asked *What specific elements of the design and data collection are most requested in required reports, and on an ad hoc basis to policymakers?*

As noted in the quantitative portion of this report, few state laws have provided detailed description of proposed content of required reports, though when they have, they often call for literature reviews of health effects and data on trends in use broken down by demographic characteristics and geographic subunits and adverse events.

One of the state respondents reported that there is considerable interest in marijuana surveillance data on the part of governmental officials to keep the marijuana industry “in check” in the absence of federal regulations. Overall, however, most report that *ad hoc* solicitation of data by policy makers is a relatively rare occurrence. According to some respondents, the limited number of queries in part appears to be related to certain unique characteristics of retail marijuana, with public health considerations playing a secondary role in policy decisions and a reluctance to damage business interests and the flow of money from taxes into state coffers. The substantial financial benefits from taxation are reportedly a more forceful driver than concerns over adverse events, especially in states with no sales tax or state income tax and where funds are being used for popular but chronically underfunded programs such as education. One of the states reported that interest in data on potential health effects may be affected by political campaigns of incumbent officials. States in which legislatures meet only every other year and have full agendas when they do meet also seem to have less interest in surveillance data. In the face of this relative indifference, some states have taken, or are hoping to take, a more pro-active role in sharing findings and collaborating with legislative bodies.

When queries do occur, the most common areas of focus have been:

- 1) Trends and changes in adult and youth use, characteristics of users after retail legalization
- 2) Details on youth use and prevention measures
- 3) Use by pregnant and lactating women
- 4) Potential exposure of infants and children

- 5) Effects on children, especially poisonings
- 6) Healthcare utilization and consequences
- 7) Effects on impaired driving, traffic accidents and fatalities.

Additionally, respondents report receiving queries about the effects of advertising on youth, best practices in youth prevention, sales data, and economic impact.

Most important elements of design and data collection

Respondents were asked: *What specific elements of the design and data collection do you believe are most important in required reports to policymakers?*

Themes emerged around four issues: 1) content and criteria for determining content of reporting, 2) technical data collection and quality issues, 3) the importance of careful and nuanced data interpretation and 4) presentation of data in an appropriate format for the intended audience.

In terms of content, a repeated theme was the particular importance of youth surveillance, not only in terms of numbers of users but also age at initiation, driving under the influence, changes in perception of harm, and the use of marijuana within the context of other behaviors such as smoking and drinking. Data on pregnant women and adult trends were also considered as core elements. Having data at the level of cities and counties was also deemed important.

Several states have put substantial thought into selecting appropriate data indicators, and based on the analysis of report content described earlier in this document, some sources that would seem highly promising such as all payer and claim data have not proven easy to use or interpret.

The [Department] has identified criteria for selecting data indicators useful for monitoring the change in cannabis law. The criteria include relevance to cannabis use, risk and protective factors, and consequences; validity demonstrated in prior research; regular data collection and production, among others; data employs standard, accepted measures; is already in use in other states and federal data systems; includes all or a representative sample of [state residents]; allows analysis of subgroups; and allows analysis within... counties. – Respondent, recent adopter state

The importance of data quality was mentioned by some states and includes considerations of adequate sample size and power in surveillance systems and surveys. Because of potential political polarization around retail marijuana legalization, proactively providing appropriate data interpretations and making readers aware of data limitations are also essential:

Only data collected from studies that used validated scientific methods should be used in reports to policy makers. Sample size and power should also be sufficient to be included... Data limitations... need to be spelled out and clearly communicated. It also helpful to state when data can and cannot be compared to other data, and why. Policy makers have been deterred in the past by inferior survey results that differ from results of superior surveys.
- Respondent, early adopter state

Respondents also underlined the importance of providing a nuanced and balanced view that takes into account that marijuana use, unlike cigarette smoking and abuse of other substances such as opioids, may have some positive health and societal benefits such as decreased arrests. The importance of a

holistic view of the effects of retail marijuana on communities was also mentioned. Without balance, there is the risk of alienating audiences, and especially until more data are accumulated, negative “reefer madness” messaging may be counterproductive. Some states have instead focused on harm reduction messages such as delaying initiation of first use among teenagers or emphasizing safe driving practices after consumption

It is of the utmost importance that data are correctly and objectively interpreted and properly translated into common language for required reports for policymakers. Data results have been inappropriately misinterpreted by others outside public health, which can cause confusion and potentially mislead policy makers. - Respondent, early adopter state

Trust enforces data, and [we need to]be objective so people will continue to look at public health data and evidence-based prevention..[If] we are seen as [believing] either the sky is falling because now everyone is using a substance or alternatively it doesn't matter because people are not smoking that much no one has died of THC--if we [are seen as] too partisan, we won't be trusted. - Respondent, early adopter state

Finally, some states emphasized the importance of how the data are presented. While detailed and lengthy initial reports add to scientific credibility, some of the early adopter states report moving toward shorter and more focused communication through fact sheets on specific topics such as youth and adverse events, or to readily accessible interactive online data.

Elements which make this data easy to understand and which are visually pleasing are important to policy makers and the general public (e.g. colorful bar graphs and pie charts). Executive summaries and one pagers for more detailed reports are also requested. - Respondent, early adopter state

Future directions for surveillance

Respondents were asked: *Describe examples of future plans for using surveillance or other marijuana data collection to inform specific policy decisions or program planning in your state.*

The focus of many of the recent adopters was on establishing basic data collection systems and adding appropriate and detailed questions to national and state-level surveillance systems. An area of particular interest is adding questions to better understand the current modes of use, including dabbing, vaping, and others.

The early adopters continue to refine the questions asked on existing surveys, but some are also exploring additional sources of data to further define and appropriately target public health and prevention messages. One state is adding questions on marijuana to a prospective cohort study of pregnant women that will follow these women and their offspring to better understand use in women during and after their pregnancies. Exploring different data sources to create a more comprehensive picture of the magnitude and severity of adverse events was also mentioned. Increasingly, focus groups and other qualitative methods are planned to further explore the reasons behind the numbers, especially among youth, to better direct prevention efforts. Such methods are also being used to test public health messages prior to their widespread release.

Lessons learned

Respondents were asked, *What lessons would you like to share with other states based on your experiences with marijuana-related surveillance or other data collection?*

States provided thoughtful and thorough recommendations on lessons learned, as detailed below.

The importance of planning for surveillance prior to implementation of the law was mentioned by virtually all states. The planning involves multiple components, including locating funding, identifying and establishing partnerships with other “data owners”, and determining where the responsibility rests for marijuana surveillance. Working with local jurisdictions to assess needs and activities is also an important early step. Strong initial coordination was also a strong recommendation:

Establish stable funding in place for public health surveillance around impacts of marijuana use prior to legalization. Build relationships with different departments or divisions collecting survey data or any potential marijuana data source. Determine what public health authority is in place to obtain marijuana-related data or information. -Respondent, early adopter state

...States should .. identify a high-level, data-savvy person who can lead and coordinate development of a surveillance plan that brings together people from across the public health agency (and outside agencies), and really seeks to inform public health policy & practice. There are so many data sources & most of the people working on them don't sit together, so having the point person be high-level is important. - Respondent, early adopter state

When determining what data sources will be included, some recommended making provisions to include the critical 18-26 year age group, which is not captured in the youth surveys and may be inadequately captured in the BRFSS. This is a critical age group in which to monitor behaviors and potential exposure of small children in their households. College students in this age group can be reached through college surveys, but surveying the non-college population is also important. Another consideration for inclusion in surveillance is tracking advertising, which has become nearly ubiquitous following legalization and may be playing an important role in attitudes and use.

Collecting baseline data as soon as possible was deemed essential. Respondents suggested identifying national and state data sources such as the BRFSS, YBRS, and PRAMS or their state equivalents, and ensuring that appropriate questions are included. Collecting such baseline data may provide critical information for developing policy after legalization. Using standardized questions across data collection systems is important to facilitate comparisons both within states and with other states. One suggestion was that if possible, extend baseline data from sources such as the YRBS to years prior to medical marijuana legalization. Changes may have already begun to take place at that juncture rather than only after legalized retail sales go into effect.

In states with serious limitations of funding and staff, one state suggested partnering with universities for data analysis and taking advantage of ad hoc studies going on within the state to gain attention to marijuana-related health issues.

Several states mentioned that the importance of high quality data. Adequate sample sizes are available to examine data by geographic subunits and subgroups within the population since use and effects may

not be uniform across the population. Data collection and analysis should be scientifically rigorous, and findings should be validated, where possible, using a variety of data sources.

In terms of disseminating results to maximize impact, one respondent suggested taking a more proactive approach by reporting on marijuana, alcohol, and drug use and prevention on a regular, consistent basis at state, city, and county level and by reaching out to audiences such as the Chamber of Commerce, and that such reporting could be strengthened if those working on prevention, treatment, and law enforcement could present together. Consideration might be given with these audiences of presenting not only the benefits of the tax revenue but also health and other costs associated with use.

[Such] increased, consistent education would hopefully build more understanding that prevention should be funded robustly along with enforcement and treatment... Changes in attitudes towards use matter.... So consistently sharing data around this with policy makers is important.

- Respondent, early adopter state

One respondent also suggested that consideration be given to how legalized retail marijuana sales are represented—not as recreational marijuana but as commercial marijuana or adult use.

Finally, being clear on the role of public health departments in providing fair and unbiased information is critical:

I will say that when many public health folks/ epidemiologists get confronted with a new controversial issue, it is often [like] “deer in the headlights”. And then we get very worried about not tripping up. But if we focus on our role as trusted, objective, evidence-based, population data-focused, non-partisan subject matter experts, that will serve us well in the longer run! - Respondent, early adopter state

Conclusions

The eight states that have adopted legalized retail marijuana sales have had widely varied experiences. The four states with legislation passed in 2016 appear to have greatly benefited from the experience of the four early adopter states, as well as the generosity of these early adopters in providing advice, and, in some cases, technical assistance.

For those states in which legalization is likely in the future, several clear messages emerged:

1. Plan as far ahead as possible

- a. Get a “seat at the table” early, preferably long before the legislation is passed. This will increase the likelihood that a mandate and a funding mechanism for surveillance will be included in the legislation. Although states have succeeded in getting funding after the initial law is passed, it requires considerable effort. When asking for funding, however, be aware that medical marijuana-associated funding may decline after legalization, and tax-based funding may be considerably delayed until the law goes into effect and taxes become available.
- b. Identify a high-level person who can advocate for a health department role and who will have convening power to assemble the many potential data providers not only in, but beyond the health department.
- c. If there is the opportunity to shape legislation, be as specific as possible in the reporting content and frequency. This will help not only with access to state data sources, but also may increase the likelihood of ongoing funding. Consider not only personnel costs, but also the costs of data collection (for example, for BRFSS, where the marijuana module is optional and requires additional funding, or user surveys).

2. Decide and prioritize what should initially be measured

- a. Consider what policy-makers are interested in (youth, pregnant women, poisonings, exposure of young children, traffic accidents and fatalities)
- b. Find out what baseline data are available, and advocate for the collection of additional data in national and state surveys, such as the BRFSS, where marijuana remains an optional module. Ideally, the baseline should include years prior to medical marijuana legalization because use and attitudes may have already begun to change.
- c. Think through relevance, validity, frequency, and availability, comparability with other states, analysis of subgroups and at county level
- d. Examine the data sources used by state tobacco and by alcohol programs, though be careful about approach and message
- e. Reach out to partners who have potentially useful and readily available data (Medicaid/Medicare, criminal justice system, department of education, etc.)

3. Don't reinvent the wheel

- a. Some state legislatures have requested literature reviews on the harmful effects of marijuana. Explore ways of building on and updating the excellent reviews done by other states. CSTE may be able to facilitate this contact.
- b. Use the recommended indicators, standard questions, and definitions being promulgated by CDC and CSTE. This will also facilitate temporal and interstate comparisons.
- c. Network with counterparts who have legalized retail marijuana to determine the data sources they have assembled and considerations in the analysis of the data. They may be

- willing to provide sample analysis plans and programs, although they may not be directly applicable since data systems may vary in their organization and software. This can also be facilitated by CSTE.
- d. Review the published state reports and fact sheets. They can provide useful ideas for the structure and organization as well as attractive means of presenting the data and developing summaries for policy-makers.
- 4. Maintain a strong emphasis on quality**
 - a. Inadequate sample sizes and poorly collected and analyzed data may lead to erroneous conclusions and contradictory findings. It will also complicate trend analysis since confidence intervals are likely to overlap.
 - b. Ensure that sample size is adequate to not only come up with global estimates but also for key population and geographic subgroups, which will help in future efforts to identify at-risk groups, develop targeted messages, and measure response. County-level data will also assist in engaging local officials and provide the opportunity for more granular monitoring.
 - c. Use caution with convenience samples and non-representative surveys. Especially if repeated over time, they may produce difficult-to-interpret findings, or findings that conflict with other data systems (e.g., cannabis use prevalence from a convenience sample vs. BRFSS).
 - 5. Don't wait for policymakers to come to you: seek them out**
 - a. Consider periodic short updates in a user-friendly format that presents not only data but also the key message(s) that emerge from the data. Although an initial detailed report is important for establishing scientific credibility, most will sit on the shelf.
 - b. Take opportunities to give presentations at state, city, and county levels and consider reaching out to the business community. This will likely increase trust and help ensure that the hard work being done will influence policy and elicit funding needed for key public health interventions and school-based strategies.
 - 6. Avoid "reefer madness" and focus on harm reduction messages.**
 - a. Although there are some alarming trends following legalization, remember that the audience may have a different perspective and that by alienating them, the health department's credibility may be undermined.
 - b. Maintain a more holistic perspective when interpreting data. Adolescence is a time of experimentation, and present data wherever possible on tobacco and alcohol use. Similarly, for adults, data on cigarette smoking and binge drinking provide useful comparison.
 - 7. Accept that there will be an evolutionary process.**
 - a. Start small with user data from national and/or state surveys for youth, adults, and, if possible, pregnant women plus poison control center data and ED and hospital discharge data.
 - b. Periodically evaluate the usefulness and difficulty of analyzing and interpreting the data
 - c. Add additional questions to behavioral surveys as the need becomes apparent, especially for monitoring interventions
 - d. Consider ad hoc surveys to collect additional information on recreational users employing one or more of the strategies used by the adopter states.

Data sources

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